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Goal-Directed Behavior

Edited by
Henk Aarts and Andrew J. Elliot



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Preface

Social psychology aims to understand, explain, and predict human behavior in its social context. One way to achieve this is by systematically observing people's behavior in their social surroundings and inferring from these observations the potential causes, processes, and consequences of human behavior. We all make such observations ourselves on a daily basis, and these observations sometimes lead us to conclude that the behavioral system responds to social situations by trial and error. Indeed, human behavior can be fairly unpredictable, and at times there seems to be no clear organizing principle behind the way the social environment animates the behaviors people display and perform.

Although human behavior sometimes appears to consist of a random selection of responses, often it does not. Our behavior is sensitive to learning, is influenced by past experiences, and tends to be organized and structured in the service of future action. Research in the tradition of behaviorism has shown that human behavior can emerge from rigid responses to stimuli that are reinforced by rewards. When chained together, such responses can form complicated patterns of action, setting one another off like a line of toppling dominos. According to this perspective, the environment organizes and determines human behavior.

Clearly the environment plays an important role in controlling behavior. However, acting on fixed stimulus-response rules—such as hitting a beeping alarm clock in the morning—is not the whole story. Our behavioral repertoire must be more adaptive and flexible in order to deal with the varying circumstances we encounter in everyday social life. Such flexibility relies on our capacity to represent mentally what we want and do and to direct behavior in line with these representations. Accordingly, contemporary cognitive approaches to human behavior propose that a substantial component of action is directed by goals that reliably control and motivate the behavioral system in a dynamic world.

The idea that our behavior is directed by goals appears to be well accepted by most contemporary researchers and theorists, but this was (and, in some instances, still is) not always the case. This dispute about the role of goals is rooted primarily in the cognitive revolution, in which there was little or no room for motivation and cognition was seen as the more parsimonious account for behavior. For instance, in the study of attributional reasoning, goals have been posited to lead people to make self-serving attributions for success and failure, such that they believe whatever they want to believe regarding the cause of their behavior. However, this motivational view of self-serving attributions has been challenged, as the effect of goals on

attributional reasoning could be interpreted in entirely cognitive, nonmotivational terms, as the result of prior beliefs and expectancies that people have about success and failure. Also, in the study of stereotyping and behavior, it has been argued that stereotypes are automatically activated and applied upon encountering members of stereotyped groups. However, whereas the activation of stereotypical traits and inferences indeed follows from exposure to social stimuli, such activation may be facilitated or even inhibited by context and specific processing goals.

A great deal of past empirical work on the role of goals in social psychology has been open to a cognitive account because it has often neglected to specify precisely what goals are and how they emerge and execute control over behavior. Fortunately, this has changed considerably over the past two decades.

This edited volume contains a collection of chapters from internationally renowned scholars in the area of goals and social behavior. The book is organized around a series of topics that are of critical importance to understanding the social-cognitive aspects of goal-directed behavior. In each chapter, the authors offer an introduction to past research on a specific topic and combine this with a presentation of their own empirical work to provide an integrated overview of the topic at hand. As a whole, this volume is designed to provide a broad portrait of goal research as it has been and is currently being conducted in the social psychological literature. It is meant to provide an introduction to essential issues, while at the same time offer a sampling of cutting-edge research on core topics in the study of goal-directed behavior, such as how goals are represented, where goals come from, and what goals do in the process of regulation. It is our hope that you enjoy and learn as much from reading the chapters that follow as we did ourselves.

Henk Aarts and Andrew J. Elliot

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Editors

Henk Aarts (PhD, Radboud University, 1996) is Professor of Psychology at Utrecht University. His research deals with several topics related to the role of goals in social cognition and behavior. His work is published in fundamental and applied journals. One main interest in his research program concerns the observation that, in contrast with what often is assumed, conscious intentions do not play a strong causal role in behavior as well as that people infer goals from their own and others' behavior. This suggests that although goals play a pivotal role in human behavior, these goals may well operate outside of consciousness. In his research he tries to unravel core aspects of this intriguing and important topic. For more information visit http://www.goallab.nl.

Andrew J. Elliot (PhD, University of Wisconsin–Madison, 1994) is Professor of Psychology at the University of Rochester and the University of Munich. His research focuses on approach and avoidance motivation with regard to temperament, competence, relationships, and color perception. He has authored more than 130 publications, edited several books (e.g., *Handbook of Approach and Avoidance Motivation*, Psychology Press, 2008) and journals (e.g., *Personality and Social Psychology Bulletin*) and has received several awards for his research contributions (e.g., the APA Distinguish Scientific Award for Early Career Contribution to Psychology). More information on Dr. Elliot and his research may be found at http://www.psych.rochester.edu/research/apav.

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1

The Representation and Regulation of Goals

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What is a goal? How do people pursue goals? The answers to these questions may seem obvious because people have a lifetime of experience at setting goals, pursuing goals, disengaging from some goals, and attaining others. One's history of experience with goals, however, does not mean that one has an accurate understanding of where goals come from, how the mind represents them, or how one goes about pursuing the aims that are so central to one's sense of personal fulfillment.

A goal is an end state that the organism has not yet attained (and is focused toward attaining in the future) and that the organism is committed to approach or to avoid. This chapter examines the concept of "goals" and the set of principles that govern goal pursuit. Despite the obvious connection between having a goal and pursuing a goal, the history of research on the psychology of goals has emphasized the distinct mental operations that are associated with first having or setting a goal versus attempting to attain that goal through responding. For example, Gollwitzer (1993) discussed goal setting as characterized by a deliberative mindset in which one is weighing options (Which from among many possible goals should one select?), staying open-minded in considering information, and analyzing the value associated with (desirability) each possible goal along with their possibility of being attained (expectancy of success). A separate set of mental procedures and obstacles are presented to the individual who is *implementing* the pursuit of a goal that has already been selected. Separate from its representation is a goal's regulation, which requires shielding the goal from distractions (including warding off thoughts of alternative goals rather than being open-minded to considering them), detecting opportunities to act, and monitoring progress toward the goal.

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This separation highlights four issues that will be the focus of this chapter. First is the notion that the difficulty individuals feel in goal pursuit is a function of both which goal is selected (what Gollwitzer & Moskowitz, 1996, referred to as issues of *goal content*) as well as the strategies and plans associated with the goal—how one implements the goal and regulates attaining it (what Gollwitzer & Moskowitz, 1996, referred to as issues of *goal process*). Efficient control stems both from the "which" as well as the "how" of goal pursuit. For example, losing 10 pounds and maintaining weight loss is a moderately difficult, yet attainable goal one can set. Of interest are questions surrounding how one selects goals, such as how vague (lose weight) versus how specific (lose 10 pounds in 10 weeks) the goal is. But, difficulty in losing and keeping off weight will also depend on another point of interest—issues of implementation and strategy. One can adopt a poor strategy (selecting a trendy diet where weight loss is easy but difficult to maintain), one can have a good strategy marred by poor implementation (failing to do the exercise to which one is committed), or one can have difficulty warding off competing goals that distract from or undermine the focal goal (agreeing to socialize with a grieving friend over fattening food or drinks). Second is the somewhat counter-intuitive idea that the essence of motivation (the goal) is in fact a cognitive structure, a mental representation. The representation must be one capable of capturing both the specified end and the anticipatory desire associated with achieving the end that defines what a goal is. Third is that, as cognitively represented objects, goals can both (a) be selected by consciously willing them, but also (b) be triggered unconsciously, raising another counter-intuitive idea—that goals need not always be conscious. As with other mental representations, a goal can be dormant in memory, it can be consciously deliberated upon, and it can be made accessible. And, fourth, mimicking the general idea that a mental representation, once accessible, can be applied to the current context to shape how one responds, an accessible goal (regardless of whether it arises from conscious or unconscious sources) will impact how one responds. Goals have associated with them specific mental operations and behavior plans that are initiated as part of goal pursuit, regulatory processes that may be conscious or unconscious.

GOALS AS MENTAL REPRESENTATIONS

Goals reside in memory as mental representations. They shape behavior when goal-relevant contexts are entered because a given goal representation is selected by the person in that moment, designated likely to be afforded an opportunity to be pursued within that setting. The proposition that goals are cognitive constructs that are represented in a fashion similar to other types of representations (e.g., social constructs, stereotypes, schemas) does not require these different types of representations all have identical properties. Goal representations have unique properties. This section will examine the properties of the goal representation. First, however, we focus on the fact that when selecting a goal to pursue the individual often, but does not need to, consciously evaluates a given representation against other representations in making a conscious choice about which goal to pursue.

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Explicit and Implicit Triggering of Goal Representations

The bulk of the history of research on goals has emphasized consciousness, with the selection or setting of a goal described as something a person explicitly chooses to do (e.g., Locke & Latham, 1990), as the end product of a period of conscious deliberation (Gollwitzer, 1990). In some research (almost the entire history of research in cognitive psychology and social cognition), goals are largely treated as independent variables in that they are manipulated by participants being explicitly asked to adopt one goal versus another (in order to examine their impact on subsequent behavior and cognition). In other research, people are asked to deliberate and select from among their own goals. This latter approach better allows for an examination of the processes implicated in selecting a goal as well as an examination of how factors within the moment, or in the current context, impact the representation of the goal. This includes factors such as conscious evaluation of the perceived opportunities for goal pursuit (affordances), the expectancy of achieving success at pursuing the goal in the current context, and the value of achieving a given goal. These various factors are analyzed by the individual not in a vacuum, but while simultaneously considering competing goals that one could potentially pursue instead.

Explicitly Selecting a Goal

One source of goals is needs. The kind of need that a person is currently addressing serves as the source of that person's goal-setting activities, affecting the end state that is selected and the behavior the individual adopts in pursuit of that end state (e.g., Deci & Ryan, 1991). Needs produce desires, and desires specify incentives. For example, a person with a need to belong or be accepted by others might set a goal of creating a musical composition, which involves the desire to create something pleasing to the masses, or popular. A person with a need to promote high self-esteem might set the goal of creating something worthy of critical acclaim, something that is unusual, interesting, and unique. Deci and Ryan (1991) postulate that goals in the service of autonomy needs lead to greater creativity, higher cognitive flexibility, greater depth of information processing, and more effective coping with failure than when goals have as their source needs related to obligation.

Atkinson's (1964) expectancy-value theory, as with many other approaches to goal selection (e.g., McClelland, 1953; Nuttin, 1980; Weiner, 1972), similarly construes goal pursuit as an issue of need satisfaction. The context determines what will become a person's goal because certain actions are seen as more instrumental than others for the satisfaction of one's needs (i.e., acquiring the respective incentives). Thus, the selection of a goal is tied to its desirability, which is specified by the goal's association to the person's respective need. It is also, thus, tied to the instrumentality of the goal for delivering the desired incentive. In sum, one factor shaping goal selection is the presumed value of the goal, its desirability, to the individual. A second factor is one's beliefs about how the goal can be realized and if it is feasible to expect the goal to be attained under the current conditions. Thus, goal selection, or setting, was seen as a process whereby one (or few) from among the multitude of potential goals is identified as the current

concern. The process is characterized by two important sets of evaluations or determinations (feasibility/expectancy and desirability/value) that are the products of a period of conscious deliberation.

A second potential source for one's goals is a person's implicit theories. For example, Dweck and colleagues (Dweck, 1991; Elliott & Dweck, 1988; Grant & Dweck, 2003) focus on theories about the nature of ability. They define a person with an entity theory as holding a belief that the amount of ability is fixed and cannot be easily changed. Holding such a theory leads one to set goals for which task performance is used to learn about what is perceived to be one's fixed capabilities—they set what are known as performance goals. They define a person with an incremental theory as one who holds a belief that ability can be improved by learning. This theory leads people to set goals of wanting to know where and why they make mistakes in order to learn how to improve—known as learning goals. These distinct types of goals have important behavioral consequences, in particular when it comes to coping with failure. For individuals with performance goals, negative outcomes signal a lack of intelligence and thus result in helpless reactions (e.g., low persistence). People with learning goals, on the other hand, view setbacks as cues to focus on new behavioral strategies and master the causes of the setback. Gill and Andreychik (2009) offered an alternative conceptual approach to lay theories that is most clearly distinguished from that of Dweck and colleagues by its emphasis on *externality*, or the extent to which a perceiver has a theory that views acts and outcomes as caused by factors outside the actor (what Gill and Andreychik, 2009, call *social explanatory style*). Such theories lead people to focus on goals of a more prosocial nature, as well as goals to take perspective, and goals to see a wider range of environmental influences. Gill and Andreychik (2007, 2009) have both measured and manipulated this lay theory and linked it to phenomena as diverse as an increased tendency to cite external forces when explaining behavior, a decreased tendency to conclude the perpetrators of a terrorist atrocity are inherently evil, and show more positive attitudes toward others who are victims or suffering.

A third source for one's goals is feedback regarding one's standing in relation to a to-be-approached or to-be-avoided state, the detection of a discrepancy between such states and a current state (e.g., Carver & Scheier, 1981; Elliot & Harackiewicz, 1996; Powers, 1973). Discrepancies are at times introduced by external agents (such as negative feedback) and at times are introduced by the individual's own monitoring processes. According to Carver and Scheier, these internal monitoring processes that yield a discrepancy involve a reference criterion being compared with a perceptual input (a current state of progress toward the criterion) in a comparator. If the comparator performs this operation and reveals a difference between the two, a signal is generated (i.e., a discrepancy detected). This discrepancy then elicits a response aimed at reducing the discrepancy between the criterion and the perceptual input. Together, these steps comprise the central conceptual unit of their analysis—the negative feedback loop. The term *negative feedback loop* refers to the fact that one's response is dependent on feedback regarding one's current state as it relates to a desired state. The response is performed as long as there is a negative state of goal attainment (a discrepancy) being fed back through the system (a closed loop control system; e.g., Powers, 1973).

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A wide range of studies, relying on a variety of goals (from restoring one's sense of self-as-consistent, to reducing one's prejudice, to affirming one's efficacy as an intelligent person), have demonstrated that people engage in goal-directed behavior when confronted with such explicit discrepancies (e.g., Devine, 1989; Elliott & Dweck, 1988; Festinger & Carlsmith, 1959; Monteith, 1993; Steele, Spencer, & Lynch, 1993; Wicklund & Gollwitzer, 1981; Wortman & Brehm, 1975).

A fourth source for one's goals is a specific form of discrepancy detection—the consideration of one's fantasies about future hopes and elaboration regarding one's desires for the future (Oettingen, 2000). According to Oettingen's fantasy realization model, there are three ways of contemplating the future that shape how one's goals are selected. First, there is the strategy of mental contrasting, where fantasies about a desired future are compared against a standard set by negative aspects of the present reality. This emphasizes the necessity to alter the current reality and leads people to commit strongly to goals focused on changing the status quo. A second strategy arises solely from fantasizing about a positive future, what is referred to as indulging. Because a desired future being unrealized (the negative reality) is not one's focus, the goal that is set does not adequately take into account expectations for success. The goal is determined merely by its desirability to the individual, as a function of fantasy, not feasibility. Third, goals can be set by reflecting only on a negative reality, what is called dwelling. Similar to indulging, the goal should be set in a fashion that is independent of the perceived chance for goal attainment (i.e., feasibility). However, this now occurs because the individual is ruminating on failures of the past and present, with the goal merely reflecting the person's past determination to attain the goal.

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Implicitly Triggered Goals

Despite goal selection at times being the end product of consciously willed consideration of one's wants, efficacy, and commitment, it is at other times achieved outside of conscious awareness. Goals have been formed and selected in specific contexts throughout one's lifespan and need not be constructed anew by the person in each subsequent, relevant moment. Oddly, though the research on goals that blossomed during the cognitive revolution in the latter half of the 20th century left this possibility unexplored, earlier research on goals from the first half of the century did not. This was largely because the earlier research relied on animal models, where both consciousness of and the comprehension of goals were not possible—rats and pigeons do not contemplate their desires or sense of efficacy. The transition to human models created a fervor over the ability to study the role of consciousness in humans as a "determining" organism with free will, so much so that what now seem like obvious questions relating to the triggering of goal representations were ignored in favor of a focus on how people consciously think about desirability and the skills relevant to achieve their goals.

What at the time of its reintroduction in the 1990s seemed like a novel and counter-intuitive idea was instead the starting point for studying goals—the belief that goals are best conceptualized as mental representations that are triggered and pursued without consciousness. Tolman (1932) posited that cues in the environment become associated with need states of the organism when these external cues

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have, in the past, satisfied these need states. This association was said to be internally represented in the mind of the perceiving organism and able to be triggered when entering an appropriate context. Stimuli encountered in a new context that have value for the organism in terms of satisfying the goal will trigger that goal and the relevant behavior that can deliver the value that the stimulus affords.

Tolman (1932) made it clear that this conception of a goal, because it described the behavior of rats, did not rely on consciousness, but rather on simple mechanisms of stimulus and response that were prevalent in the behaviorist approach to psychology that dominated that research era: "the reader will perhaps need constantly to remind himself that the use of the terms perception, mnemonization and memory implies nothing as to consciousness" (Tolman, 1932, p. 134). Tolman saw goals as mental representations formed as a function of associative learning; an association between a need (such as hunger), a context (such as a certain type of maze), and incentives (food) that have in the past satisfied the need in that context. The organism can expect the incentive to exist when next entering the same context when in the same need state due to the triggering of the representation. Thus, having a goal does not require that the organism has sensations that are experienced as intent or a feeling of purpose. Indeed, it has been posited that in humans such feelings are often epiphenomena that are generated after the fact; rather than initiating our action, the "feeling of willing" is often generated to explain goals that already exist and behavior that has already started to be performed (e.g., Libet, 1985; Wegner & Wheatley, 1999).

It was a watershed moment in the psychology of goals when Bargh (1990) reintroduced these ideas in the context of the sophisticated understanding of human goal pursuit that had evolved in the intervening 60 years. Bargh's "auto-motive" model amended existing models of goal pursuit by highlighting the question these models had ignored (and highlighted above): Where do goals come from and why do we assume they arise from consciously selecting or accepting them? Bargh asserted that goals are not typically born of consciousness, but that the routines, processes, and plans involved in the pursuit of a goal are implicitly associated with the goal as part of a mental representation. Bargh stated:

> [G]oals and intents are represented in the mind in the same fashion as are social constructs, stereotypes, and schemas.... Just as other chronically accessible social representations do, then, chronic goals and intents, and the procedures (Smith, 1984) and plans (Miller, et al., 1960; Wilensky, 1983) associated with them, may become directly and automatically linked in memory with representations of environmental features to which they are frequently and consistently associated.... The result of this automatic associative link is that the motive-goal-plan structure becomes activated whenever the relevant triggering situational features are present in the environment. (p. 100)

Sources of a Goal's Implicit Accessibility

Just as there are a variety of ways a goal may be selected after a period of conscious contemplation, there are a variety of ways a goal representation is triggered outside of conscious awareness. Moskowitz and Gesundheit (2009) reviewed the vast accumulated evidence

to illustrate the five general ways they identified in which goals attain implicit accessibility:

The Unconscious Triggering of a Goal by an Undetected Stimulus Chartrand and Bargh (1996) provided the first illustration of goal priming. The goal in question was to form an impression of another person, and this goal was assessed with measures of recall and judgment used in prior research where the goal of impression formation had been consciously introduced (Hamilton, Katz, & Leirer, 1980; Hastie & Kumar, 1979). Chartrand and Bargh reasoned that implicit goals will trigger the same responses as evidenced in the earlier research, even if people did not consciously select this goal. To illustrate this, they subliminally primed participants with words relating to either impression formation goals or control words. Evidence for goal pursuit emerged in how people responded on the tasks, despite the fact that the cognitive response enacted and the goal being pursued were not consciously detected.

Goals are not only unconsciously primed by subliminal exposure to the goal itself. Because significant others are often associated with specific goals, exposure to those significant others can prime the associated goal. Shah (2003a) asked research participants to provide the first name of their mothers and the name of a close friend. Participants were then asked to provide an attribute that represented separate goals that their mothers and friends had for them. In a subsequent task they were primed with either the name of their mothers, the name of their friends, or control words. To assess if the goal had been primed, participants indicated how committed they were in the upcoming week to attain the attributes previously listed and how frequently they would pursue the goal. When primed with the name of their friend compared to the control and mother primes, the intention to pursue the goal associated with the friend was heightened. Similarly, Fitzsimons and Bargh (2003) primed goals by subliminally exposing people to their significant others—mothers in one experiment and best friends in a second experiment.

Not all unnoticed stimuli that trigger goals are in the external environment. Although subliminal presentation is one way to ensure a priming stimulus is undetected, it is possible to activate goals implicitly from one's own mental activity. For example, goals can be triggered as an unintended consequence of mental activity in which one is engaged, even if one is not aware of that activity or its impact on one's goals. For example, one can consciously read sentences that describe a person. This intended act can lead to unintended and implicit activity—the formation of spontaneous inferences about the person's traits and behavior that the person forming the inference is unaware of having made and the existence of which they deny (e.g., Uleman & Moskowitz, 1994). And these unintended processes of inference formation can then prime associated representations (Moskowitz & Roman, 1992). Such unintended inferences are not limited to traits, but also extend to implicitly inferring goals relating to a target person (e.g., Aarts, Gollwitzer, & Hassin, 2004; Hassin, Aarts, & Ferguson, 2005). Such spontaneous goal inferences illustrate one manner in which goals can be implicitly primed in one's day-to-day life. And as Aarts et al. (2004) have shown, such undetected goals then alter the manner in

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which people behave without their realization of the goal's accessibility, the source of the goal's accessibility, or its influence on how they act.

Liberman and Förster (2000; Förster & Liberman, 2001) illustrate another way the conscious initiation of a mental activity has unintended and undetected consequences that result in the nonconscious priming of a goal: through attempts at thought suppression. They posit that people have difficulty suppressing thoughts, recognize this difficulty, and attempt to link meaning to this experience. They develop a theory of why they are having difficulty suppressing a thought. The theory that evolves is that they have a goal of wanting to think about that thought. The only conscious part of this process is the initial goal to suppress a thought and the experience that this is hard to do. The development of a theory as to why this is hard, and the inference of a goal as a result, are not conscious to the person.

The Unconscious Triggering of a Goal by Consciously Detected Stimuli Goals can also be primed when one consciously attends to a stimulus. Chartrand and Bargh (1996) incidentally exposed participants to words relating to impression goals. The participants completed a scrambled sentence task (Srull & Wyer, 1979) in which a set of words presented in a jumbled order had to be arranged in a fashion that produced a coherent English sentence. For half of the participants, the sentences contained words relating to the goal of forming an impression. Participants with impression goals primed responded in ways similar to people who consciously adopt those goals and different from participants in the control conditions. The goal to form impressions was implicitly triggered by the priming procedures.

Many similar procedures have been used where people are exposed to goal items as part of a task that they do not realize has anything to do with their goals. For example, Bargh, Gollwitzer, Lee-Chai, Barndollar, and Trötschel (2001) triggered, unconsciously, the goal of attaining high performance in participants by having them solve word search puzzles containing words such as *win*, *compete*, and *succeed*. Evidence that the conscious focus on these words resulted in heightened accessibility of the goal was assessed during a later performance situation where new puzzles were to be solved, yet participants were instructed to stop midstream so the goal would not yet have been met. A hidden video camera recorded whether they persisted to work on the task after being told to stop, because persistence is one indicator of goal pursuit. They found 57% of people primed with performance goals persisted at the task compared to only 22% of control participants.

It is not only words that trigger goals. Kay, Wheeler, Bargh, and Ross (2004) demonstrated how an object in the environment increases the accessibility of goals associated with that object. For example, objects in the room associated with the domain of business (e.g., briefcases) triggered the goal of competition. Participants who saw these objects were subsequently more competitive in a task when compared to participants in a room with control objects (e.g., backpacks).

Consciously Selected Goals That Implicitly Retain Accessibility A goal consciously selected at one point in time may remain accessible in subsequent contexts where the individual is now unaware that the goal is accessible and guiding responding—the accessibility lingers. This can be illustrated when one believes

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one has disengaged from that goal. Think of the experience of trying to pull from memory some information that feels as if it were on the tip of the tongue. One knows the answer is in memory but cannot quite reach it. Assuming one does not hop on a search engine to pull it from the collective memory, it is typically the case that disengagement from the goal leads to its unconscious pursuit. When not expecting it, the answer rushes into consciousness. Another example is the story of Archimedes running naked through the streets of Syracuse yelping "Eureka." The answer to the difficult problem he could not solve consciously came upon him in the tub, as it does for many of us. Relaxing in the tub and disengaging from the goal of recalling the answer leads the goal to be pursued below consciousness. From Archimedes in ancient Greece to the ancient-seeming Keith Richards awakening from deep sleep to write the music to the song "Satisfaction" that suddenly burst into his consciousness, goal pursuits are often successfully engaged when the goal is consciously forsaken, but unconsciously accessible.

This idea was first empirically illustrated in the seminal research of Zeigarnik (1927). Research participants were consciously asked to adopt the goal of working on a series of problem sets until each set was completed. However, this activity was not completed, but interrupted, and the problems removed from sight so participants could not continue to work on them. Participants were then given other tasks to complete. At the end of the experimental session, Zeigarnik assessed whether participants continued to dedicate cognitive resources toward completing the interrupted goal that was no longer the focus of conscious attention. This was assessed by asking participants to recall the tasks they had worked on. Unfinished tasks were recalled twice as often as finished ones. The goal was accessible and ruminated on (hence its advantage in memory), despite participants having consciously disengaged from it.

Numerous examples of a goal that was once consciously selected subsequently having heightened implicit accessibility have emerged in the intervening decades since Zeigarnik. Let us conclude with one example. Gollwitzer (1993) described plans that specify links between goal-relevant responses and stimuli capable of cueing the responses as *implementation intentions*. Although consciousness may be required to formulate an implementation intention, it is not required to trigger or implement these plans. The mere presence of a stimulus associated with the plan may allow one to initiate the intended response without the need for conscious choice. These plans make goal pursuit efficient by heightening one's ability to detect opportunities to act, reducing the cognitive capacity required to initiate action (Brandstätter, Lengfelder, & Gollwitzer, 2001) and heightening the accessibility of cues specified in the plan (Aarts, Dijksterhuis, & Midden, 1999). Bayer, Achtziger, Gollwitzer, and Moskowitz (2009) provided evidence of the implicit nature of accessibility following the conscious formulation of an implementation intention. Participants were asked to press a button on a response box whenever a certain type of geometrical figure (i.e., angular vs. rounded) was present. They formulated a plan for doing so using implementation intentions: for example, to respond to triangles especially fast by pressing the button for angular shapes as quickly as one possibly could. These critical stimuli (triangles) as well as control stimuli (circles, squares, etc.) were then presented as subliminal primes. Following

the primes, geometrical figures were presented and were to be classified by pressing the appropriate button. When the critical item (a triangle) was shown as the prime, angular targets (triangles as well as other angled shapes) were responded to faster than control targets (i.e., round targets). The subliminal cue triggered the implementation intention, heightening the accessibility of the once consciously selected goal. This made participants faster to respond to any angular shape due to the response advantage of having the behavioral tendency (pressing the button for angular shapes) activated.

Goals That Attain Heightened Accessibility From Discrepancy Detection Discrepancy detection can result in a goal's implicit accessibility just as, as reviewed above, it can result in the explicit triggering of a goal. A goal being implicitly accessible after discrepancy detection requires either that (a) the individual is not aware that the discrepancy exists or increased the accessibility of the goal, which can occur if a discrepancy is primed (e.g., Custers & Aarts, 2007), or (b) the individual knew a discrepancy triggered a goal at one point but is not aware of that goal's continued accessibility at a later point in time, impacting a response that they do not consciously connect to the goal or to the discrepancy (this occurs when the response is temporally distanced from the discrepancy detection, as well as when the response bears no surface resemblance to the goal and does not seem to the individual as relevant to the goal).

For example, Koole, Smeets, van Knippenberg, and Dijksterhuis (1999) gave participants false feedback that communicated a discrepancy—they took a putative intelligence test comprising unsolvable problems, thus being forced to experience failure to the goal of being intelligent. Despite the fact that this discrepancy was conscious to the person at the time, its accessibility at a later time (evidenced by its impact on subsequent performance) was not. Participants next performed a lexical decision task that implicitly assessed the accessibility of the goal; participants were not aware that identifying items on a screen as words (or not words) had any relation to their sense of intelligence or could address that goal. Relative to control participants, those who had experienced the discrepancy detection were faster to recognize words related to intelligence relative to control words.

Such lingering accessibility from discrepancy detection has been the primary manipulation of implicit goals in my own research on egalitarian goals. For example, Moskowitz (2002) asked participants to contemplate a past failure at being egalitarian, thus creating a discrepancy between their egalitarian goals and their prior performance in this domain. To illustrate that this discrepancy triggers a goal, and that the goal's accessibility is not conscious to the person at the time of responding, participants were next asked to join a separate experiment ostensibly about perceptual ability. In this task two objects moved on the screen, and participants were asked to indicate whether the vertically moving object was going up or down while ignoring a horizontally moving object. The moving objects were words that moved too quickly to be identified as words. On trials where words related to the goal of being egalitarian were presented, attention was guided by the goal (slower response times to the focal item if the egalitarian word was a to-be-ignored

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item). This occurred despite their not knowing that words relevant to their goals were presented or that this task was in any way relevant to their goals. Similar evidence for discrepancy detection having lingering accessibility is seen in experiments where stereotype inhibition is the evidence of goal pursuit (Moskowitz & Li, 2011).

Chronic Goals Bargh (1990) asserted that the more consistent and habitual pursuit of some goals than other goals leads to those goals acquiring a chronic state of heightened accessibility that persists across a variety of contexts (e.g., Bargh, 1982; Higgins, King, & Mavin, 1982). These goals are associated with the individual's longstanding interests and are highly relevant to their most cherished values and motives. The constant pursuit of such goals over time and across contexts leads them to have a favored status in the system's goal hierarchy, a readiness to be used in construing the world, even guiding cognitive operations such as attention (e.g., Bargh & Pratto, 1986), and causal explanations when making sense of the behavior of other people (e.g., Moskowitz, 1993).

Once again, my own research on egalitarian goals is used as an illustration. Moskowitz, Salomon, and Taylor (2000) identified White Americans with chronic goals to be egalitarian toward African Americans. Moskowitz et al. illustrate that the triggering of such goals impacts responding in the form of the inhibition of stereotypes. In a serial priming task (White vs. Black faces as primes followed by stereotypic or control words as target attributes in a lexical decision task), they replicated a classic effect of stereotype activation for the nonegalitarians (they respond faster to words relevant to the stereotype after seeing images of African Americans). People with chronic egalitarian goals, however, inhibit stereotypes when they encounter a picture of an African American man. For these individuals, African American men are cues to their egalitarian goals—they represent an opportunity or means that affords one the chance to be egalitarian. With the detection of this opportunity to pursue chronic egalitarian goals comes the triggering of the means to that goal, such as inhibiting stereotypic thoughts.

Plant and Devine (1998) show that the chronic goal to control prejudice can arise from either an internal (to be egalitarian) or external (the desire to conform to group expectations) motivation. Plant and Devine's internal and external motivation to respond without prejudice scale (IMS and EMS, respectively) has been used to show that chronic goals allow people to control implicit prejudice (Devine, Plant, Amodio, Harmon-Jones, & Vance, 2002). People motivated to control prejudice for solely internal reasons (high IMS/low EMS) do not respond as quickly to negative words when primed with Black faces relative to other groups (high IMS/high EMS, low IMS/high EMS, low IMS/low EMS).

In summary, these five sources of a goal's accessibility are said to result in a goal being nonconsciously activated because one of two criteria is met: (a) The stimulus that activates the goal is not consciously detected by the perceiver (as with subliminal presentation), or (b) the state of heightened activation is not consciously noticed by the perceiver, even if at some prior point either the goal-relevant stimuli or the goal itself had been consciously detected.

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The Properties of Goal Representations

The fact that a goal can be selected outside of awareness, triggered by contextual cues, reveals that the goal is mentally represented. But what comprises the representation? How is this representation distinct from other types of representations? The properties of the goal representation are reviewed next.

Standards or End States A goal representation specifies something to strive to attain or to avoid, a standard, or an end state, that the individual will attempt to bring about by initiating responding. First, to represent an end state requires having semantic knowledge of that end state. However, the semantic knowledge of an end state is specific to the context in which that state is contemplated. For example, one might have the goal of being a good student. But what is the standard for "good," or how is that end state actually defined or manifested? This can change from moment to moment. It might be defined by one's cultural references, because the "self" in isolation brings to mind different meanings and manifestations of goals than the "self" in context. Markus and Kitayama (1991) referred to individuals as possessing multiple selves that can each define the end states we strive to attain somewhat differently. What it means for me to be "a good student" in terms of my individualized sense of self may be different from what it means when thinking of the self in terms of the collective. Different semantic knowledge will be invoked. Higgins (1987) also referred to various types of selves that could impact the semantic knowledge that comes to represent a standard that has been set. Being "a good student" might be defined in terms of one's hopes for personal ability (the idealized self), or it might be defined by a sense of what type of student one ought to be to bring pride to and reflect positively on one's family (the "ought" self). The same goal is represented by different types of semantic information dependent on how the self is contextualized.

Discrepancies Semantic knowledge of the end state is not sufficient to label a representation as a goal. A goal must also contain knowledge that the end state is not yet attained. That is, a goal is something to be attained, not something already attained. One can desire to retire in Paris, but if one has retired in Paris this is no longer called a goal. The representation of the goal, thus, needs to contain feedback from one's monitoring of progress toward the end state, feedback that indicates a shortcoming (e.g., Carver & Scheier, 1981). There must be a *discrepancy* between the state one has specified as the end point and one's current state of being. The discrepancy is at the heart of the goal concept. A goal is a desired end state toward which one is *striving*, and the discrepancy is what fuels the striving; it is the motivational force that impels responding.

Evidence that discrepancies are part of the goal representation was provided by Custers and Aarts (2007). In one experiment, participants with and without the chronic goal to be "well groomed" were asked to perform a task that measured whether a goal had been triggered. This was assessed by having people respond to a word that was an instrumental act relating to the goal of being well groomed. For example, the word "polishing" is instrumental to delivering the

goal of having well-groomed shoes. If the goal had been triggered prior to seeing this word, then the speed with which people respond to the word would be impacted. Their experiment illustrated the inclusion of discrepancies as part of the goal representation by showing that discrepancies trigger the goal and thus impact responses to the word. Participants were split into two groups, one group saw discrepancies relating to the goal of being well groomed ("your shoes are dirty") prior to responding to the word, the other group saw control sentences ("your shoes have laces"). For people with chronic goals to be well groomed, reactions to the target word were impacted only when the word was preceded by the discrepancy-inducing sentence. How do we know this is because the discrepancy is represented as part of the goal and hence triggers the goal and not a case of semantic activation whereby reading about dirty shoes impacts how people respond to the word "polishing"? The impact is not seen for people who do not hold the goal of being well groomed. Thus, the discrepancy alone does not impact responding and has no motivating power (because nonchronics exposed to the discrepancy do not show the effect), and the representation of the end state without the discrepancy does not impact responding (because chronics without a discrepancy do not show the effect). It is only when the desired end state and the discrepancy are paired as part of the representation that a goal emerges and goal-relevant responding is observed.

In the previous experiment, the discrepancy was detected by feedback provided by an external agent. More typically a discrepancy is a by-product of an internal monitoring system that assesses progress toward the end state. The goal representation, like other representations, is capable of being updated when contextual forces provide input that is relevant to the representation. This can be provided by feedback from others or from monitoring one's own goal progress. Whatever its source, feedback has the power to increase (as evidenced by Custers & Aarts, 2007) and decrease the accessibility of the representation.

It is important to highlight that the type of feedback that is delivered by the monitor, and thus the nature of the discrepancy that is being represented, is dependent on the type of standard against which progress is measured. Higgins (1987) noted that distinct forms of discrepancies, with unique psychological consequences, emerge when progress toward a goal is measured against an ought standard versus an ideal standard. This is because different conceptions of "the self" (e.g., ought vs. ideal) can define the end state in different ways. Discrepancies with ought standards leave people focused on how they are letting others down, and the emotional consequences that accompany such a discrepancy are experienced as guilt. Discrepancies with ideal standards leave people focused on their inability to attain personal hopes and wishes, and the emotional consequences are experienced as anxiety or dejection. Each type of discrepancy has its unique emotional flavor, but each carries with it a distinct motivational force as well, a force that leads the person to strive toward that standard and step up efforts in the face of the "failure" (Brehm & Self, 1989; Wright & Brehm, 1989). Thus, the nature of goal striving is uniquely tied to the perception of the discrepancy. This is partly determined by the perceived difficulty of reducing the discrepancy through a given response, partly determined by the perceived incentive value of the response, and

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partly determined by the perceived instrumentality of the response for attainment of the goal.

Abstraction of the Goal The goal representation not only specifies a desired end state, but it also specifies the level of concreteness or abstractness of that end state. The same goal can be expressed in a range of ways that vary, hierarchically, in terms of their specificity from low levels (concrete) to high levels (abstract). Many goal theories (e.g., Bandura, 1989) implicitly acknowledge the fact that goal pursuits are hierarchically organized, but they do not explicitly consider it in their theorizing. Carver and Scheier (1981) made this assumption not only explicit, but central to their discussion of how goals are represented and regulated. Carver and Scheier proposed that self-relevant goals (termed *system concepts*), such as being a nice person or having a positive sense of self (high self-esteem), reside at the top of the hierarchy and are the most abstract. Action goals (termed *principles*), such as being friendly to one's colleagues or focusing on positive feedback, are at the middle level of the hierarchy and have moderate levels of abstractions. The most concrete and least abstract of goals are those at the lowest level of the hierarchy and define a specific course of action (termed *programs*), such as sending a greeting card or generating alternative explanations for specific instances of negative feedback. Each goal is capable of specifying end states, or what Carver and Scheier term a *reference criterion*. How those end states are specified is impacted by the higher levels of abstraction. Their model argues for a relationship among these levels of abstraction such that the outcome of a higher level of goal abstraction sets the reference criterion for the immediately lower level of abstraction. Thus, the reference criterion for a program is set by feedback provided by the output of the respective principle. Discrepancies detected when monitoring progress toward goals at a moderate level of abstraction will set for the individual lower level goals, or reference criterion, for more concrete programs of behavior. For example, failure to be kind to one's colleagues would trigger a more concrete lower-level goal of sending an e-card. Action at the higher levels of abstraction would then be suspended until the feedback from the lower-level signals that its criterion has successfully been reached, or until attention is focused for some other reason on the higher level reference criteria (such as when one attains a heightened state of self-awareness; Scheier & Carver, 1983).

Abstract goals can afford one the possibility of many means to goal attainment whereby one route is easily substituted for by another, yet can also leave one less able to take advantage of any given opportunity to initiate goal pursuit or to seize on evidence of adequate success at achieving the abstract state. Thus, high level strivings (e.g., making new friends) tend to be associated with psychological distress, particularly anxiety and depression. Concrete goals constrain the number of possible means to pursue the desired state, yet afford a better chance for detecting and seizing on opportunities. Such low level strivings (e.g., speak clearly and plainly to strangers) are linked to greater levels of psychological well-being but are also found to be associated with greater levels of physical illness (Emmons, 1992). As the culture shifts toward personal behavior becoming more public (YouTube, Twitter, Facebook), thus providing perhaps more chronic states of heightened

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self-awareness, it will be interesting to monitor if any longstanding shifts in how goals are abstracted by default emerge, or if long-term implications for psychological or physical well-being are the by-product.

Framing of the Goal A goal representation also specifies a framing for the goal. One framing determines whether the goal is defined in terms of approach or avoidance (Carver & Scheier, 1981; Elliot, 2008; Higgins, 1997). This type of framing has also been called a regulatory focus, defined as the representation of a goal through one of two possible self-regulatory systems. One system frames the goal in terms of self-realization and the need to maximize positive events, focusing the individual on the ideals associated with the goal and its positive reward. This frame results in the goal having what is termed a *promotion focus.* The other system frames the goal in terms of the need for security and safety, focusing the individual on minimizing losses and the activities that allow them to fulfill their responsibilities and duties (what they ought to do rather than what is their ideal). This frame results in the goal having what is termed a *prevention focus* (for a review, see Förster & Werth, 2009). Thus, a goal such as to get along with others and be accepted can be framed as approaching a positive outcome (e.g., spend time with others, enjoy their company) versus avoiding a negative outcome (e.g., avoid being lonely and causing others to dislike you). A goal, such as to achieve, can have a promotion focus that frames the goal as success and outperforming others and a prevention focus that frames the goal as avoiding failure or not performing poorly relative to others.

It is well beyond the scope of this chapter to examine the many consequences that this shift in the nature of the goal representation has for human performance and emotions. Just as a small sampling, Tversky and Kahneman (1981) found that framing a decision in terms of loss versus gain will reverse the type of behavior people choose to perform, making them risky or cautious as a reaction to the exact same context. This work can be viewed through the lens of regulatory focus, with different framings triggering different goal representations of the exact same context (a context affording the goal of maximizing positive events vs. one that affords one the opportunity to minimize losses). Elliot, McGregor, and Gable (1999) found that achievement goals with a prevention focus were associated with decreased intrinsic motivation, maladaptive study strategies, and poorer classroom performance, while a promotion framing of this goal did not (see also Elliot & Church, 1997). Higgins, Grant, and Shah (1999) illustrated that achieving a goal focused on *gains* is experienced with *cheerfulness-related* emotions (joy, happiness), whereas achieving a goal focused on *loss* leads to *quiescence-related* emotions (relief, calm). Failure when in a promotion focus is not a loss but is experienced as a nongain, triggering emotions such as dejection and sadness; whereas failure when pursuing a goal framed in terms of prevention leads to the experience of loss and feelings of agitation and anxiety.

Goals are framed not merely in terms of approach and avoidance, but in terms of time. Bandura and Schunk (1981) described proximal goals as those that relate to what one does in the present or near future, and distal goals as those that are framed in terms of a point far into the future. More recently, Trope and Liberman (2000, 2003) proposed that psychological distance, not merely in terms of time

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but also social distance and distance in space, impacts goal pursuit by determining how information that is relevant to a goal is framed. From this perspective, the impact of thinking about time (a goal being close in time or distant in time, thinking about decisions that are delayed vs. immediate, thinking about aging and death) is to alter the construal level with which information is considered. Greater psychological distance (longer time periods) creates high-level construals, which result in information being considered in a more abstract fashion. Smaller distance (a more immediate time frame) promotes low level construals, which result in a focus on specific, low-level, secondary, concrete features of a given piece of information. This work is relevant to goals not because it addresses the way time and distance impact the goal's representation, but because it discusses psychological distance as affecting whether a goal is successfully pursued by allowing one to see more clearly the relevance of information to a given goal. They argue that low levels of construal diminish seeing the connection between the behavior and the goal, not providing an adequate match between the more abstract construal of the goal and the concrete construal of the information. Higher levels of construal shift the abstraction with which the relevant information is seen, thus making its match to the goal more apparent and enhancing the likelihood that the information will be seen as relevant to the goal, capitalized on, and used in goal pursuit (e.g., Fujita, Trope, Liberman, & Levin-Sagi, 2006; Liberman, Sagristano, & Trope, 2002).

However, it should be noted that this construal level theory (CLT) could similarly be applied to how the goal itself is construed, thus impacting the representation of the goal as well as the information relevant to the goal. Though they do not discuss this, and their research holds construal level of the goal itself constant, I would argue that framing a goal in terms of greater time (delayed goals) or in a mindset when contemplating distant time periods irrelevant to the specific goal (thinking about mortality or about aging) would alter the framing of the goal, creating goals that are framed more abstractly. This possibility links the research on a goal's framing in terms of time to that on goal abstraction. It might on the surface appear as if these two lines of research make opposing conclusions because CLT argues that increased concreteness makes goal pursuit less efficient or successful, whereas Bandura and Schunk (1981) observed that framing a goal in proximal terms improved goal attainment. And where Bandura and Schunk report no effect of holding a distal goal compared to a control group, CLT shows improved goal pursuit with increased time (abstraction). Yet these lines of research address different types of abstraction or construal. One is concerned with the construal level of the goal itself, the other with the construal level of the information relevant to a goal. Thus, the former research line concludes distal goals are too far removed in time to guide effectively a person's actions and fail to yield small successes that promote self-efficacy and interest, while the latter shows that framing the means to a goal, and features of the information relevant to a goal, in a distal fashion, have an opposite effect. Presumably, if CLT were applied to goal framing itself, the results would look similar to the impact of abstraction and concreteness in goal representation revealed by researchers who have manipulated abstraction of the goal representation more directly (e.g., Bandura & Schunk, 1981; Emmons, 1992; Gollwitzer, 1999).

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Affordances McArthur and Baron (1983, p. 215) described affordances as "the opportunities for acting or being acted upon that are provided by environmental entities." The review of implementation intentions (above) revealed that cues signal such affordances. However, it is also the case that a given cue can be associated with multiple goals. For example, one's mother might serve as a cue to goals such as achievement, affiliation, eating, or avoidance. Thus, it is not the cue alone that triggers the goal, but the context in which the cue is encountered matters as well. Affordances, as opportunities to pursue a goal, are specified by cues that are often situation specific. The notion of affordances as environmental entities that are capable of addressing a goal requires an assumption that is often left implicit—that the goal representation includes the relevant situations and cues.

Aarts and Dijksterhuis (2003) demonstrated that a situation is part of the representation in a study where a picture of an environment increased accessibility of goals associated with that environment. Following a picture-viewing task in which participants studied images containing either a library or an exclusive restaurant, they found that participants who studied the library image responded faster to words associated with behavior appropriate for a library environment (e.g., silent, quiet, whisper) compared to control words. This only occurred for participants who were told that they would be visiting the library, suggesting that it is the actual goal of going to a library that increased the accessibility of the behavioral norms associated with being in a library, not simply the semantic content of the concept of a library.

A host of other experiments have illustrated the ability of the situation to trigger the goal when the situation is encountered. Indeed, the situation can even be a person. In one experiment, one's mother was shown to trigger goals associated with mother (Fitzsimons & Bargh, 2003), a clear illustration that this specific person is seen as a cue that affords an opportunity to act in specified goal-relevant ways because the person is part of the representation of the goal. They reasoned that if "mother" is part of the goal representation, then priming the participant's mother would activate the goal representation. To test this they recruited participants who saw their mothers as affordances to pursue achievement goals. The participants then were primed with "mother" or with a different relationship partner, such as "peer." To examine whether achievement goals had been triggered, participants next were asked to rate behavior that was ambiguously relevant to achievement. This behavior was seen as achievement-oriented only among participants who had been primed with "mother." A similar finding was found by Shah (2003a) with a different relationship partner—one's father. One experiment subliminally presented participants with words relating to the concept "father." People who had close relationships with their fathers that involved specific goals had those goals triggered, despite never consciously seeing the word "father." The father was an affordance that was stored as part of the goal representation, triggered by its presence in the situation.

Not only significant others signal affordances to goals, but categories of people can also afford one the opportunity to goal pursuit if that category is included in the goal representation. Experiments in which faces of group members trigger goal pursuit serve as further evidence that affordances are part of the goal

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representation. For example, Moskowitz, Li, Ignarri, and Stone (2011) created goals in participants to be egalitarian to members of the group African Americans by having them write about a discrepancy in that domain (a time they had acted in a biased fashion toward an African American). Participants then performed an ostensibly unrelated attention task in which they had to identify which from among four men in an array was wearing a bow tie. When an African American man appeared in the array without a bow tie, participants were slower to identify the correct answer. This indicates that the image of an African American man was seen as an opportunity to pursue the egalitarian goal because this category of people is included in the representation. The link between the stimulus and the goal leads the goal to be triggered and thus distracts attention momentarily away from the identification task. How can it be shown that participants having been distracted by an African American face is an illustration of a goal representation having been accessible, as opposed to participants having been distracted because semantic content relating to African Americans was accessible? A separate group of participants who had written about a success at being egalitarian to African Americans did not show this effect. This research reveals more than a link between African American faces and semantic content relating to African Americans; it reveals affordances—these faces represent opportunities to pursue a specific goal associated with African Americans.

Means Tolman (1932) described a goal representation as including not only a specified end state, but also behavior routes that lead to the goal. It contains knowledge of relevant means toward getting to the designated end. If this were the case, it would be demonstrable that thinking about the goal, consciously or not, would lead to thoughts (conscious or not) of the means toward achieving that goal. Similarly, thoughts of the means to a goal would lead to heightened goal accessibility.[*]

[*] Research consistent with this logic, though not conducted with goals-means relations as its intended focus, is that on (a) the automatic triggering of positive and negative affect when approach and avoidance behaviors are enacted, and (b) the automatic enactment of approach and avoidance behaviors when positive and negative affect is detected. Cacioppo, Priester, and Berntson (1993) had participants engage in arm flexion (pulling the arm toward the self) versus arm extension (pushing the arm away from the self)—approach and avoidance behaviors. They found that neutral objects were evaluated more positively during arm flexion. Chen and Bargh (1999) illustrated that positive stimuli are detected faster and the affect associated with them triggered more quickly when approach behaviors such as flexion are performed (the same is true for negative stimuli and avoidance behavior such as extension).

This work is consistent with asserting that means are part of a goal representation because it is generally accepted that automatic attitude activation provides fast feedback about the affective nature of a stimulus which helps organisms pursue survival goals. If the means to a goal are part of the representation, then enacting flexion and extension behavior will implicitly trigger approach and avoidance goals, including implicit affect. And if implicit activation of affect triggers a goal, then the associated means to those goals would be triggered as well. Of course, it could merely be that approach behaviors are associated with positive affect without the need to be mediated through a goal. But recent evidence suggests that the affect-behavior link observed is mediated through affect and flexion-extension behavior (means), each being part of a shared goal representation (Eder & Rothermund, 2008; Lavender, & Hommel, 2007).

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Aarts and Dijksterhuis (2000) addressed the former type of evidence—triggering the goal activates the means. Their research participants performed a task in which travel goals (which were highly relevant to some of these participants) were triggered and the accessibility of the means to the goal (suitable and unsuitable locations for goal pursuit) was subsequently assessed in an ostensibly unrelated reaction time task. They found that for participants to whom the travel goals were highly relevant, being primed with travel goals led to faster responses to locations suitable for their travel goals. This was not found for participants who did not find the travel goals to be particularly relevant. Additionally, in a "no goal" prime condition, the former participants' response latencies did not differ from those of the latter. The goal primed the means to that goal when such goals were relevant to people.

Shah and Kruglanski (2003) addressed the latter form of evidence—enacting or thinking about the means can trigger the goals associated with those means. In one experiment participants responded to words related to education and health goals (e.g., "educated" and "knowledgeable"; "strong" and "fit"). Unknown to participants, words representing the means for achieving each of these goals (e.g., "study," "read," "exercise," and "run") were presented subliminally in each trial just prior to the target word. They found responses to target words representing the goals were faster following the presentation of the means that corresponded with a given goal than following a control word.

Representations that include the relevant means to a goal also include knowledge regarding obstacles to attaining the end state (Kruglanski, 1996). This can have a functional role in goal pursuit by allowing the individual to detect obstacles easily and to have ready-made plans for dealing with the obstacle (due to the association between the obstacle and the means as part of the mental representation). A mental representation including both the means and obstacles to a desired end state can be revealed in experiments where the presence of the obstacle is shown to trigger the goals and means that will help one overcome (or counteract) the obstacle. Fishbach, Friedman, and Kruglanski (2003) had participants list goals they wanted to pursue and temptations to avoid in order to achieve those goals. The participants then performed a computerized task that exposed them to words related to a temptation they had just listed, followed immediately by a lexical decision task (LDT) where an item had to be identified as being a real word (vs. a series of letters forming nonsense). If a temptation was linked to a goal as part of the same mental representation, then seeing the temptation in the word exposure phase would trigger the goal and its related means. This would cause participants to identify such items more quickly as "real words" during the LDT. Fishbach et al. found that responses following a temptation were quicker for words associated with the goal relative to irrelevant goals. Temptations primed goals they were incompatible with or to which they served as an obstacle. To regulate behavior, people may develop a strategy for resisting or counteracting temptations by associating obstacles to a goal with the goal itself, thus triggering a functional response each time exposure to a temptation or obstacle occurs. This is called *counteractive control*, and it is made possible by the associative links between obstacles and the means to overcome them.

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Affect A discrepancy has no motivational force if one is discrepant from a state that one does not desire to approach. For example, Monteith (1993) asked research participants to contemplate two aspects of their feelings of prejudice toward minority groups: how they should act (the standard or end state) and how they actually respond. This task led people to experience a discrepancy between how they should versus how they would act. This discrepancy did not necessarily create the goal to respond in nonprejudiced ways. People who were high in prejudice to start with, who did not desire to be low in prejudice and saw no value in it, were not found to have goals created by this task. Many models of goal pursuit implicate the *value* of the goal state as a determining force for commitment to a goal and whether a goal is transformed into behavior. We have already reviewed a variety of models that contain the calculation of the goal desirability as an essential component of the goal representation that indicates the level of desire associated with the goal and determines whether goal-directed behavior will emerge (e.g., Atkinson's, 1964, expectancy-value theory; Deci & Ryan's, 1991, self-determination theory; Gollwitzer's, 1993, action phases model; Oettingen's, 2000, fantasy realization model).

With its roots in research showing that affect can be triggered nonconsciously and can motivate action (e.g., Bargh, Chaiken, Govender, & Pratto, 1992; Berridge, 2001; Fazio, Sanbonmatsu, Powell, & Kardes, 1986; LeDoux, 1996), recent research has focused on the nonconscious nature of the affect in the goal representation (for reviews, see Custers, 2009; Ferguson & Porter, 2009). If affect is part of the representation, encoded there through learning over one's history with goal-relevant stimuli and behavior, then goal-relevant behavior should increase as the positive affect associated with the goal increases. This would occur even if the positive affect associated with the goal was produced nonconsciously, such as through subliminal conditioning. Custers and Aarts (2005) manipulated the positive affect associated with a potential goal in this way. Affectively laden stimuli were paired temporally (by flashing them subliminally) with a representation of a behavior (e.g., solving puzzles) that was known to be neutral to the person and not a goal they wanted to pursue. This created a nonconscious association between the affect and the behavior, fortifying the representation with affect that turned it into a goal. They assessed this by measuring the motivation to engage in the behaviors—the desire to engage in the formerly neutral acts was higher when subliminally paired with positive stimuli (relative to neutral ones). In a second experiment, they further found that such conditioning not only fortified the intention to act, but also produced motivated behavior toward a goal object for which one previously had neutral reactions.

A representation does not need to have positive affect paired with it as part of an experimental manipulation to have affective responses included among its associative web. A representation can preexist as a desired state. Memory for a specific goal-relevant situation contains valence (Tolman, 1932),[*] and that specific

[*] Tolman (1932) posited that valence was central to the goal representation. The representation that is triggered (what Tolman referred to as the memory that is brought to bear) when goal-relevant contexts are entered was said to contain two forms of valence: the valence relating to the organisms past experience with a specific object that is not currently present in a goal-relevant context and the valence relating to past experience with a specific object that is present in one's current goal-relevant context.

situation triggers not merely the memory of the cues and means relevant to that context (as discussed above), but also the affect. Ferguson (2007) examined such preexisting, affectively rich representations and found that affect (implicit positive affect toward the goal) moderated the relationship between goal-relevant behavior and the triggering of the goal representation, suggesting that the affect is part of the goal representation and is responsible for energizing goal-directed behavior.

Goal Systems

The notion of goals as mental representations that can be primed and that share many features with other types of representations, suggests that goals, like other representations, reside in associative networks and are interconnected through what Kruglanski et al. (2002) called a *goal system*. Such a system would require coordination among goals within the system. By coordination it is meant that a goal pursuit does not exist in isolation relative to the other goals within the system, but they are linked together. Evidence reviewed above suggests that goals are associated with their corresponding means of attainment, hence triggering response plans and stirring action efficiently and unconsciously (e.g., Aarts & Dijksterhuis, 2000; Bargh, 1990; Bayer et al., 2009). Evidence reviewed above also suggested that this spreading of activation is bidirectional, with means priming goals, but also in the reverse direction from goals to means (Shah & Kruglanski, 2003).

The associative network in which a goal resides, as with associative links between other forms of representation (Carlston & Smith, 1996), allows for activation and inhibition of one goal by another. Goals can promote one another, and movement toward one can facilitate standing on another (e.g., Fishbach & Trope, 2008; Shah & Kruglanski, 2002). Goals may compete, and movement toward one may require inhibiting other goals to "shield" the goal that is one's current focus (e.g., Fishbach et al., 2003; Shah, Friedman, & Kruglanski, 2002). We have already reviewed examples of such facilitative and inhibitory linkages: an egalitarian goal led to the inhibition of stereotypes (Moskowitz et al., 2000), yet facilitated attention to goal-relevant stimuli (Moskowitz, 2002; Moskowitz et al., 2011). A temptation to a goal led to the triggering of the goal (Fishbach et al., 2003).

This discussion suggests various ways to illustrate that goals are associated within a goal system. For example, if there is hierarchical organization in which a subordinate goal is linked to multiple higher-order goals, there should be associative links between goals that vary according to associative strength, and these links should allow for facilitation and inhibition among goals that are compatible or competitive, respectively. These topics are the focus of a review by Cavallo and Fitzsimons (Chapter 9, this volume), and as such, only brief examples will be provided here. The reader is directed to their review of *intergoal dynamics* for further detail.

Goal Hierarchies Kruglanski et al. (2002) specify that goal systems contain *vertical* links that connect higher-order, or superordinate goals, to lower goals and that connect goals to their respective means. Such systems also contain *lateral* or *horizontal* links among goals. It is these horizontal links that allow for the

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facilitative and inhibitory processes, described above among goals; whereas, it is the vertical links that allow for the triggering of goals from means (and vice versa) and from superordinate goals and motives (as reviewed above in the discussion of goal abstraction). The notion of a hierarchically organized goal system, with the general notion of needs giving rise to motives, motives giving rise to superordinate goals, these specifying subordinate goals, which finally link to action, is not novel (Bandura, 1997; Carver & Scheier, 1990; Powers, 1973). It is well accepted that goals (e.g., to be a good student) are both *end states* to subgoals (e.g., to get an A in a class) and means (e.g., to study hard) as well as at times being means for the hierarchically superordinate goals (e.g., to achieve) they serve (e.g., Carver & Scheier, 1981; Emmons, 1992; Hyland, 1988).

What is more novel is research focused on experimentally illustrating the hierarchical and horizontal organization. For example, Fishbach et al. (2003) performed experiments aimed at illustrating counteractive control (reviewed earlier) in which temptations away from a goal trigger that incompatible higher-order goal, setting in motion processes that override the temptation or counteract the value of the temptation. They illustrated that when participants were primed with a temptation, it activated the goal with which that temptation was incompatible. However, when participants were primed with a goal, it did not activate the temptation. This provides direct evidence of the hierarchical organization of the goal system: temptations only triggered goals to which they were relevant (associated through a hierarchical link in a goal system), yet these higher-order goals did not trigger the subordinate temptations.

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Associative Strength The hierarchical structure in the goal system specifies an ability to transfer or relay affect and commitment from goals to lower order actions, thus energizing the means with the motivational properties of the goal (Kruglanski et al., 2002). For example, Ferguson and Bargh (2004) found that the implicit evaluations research participants held toward the means to a goal were altered as a function of how strongly the goal was held. Participants who came to the lab thirsty (asked to not have a drink for several hours) were split into two groups: one that then had drinks as part of an alleged taste test and one that ate pretzels as part of an alleged taste test. The goal to drink was thus manipulated so that it was high in half the people and low in the others. Those with more strongly held goals had this affect transferred to the means, as reflected by their more positive implicit evaluation of goal-related objects that could be used to quench their thirst.

Similarly, the affect associated with a means should not only change as the affect associated with one goal with which it is linked changes, it should also change as a function of the goal to which it is linked. For example, acts such as eating cake and eating vegetables should not only shift in affect as a function of how hungry one is, but also as a function of what goal one is pursuing—eating cake should be less positive when one has the goal of dieting and more positive when one has the goal of enjoying the taste of a food product. This is precisely what Fishbach, Shah, and Kruglanski (2004) found when they manipulated the strength of these goals through a priming procedure. Thus, subtly triggering the goal of "weight watching"

versus "food enjoyment" impacted how positively they felt when later eating cake. Compared to a control condition, high calorie foods were less associated with positive emotions when primed with weight watching goals and more associated with positive emotions when primed with food enjoyment goals.

This transfer ought to be moderated by the associative strength that links goals and means. Fishbach et al. (2004) found that the correlation between the magnitude of affect for a goal and the magnitude of affect for its means (e.g., the correlation between the amount of affect for the goal of "being educated" and the amount of affect for its corresponding means of "studying") depended on the associative strength between the goal and the means. Associative strength was assessed by the degree to which the goal primed the means.

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Equifinality There are many potential means that can help one to move toward and ultimately satisfy a given goal. The fact that multiple links emerge from a goal to subordinate means, that vary in their ability to address the goal, was labeled by Kruglanski et al. (2002) as *equifinality*. Mahler (1933) discussed the fact that when one route to goal pursuit shuts down, another can substitute in its place because of this equifinal configuration within the goal system. Kruglanski et al. further argued that equifinality does more than provide flexibility to the person when it comes to goal pursuit. This situation feeds back upward through the hierarchy, impacting the degree to which one is committed to the goal, and determining the goal's strength. This occurs because it impacts the subjective probability (the expectancy) that a goal can be achieved. A detailed discussion of the role of expectancies (and of value) in goal pursuit is provided by Liberman and Förster (Chapter 5, this volume). However, what is worth noting here is that the greater the number of means that are linked to a goal (the larger the equifinality set size), the more likely it is that the goal can be attained because there are actions that can be substituted should one's initial choice of means be thwarted.

Of course, the existence of multiple means, each capable of replacing the next, while making adoption of the goal and its attainment more likely, creates new problems in terms of deciding among the means. How does one commit to a means when multiple viable options exist, and which will get implicitly triggered if the goal is triggered? Issues of resolving how a specific behavior is manifested from goals is beyond the scope of this chapter, and such matters of translating goals into action are the focus of a review by Sheeran and Webb (Chapter 6, this volume). One possible answer, however, is hinted at by another configuration within the goal system discussed by Kruglanski et al. (2002). They note that any single behavior may potentially advance progress toward or satisfy a variety of goals within the system, metaphorically killing two (or more) birds with one stone. They label this state of affairs as *multifinality*. Multifinal means may jump out from above the group of other means in the equifinal configuration because of the value attached to this ability to progress multiple end states simultaneously. In the end, what is suggested is that the selection of a means is ultimately governed by similar principles that govern the selection of a goal—an analysis is done to determine the subjective value associated with it and the expectancy of it being able to successfully yield the desired state. This, of course, harkens back to Lewin's (1935) discussion of

valence (the strength of the association between the desired end state and objects and means in the environment) and affordance (the opportunities the objects and means provide to successfully yield the desired end state).

THE REGULATION OF GOALS

Wegner and Pennebaker (1993) provided another watershed moment in the study of goals when they introduced a formal analysis of mental control. What was novel in their discussion of mental control was its provision of a framework in which both the human attempt to control (determine) behavior was combined under the same umbrella with *control of the mind*. For decades researchers had studied how goals are translated into action, examining topics such as achievement, weight loss, productivity at work, and anger management. However, for decades a separate literature also focused on control over one's own cognitive activity, with research focused on distinctions between automatic and controlled responding (e.g., Shiffrin & Schneider, 1977), selective attention (e.g., Treisman & Geffen, 1967), thought suppression (e.g., Wegner, Schneider, Carter, & White, 1987), inhibition (e.g., Tipper, 1985), and perceptual defense (e.g., Bruner, 1957). Control of the mind, it became apparent, followed many of the same principles involved in control over behavior: end states are specified, operations or responses are initiated that are relevant to bringing about the end state, these operations persist until the goal is reached, and monitoring systems providing feedback regarding progress toward the goal so the system knows whether to persist or disengage. In recent years the term control has, thus, come to refer to any means by which the organism guides (initiates and inhibits) responding through the mediation of goals. In fact, the term *control* has given way to the broader term *self-regulation*, defined as "processes by which the human psyche exercises control over its functions, states, and inner processes … the exercise of control over oneself, especially with regard to bringing the self into line with preferred (thus, regular) standards … any efforts by the human self to alter any of its own inner states or responses" (Vohs & Baumeister, 2004, pp. 1–2).

Shah and Gardner (2008) identified three guiding principles that govern the regulation of human responding, which they labeled as recursivity, resources, and resolutions. Resolution refers to both (a) the matter of how humans determine what need, motive, or goal to select as well as (b) how to best respond (which from among the possible means is to be selected). Shah, Hall, and Leander (2009) refer to these issues as regulating the "horizontal" rotation among goals. That is, which goal, and which path to that goal, is selected is going to be defined by the multiplicity of goals that are specified in that moment, how these goals are represented, and what affordances and obstacles to each goal (and each of its means) are presented. As noted above, these issues are the focus of other chapters in this book. The remainder of this chapter will focus largely on issues of recursivity and resources in regulation.

By recursivity it is meant that the regulation of a selected goal follows a cycle from experiencing a discrepancy associated with not yet having attained the goal, to responding, to feedback (delivered by monitoring), to (ultimately) satisfaction of the goal, ending with discrepancy reduction and the release of the motivational

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force that impelled the cycle. It is called recursive because the cycle repeats, predicated on the results of the monitoring of one's progress. By resources it is meant that the motivational force or energy that impels this cycle is limited and can be usurped, thus weakening the ability to control or self-regulate (e.g., Vohs, Kaikati, Verkhof, & Schmeichel, 2009). How this resource is conserved, replenished, and shared among one's various goals is essential to understanding behavior and successful goal pursuit.

Recursivity and the Feedback Loop

Miller et al. (1960) proposed a Test-Operate-Test-Exit (TOTE) model of control that is regarded as the launching pad for modern models of regulation. Miller et al. drew from Craik's (1947) engineering system analysis and Wiener's (1948) cybernetic control theory in formulating a model that specified the mechanisms and steps in human control in a way analogous to the way mechanical systems are engineered to self-regulate. Just as the heat in one's home can be regulated by the testing (monitoring) of a thermostat providing feedback to a furnace that operates (responds with) the release of heat, human thought and action can be regulated by processes of testing and operating.

Carver and Scheier's (1981) control theory builds from this foundation by providing a detailed accounting of the principles that underlie all human behavior, regardless of the goal. The theory recognizes that complex inputs determine the goal that is selected, the standard that is set (what is also called the control criterion; Wegner & Bargh, 1998), and places its focus on what follows—the regulation of the goal once the criterion is established. Central to the theory is the idea, already reviewed above, first popularized by Lewin's (1935, 1951) field theory, that regulating a goal is dependent on the existence of a *discrepancy*. The discrepancy is a state of incongruity between the control criterion and one's current state. Given that the model assumes such a discrepancy exists by virtue of the control criterion having been set (by definition; it is selected because it is not yet attained), the discrepancy lies at the heart of the model because its reduction, the steps taken to reduce it, and the monitoring or testing of one's progress toward its reduction are what is said to comprise regulation.

Two general principles of regulation follow the initial premise that when one experiences a discrepancy, a tension state arises that sets the regulatory system in motion. One principle is that when tension is experienced, goal-relevant responding begins and continues (persists) with the operations being undertaken (the means to goal attainment) being part of an equifinal (as reviewed above) set of possible operations that could be initiated. The other principle is that feedback regarding progress (and rate of progress) toward a goal informs the system's decisions regarding persistence, pace of responding, and cessation of operations. That is, the system is engaged in monitoring processes that provide the requisite feedback. In summary, one *tests* for the degree of consistency between the desired state and the current state, *operates* a control action or response to attempt to reduce the discrepancy between them (if one exists), then *tests* again for the degree to which a discrepancy exists. If a discrepancy persists, the control action is continued. As

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stated above, because operations persist as long as there is a negative state of goal attainment being fed back through the system, the regulatory process is said to comprise a *negative feedback loop*. If the discrepancy is reduced, one *exits* this cycle, terminating goal pursuit.

From this view, regulation is about discrepancy reduction and the commonalities underlying the reduction of all types of goal discrepancies. Although this cybernetic-type model seemingly equates the manner in which human discrepancy reduction and monitoring proceeds with the mechanistic way in which feedback loops are regulated in machines, recent proponents of these ideas clearly "warm" this cold, automated approach with affective processes. As reviewed earlier in this chapter, the notion of a discrepancy includes more than a mechanistic measurement of the distance from point A to B. The tension arising from detecting a discrepancy is aversive and unpleasant, with emotional and motivational consequences unique to human control systems. Eliminating a discrepancy is not merely mechanistic but has, as its by-products, related emotional reactions, subsequent commitment, and satisfaction (value) felt toward the goal. For example, Vohs and Baumeister (2004) argued that successful regulation of a goal has, if one adopts a long-term temporal view, a positively reinforcing impact on the value associated with the goal, increasing its desirability and strengthening its affective component. Even though, in the short term, goal attainment may reduce the discrepancy and regulatory activity, in the long term it promotes such regulatory activity by increasing the likelihood the goal will once again be set as the desired criterion. This is similar to Bandura's (1989) view that goal attainment may raise feelings of self-efficacy, which can result in one setting more challenging goals, creating new discrepancies that impel new striving. Further, even within a shorter temporal view, goals are not simply "cold" cognitions that represent discrepancies between current conditions and selected criterion but are manifestations of needs (Nuttin, 1980). Because of this, regulation of a goal requires feedback regarding one's affect, desire, and commitment. That is, for goal pursuit to continue to be implemented requires examining the feasibility and desirability of the goal in addition to the measure of progress toward a cognitively specified end state.

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Monitoring

The "Ts" of the TOTE model represent "tests" or a monitoring system. If the discrepancy is at the heart of the goal concept, as claimed above, it is also true that monitoring is the heart of the discrepancy. A discrepancy is nothing more than the feedback that results from a test regarding where one stands in relation to a control criterion; it is the end product of monitoring. Monitoring not only provides the initial force by which regulation is engaged, but effective control also involves continued monitoring in order to attain knowledge about where we stand as a result of the compensatory operations triggered by the initial monitoring feedback. Hence we test, and test again after an operation has been performed (thus the two Ts sandwiching the "O"). Such feedback increases performance and makes goal attainment more likely, as can be seen in settings as varied as performance at work to educational achievement (e.g., Bandura & Schunk, 1981; Locke & Latham,

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1990). For example, Locke and Latham found that concrete and difficult goals produce better performance, persistence, and effort mobilization than vague goals such as "work hard," but that this benefit is contingent on the feedback accompanying the designated end state. Performance needs to be "tracked in relation to one's goals" (Locke & Latham, 1990, p. 241). But, monitoring and its resultant feedback do far more than make people efficient. They are the means by which regulation is turned on, off, and adjusted. Monitoring provides the information the system needs in order to know whether to switch goals, disengage from a goal, step up (or maintain existing) operating efforts, feel good about goal pursuit, heighten or lower commitment, and substitute one means for another.

When monitoring, the reference value against which current progress is evaluated is not always the end state. It can also be the starting point (measuring how far one has come as opposed to how far one has left to go). These different reference points (glass half full vs. glass half empty) will have different consequences for the feedback system (e.g., Brendl & Higgins, 1996; Carver & Scheier, 1999; Fishbach, Zhang, & Koo, 2009). The value associated with feeling one has 20% left to go is different from feeling one is 80% of the way to the finish line. The selection of the reference point (start vs. end point) is not always under one's control and depends on a variety of factors (such as the source of the feedback).

Monitoring progress toward goal pursuit is also more complex than merely measuring the distance to a reference point. The monitor not only provides information on how far one has progressed, but also includes information regarding rate of progress. Carver and Scheier (1999) describe a meta-monitoring feedback loop by which the rate of discrepancy reduction is compared against a reference value, thus providing feedback to the individual regarding whether the operation being performed needs to be sped up or slowed. Feedback regarding the rate of progress at discrepancy reduction has emotional consequences similar to feedback about progress. Emotions can be positively enhanced if people believe they are making good progress toward goal attainment, irrespective of the discrepancy between one's current state and the control criterion (e.g., Hsee, Abelson, & Salovey, 1991). Consider weight loss as an example. The initial stages of dieting present a large discrepancy (lots of weight to lose), but often are periods of significant rate of progress (large losses in the initial weeks), thus yielding high positive affect and one feeling energized about the diet. As the control criterion (the target weight) approaches, rate of progress slows, and negative affect and discouragement build. The monitoring system is providing two sources of feedback, each with emotional consequences that feed one's evaluative component of the goal.

Improving one's ability to monitor should, given the current discussion, improve one's ability to regulate, and obstacles to monitoring would weaken it. Liberman and Dar (2009) provide an extensive review of the type of issues that make monitoring more difficult. These include:

1. Having vague or abstract control criteria where the measure for goal attainment is poorly defined and thus the discrepancy is not able to be precisely gauged. Such states characterize many of the goals we pursue in daily life, especially somewhat higher-order social goals such as

"be egalitarian," "be successful," "be viewed positively," and "be a good student" (e.g., Carver & Scheier, 1998; Higgins, 1997; Lewin, Dembo, Festinger, & Sears, 1944; Markus & Ruvolo, 1989).

2. When the contingency between effort and progress is obscured, such as when one spends a year of one's life conducting experiments for a research paper and the research paper is not published until 3 years after one has completed collecting the data. This disconnect between effort and reward, between the operations and the attainment, also characterizes much of daily life (dieting and reaching a target weight, studying and career success, eating healthy and being healthy, practice and being perfect).
3. Testing itself is not always easy to do, with appropriate measures unavailable to a person. How does one measure if one is "egalitarian" or "leaving a good impression"?

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Despite the difficulties in monitoring, it is also the case that people are quite adept at it. It can easily be promoted by heightened states of self-focused attention (Carver & Scheier, 1981). Something as simple as placing a mirror in front of research participants is capable of making them more likely to note discrepancies (e.g., Duval & Wicklund, 1972). Such a look into the mirror, whether literal or figurative, promotes monitoring. And although the bulk of the research on monitoring has focused on consciousness (providing explicit feedback to people that they are either worse than relevant others, failing in comparison to their own standards, or generally lacking in efficacy at a task; asking people to reflect on their own shortcomings), the ubiquity of monitoring is evidenced by the fact that it occurs at the nonconscious level. It is an efficient process that can run silently.

Perhaps the most well-known example of implicit monitoring in goal pursuit is that responsible for "ironic effects" found during thought suppression. Thought suppression can ironically result in the very thoughts one intended to avoid. Wegner (1994) proposed a theory to explain why an intention could produce an opposite tendency. The theory posits that one first experiences a discrepancy: the (possible) existence of thoughts one does not wish to have and wants to suppress. One compensates for this through conscious effort to think about something else—replacement thoughts—and this compensatory response needs to be monitored. In this case, Wegner describes the monitoring process as an efficient one that runs implicitly. The checking, or testing, of one's standing in goal pursuit involves searching for failures of control, detecting references to the unwanted thought. This requires holding in mind (at least below consciousness) the very thought that is not to enter consciousness, rendering the to-be-suppressed thought *hyperaccessible* (Wegner & Erber, 1992). The irony is not merely in the thought's increased accessibility due to this monitoring, but an increased impact on responding. So long as the suppression goal is in place, this accessibility does not influence responses. But a change in explicit goals leaves the person with lingering accessibility no longer being suppressed, ready to be (and often) used (e.g., Galinsky & Moskowitz, 2007; Macrae, Bodenhausen, Milne, & Jetten, 1994). In fact, even when the suppression goal is still in place it is possible that the monitoring process will result in the to-be-suppressed thought becoming so accessible that it overpowers the conscious goal

that is attempting to suppress these thoughts. This can occur, according to Wegner, because the monitoring process is simpler than the compensatory response it oversees and is relatively free from capacity restrictions. Thus, if capacity is restricted in any way, the operating process (suppression) will cease, the monitoring process will continue, and nothing is left to hold the hyperaccessible thought at bay.

Operations: The Compensatory Responses That Comprise Striving

The focus here is on the "O" in the TOTE model—the operations that move one toward goal attainment. Responses that move the person toward a control criterion are compensatory; they compensate for the discrepancy between the current state and the desired state, for the fact the person is currently falling short of, or incomplete in movement toward, the control criterion. As with goal selection, the extant history of how goals are regulated has similarly been rooted in consciousness. After a goal has been selected, regulation of the goal is typically observed in research situations that clearly affords an opportunity for overt behavior to compensate for the discrepancy in question. One's goal is one's focus of conscious attention as responses are initiated, and these responses are driven by awareness that they could be used to address the goal (e.g., Baumeister & Jones, 1978; Gollwitzer, Wicklund, & Hilton, 1982; Monteith, 1993; Stone, Wiegand, Cooper, & Aronson, 1997). Classic theories in which this approach is evidenced include the theory of symbolic self-completion (Wicklund & Gollwitzer, 1982), self-discrepancy theory (Higgins, 1989), behavioral inhibition theory (Monteith, Ashburn-Nardo, Voils, & Czopp, 2002), control theory (Carver & Scheier, 1981), the continuum model of impression formation (Fiske & Neuberg, 1990), and self-affirmation theory (Steele, 1988).

However, compensatory operations span the entire range of human responding, from overt action and conscious evaluation of objects and people to preconscious responses that occur within milliseconds of encountering a goal-relevant target, which Moskowitz (2001) labeled as *compensatory cognition*. Compensatory responses can thus be conscious or nonconscious. Crossing this with the point raised earlier that goal selection can also be either conscious or nonconscious creates a minimum of four classes of operations (Moskowitz & Ignarri, 2009). One can enact (a) conscious responses to address conscious goals, (b) implicit responses to address conscious goals, (c) conscious responses to address implicitly triggered goals, and (d) implicit responses that are in the service of implicitly primed goals.

It is this last class of operations that represents a novel development in the study of goals over the past decade and thus will be the focus here.* As with the acquisition of any skill, operations become implicit through practice and routine performance. In this case the operation is not merely easily performed, but the response is also implicitly associated to a goal with which it had been repeatedly

* For a detailed review of how conscious operations reduce discrepancies and resolve goal-related tensions (and thus release the striving) in a specific theory, Wicklund and Gollwitzer's (1982) book *Symbolic Self-Completion* is an excellent example, and among the first to import this logic to the study of motivated behavior. For a broad survey of the type of conscious and nonconscious operations in the service of both explicit and implicit goals, Moskowitz (2009) has written a recent review.

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paired during skill acquisition. This allows the goal, or the presence of cues relating to the goal, to trigger the response without consciousness (e.g., Bargh, 1990; Kruglanski, 1996), as was established earlier when reviewing the case for means as part of the goal representation. This logic of means being implicitly triggered, including implicit inhibitory processes, by specific implicit goals is what underlies research on the phenomena of *goal shielding* (Shah, 2003a) and *counteractive control* (Fishbach et al., 2003).

Kruglanski et al. (2002) argued that because goals are embedded within a system or network of many competing goal representations, a selected goal needs to be regulated by *goal shielding* operations that facilitate compatible goals and inhibit incompatible goals in an implicit, horizontal, communication and triggering among goals. Examples of goal shielding provide excellent illustrations of the implicit nature of the operations that are serving implicit goals. In one experiment, Shah (2003a) led participants to believe they would be performing two tasks. The first task was described as assessing "analytic reasoning" and the second task was said to assess "creativity." For some of the participants these two goals were seen as facilitating one another (compatible), and for other participants they were seen as irrelevant to each other. Before the reasoning task the participants were primed with either a control item or a cue that triggered their creativity goals (in this case, the name of a significant other who valued them having creativity goals). Goal shielding in the form of response facilitation was illustrated, but only among participants who viewed the two goals as compatible. Priming a person with a compatible goal (creativity) initiated implicit operations that pulled attention toward and promoted the reasoning goal. Performance on the task was superior if primed with a compatible goal as compared to a control item.

Hassin, Aarts, Eitam, Custers, and Kleiman (2009) similarly illustrated the triggering of implicit operations from an implicitly primed goal by focusing on the impact exerted on a compatible goal. Participants were given the conscious goal of solving equations while simultaneously memorizing lists of words (the operation span task; Turner & Engle, 1989). Some participants had this conscious goal preceded by the compatible goal of "achievement" being made accessible. They found that the task performance of participants primed with achievement was better than a control group because of the implicit operations that facilitated task performance. Primed participants unknowingly devoted more resources to the tasks and were faster at achieving the same working memory span. The primed goal triggered operations associated with it that facilitated performance on the conscious task.

Implicit operations in goal shielding are also exhibited by intergoal inhibition. In one experiment Aarts, Custers, and Holland (2007) had half of the participants triggered with the goal of socializing with other students. The remaining participants did not have this goal. A second goal of studying for exams was introduced to all participants through a priming procedure. These goals are incompatible. Inhibition was assessed in a sequential priming task: Primes either related to the goal of studying or irrelevant to studying were presented and were followed by targets related to socializing goals. When the goal to study was first primed, response times to the targets relating to socializing were slowed, indicating inhibition. This inhibition occurred only among people who had the goal to socialize—no inhibition

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occurred in the absence of a competing goal. Thus, in cases of goal incompatibility, implicit processes of inhibition are triggered. Shah (2003a) similarly illustrated that implicit processes of inhibition are triggered as part of the goal shielding process. People were asked to perform a task that was described as a measure of their "verbal fluency." This goal of pursuing their verbal fluency skills was, however, preceded by a priming manipulation where some participants had an incompatible goal implicitly introduced (whereas others had compatible goals and others irrelevant goals). The implicitly primed goal was implicitly shielded; this included operations that undermined performance on the conscious task when that verbal fluency task was incompatible with the primed goal and facilitated performance when the goals were compatible (relevant to when an irrelevant goal is primed). The goal of verbal fluency was inhibited and facilitated as part of the operations associated with the triggering of the implicit goal.

My own research in the domain of stereotype control has similarly examined the preconscious manner in which people engage in regulation of egalitarian goals and inhibit stereotypes. For example, it is well established that stereotypes are associated with groups and that thinking about the group (whether consciously or not) triggers stereotypes of the group, often without awareness and with undetected (and typically unwanted) influence over how one thinks and acts (e.g., Bargh, Chen, & Burrows, 1996; Darley & Gross, 1983; Devine, 1989; Macrae, Bodenhausen, & Milne, 1995). This occurs because thinking about stereotypes had at one time been consciously paired with thinking about the group, especially when one had the goal in place of forming an impression of a group member, deciding how to act with a group member, or anticipating the next behavior likely to be displayed by the group member. The pairing of the group, the stereotype, and these goals, repeatedly, over a life history, lead ultimately to the chain being rattled-off preconsciously (e.g., Moskowitz, 2010). Exposure to cues (such as faces) relating to the group (even subliminally) will trigger the goal associated with the interpersonal context and the means (such as the use of stereotypes) by which that goal is delivered.

A person with a goal of making a fast and functional prediction about what a person is like (and likely to do) may have stereotypes triggered when they see an African American man. However, the implicit response, the operation triggered in response to the cue, should be totally different if the goal that is triggered opposes stereotyping. For example, a goal such as being egalitarian is incompatible with stereotyping and should trigger the inhibition, rather than the activation, of stereotypes. What may be thought of as a typical response to a stimulus (such as a man having a stereotype triggered after exposure to a woman) is truly only a typical response to a stimulus under a specific goal discrepancy that is being implicitly regulated. Altering the goal will change the "typical" response. Stereotype activation is only typical because goals that promote stereotyping (e.g., fast closure, self-esteem promotion) are typical during interpersonal interaction. Given an alternate goal, stereotypes could be inhibited in a wholly implicit fashion; goals that are implicitly held would trigger operations that are implicitly carried out, resulting in stereotypes being inhibited without stereotypes ever having come to mind.

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Moskowitz, Gollwitzer, Wasel, and Schaal (1999) illustrated this by focusing on chronically held goals. Individuals with a permanent state of readiness to pursue egalitarian goals were identified and pitted against individuals who held no particular goals relating to fairness or race or gender. They performed a reaction time task that identified levels of stereotype activation and inhibition. The results revealed implicit processes of stereotype inhibition among the chronic egalitarians as opposed to, under the exact same cueing conditions, stereotype activation for the control group. The implicit goal was triggering inhibition even though participants did not realize they held the goal, that the task they were performing had anything to do with stereotyping, or that inhibition was being engaged as a way to compensate for or counteract the goal having been triggered. Moskowitz and Li (2011) fused the goal-shielding research of Shah (2003a, 2003b) with the stereotype inhibition finding of Moskowitz et al. Rather than identifying types of individuals with chronic goals that were associated with stereotype inhibition, they focused on the important issue that goal shielding of this sort would occur for any individual who had the implicit goal to be egalitarian. The goal to be egalitarian was created in one context where participants wrote about previous failures at being egalitarian to African American men (and a control group wrote about failures at a goal irrelevant to stereotyping). Participants then moved to a new task where stereotype inhibition and activation were assessed. The control group revealed stereotype activation, whereas the randomly selected group of people who had the egalitarian goal created on the first task revealed implicit inhibition of stereotypes on the second task. Stereotypes were inhibited even though participants were not aware of holding the goal at the time responses were made, and even though they did not know the task had anything to do with stereotyping, its control, or the egalitarian goals they had previously written about. Their compensatory response to the goal was implicit cognition—proactive stereotype inhibition.

What this review suggests is that many operations, even those that occur preconsciously, are goal driven, even if the goal itself is not consciously detected. More important, it suggests that how people respond, whether they are aware of it or not, is a compensatory reaction to such goals and that if the goal is altered, the response will be altered because a different equifinal set of means will be triggered. Earlier it was suggested that means and obstacles are part of a goal representation and that this developed for functional reasons. Here we see that function. The triggering of the means allows for efficient responding, while the associative link to the obstacles allows for the inhibition of incompatible goals and incompatible actions (ones that would undermine goal pursuit).

Persistence and Disengagement

Operations compensate for a detected discrepancy arising from a monitoring process. A last issue regarding the recursivity of the feedback loop is when one disengages versus when one persists at goal pursuit. The answers to this question are complex, and a comprehensive review is beyond the scope of this chapter. However, Fishbach and Finkelstein (Chapter 7, this volume) provide such a thorough review

of persistence and disengagement as possible reactions to negative feedback. A few points are raised here.

Research on self-completion theory (Wicklund & Gollwitzer, 1982) has found that commitment to one's higher-order goals is one determinant of whether compensatory efforts are increased in the face of failure. People weakly committed to a goal domain are more likely to disengage in the face of shortcomings. Brehm and Self (1989) offered an *energization theory* of motivation to describe when people step up compensatory efforts in the face of negative feedback. A person's potential energization, or readiness to exert effort, is said to be determined by the perceived difficulty of the task at hand (with the exception of tasks perceived to be so difficult as to be impossible) and the instrumentality of task completion for attaining one's higher-order goals. It is also shaped by classic motivational factors, such as the strength of the need (or higher-order goal), that yielded the goal and by the incentive value of the task. Thus, when strong needs are being addressed by a task, or when the task itself has high incentive value, persistence is likely, even when the challenge is a difficult one. However, with low levels of energization, even a simple task may be disengaged when failure is confronted.

An extensive body of research on *action control* (for a review, see Kuhl & Beckmann, 1994) provides one description of the processes involved in a person's giving up on an incentive (another is Klinger's, 1975, stage theory of disengagement). Action control theory sees disengagement as at times functional and adaptive, such as when persisting produces decrements to one's financial situation (Gilovich, 1983), decision making (Brockner, 1992), and well-being (Wrosch & Heckhausen, 1999). To determine whether to disengage involves updating working memory so that some goals are eliminated and others are now adopted. The ability to engage in this cognitive process varies as a function of an individual difference variable identified as action versus state orientation (for a review, see Jostmann & Koole, 2009).

Disengagement, or exiting, from a goal pursuit is not always a result of an analysis that reveals the goal is unlikely to be attained, or that an alternate goal is afforded a greater chance for success given current circumstances. Often disengaging from goal operations results from success at goal pursuit. That is, the value associated with an end state invests in a discrepancy a desire to strive. Yet once the end state is arrived at, the discrepancy dissipates. The resulting lack of a discrepancy does not signal the end state no longer has value, but merely that striving to attain that state, enacting means to approach it, is no longer of use. While we have already seen that without affect a discrepancy cannot be spoken of as being a goal, here it is being asserted that without a discrepancy one also cannot speak of a desired end state as being a goal (as opposed to it being a wish, attitude, or emotion). Affect and discrepancy in a representation lead to striving and motivates or energizes human behavior, and once the value or the discrepancy is gone, the goal is no more. For this reason, success toward a goal, which reduces or eliminates the discrepancy, will terminate the goal, leading the recursivity of the loop to be halted. This is the "E" in the TOTE model.

Lewin (1935, 1951) suggested that the discrepancy functions much the same as the drive associated with a need state. Drives are described as a tension arising from tissue deficits (need states) that energize responses, responses that will

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reduce the deficit. For example, the tension associated with a need state such as hunger can be reduced by the organism being driven to approach one of many possible types of food. Goals do not involve tissue deficits, but they similarly involve deficits—discrepancies from a desired state. It is for this reason Lewin referred to such discrepancies as *quasi-needs*. Discrepancies energize the organism because they are experienced by the organism as a tension, an undesired state, and the organism is impelled to reduce this through goal-directed responding. Once the goal has been attained, the discrepancy is alleviated and the energizing tension recedes, bringing goal-relevant responding to an end.

Two principles of persistence and disengagement emerge from this discussion. First, the individual will *persist* at responding *until* the discrepancy is reduced and the tension is alleviated (for a detailed review of this logic see, Martin & Tesser, 2009). That is, discrepancies energize responding, and this energy to respond persists until the discrepancy is resolved or the goal is otherwise disengaged. Second, the tension is divested from the organism when the monitoring or feedback reveals that the discrepancy no longer exists, and this divestiture of energy results in the system's shutting down any and all goal-relevant responding relating to that specific discrepancy.

Evidence for persistence as the response to failure, or stepping up efforts as the response when the second "test" in the TOTE recursivity loop reveals a continued discrepancy, comes from research in which behavior is marked by characteristics such as "vigorous acting toward goal attainment, persistence in the face of obstacles, and resumption after disruption" (Bargh et al., 2001, p. 1016). Such persistence and resumption are displayed even when a goal is nonconsciously triggered and the person lacks the conscious intent to initiate responding (Bargh et al., 2001). Persistence and resumption responses are also found to extend over time as the goal is not attained and one moves further from the moment in which the goal was selected. Indeed, the discrepancy is posited to even grow stronger as time passes and the end state is not approached. These characteristics reveal the uniqueness of the goal representation. Other representations (schemas, stereotypes, etc.) can be triggered, but the passage of time weakens their activation as accessibility strength dissipates (e.g., Higgins, Bargh, & Lombardi, 1985). Goal representations, however, because of the tension state that is constantly being reinvigorated by monitoring (and feedback relating to that monitoring), do not see its charge dissipate with time. Goal pursuit instead looms larger as time passes, increasing in strength over time as long as the discrepancy persists (e.g., Aarts et al., 2004; Bargh et al., 2001; Custers, 2009; Liberman & Förster, 2000). So long as monitoring processes continue to provide feedback that the goal has not yet been reached, the goal is repeatedly being reactivated, potentially growing in strength with the monitor's continuing functioning (e.g., Curtis & D'Esposito, 2003; Custers, 2009; Wegner, 1994).

In summary, tension states in a goal representation dictate that goals stay accessible and energize responding until the goal is attained, without weakening with the passage of time. Evidence for each piece of this puzzle—goal accessibility failing to dissipate with time and accessibility discharged and energy divested with goal attainment—has accrued in the past decade. The goal's persistence over

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time has been revealed by Bargh et al. (2001), using a delay manipulation. In their study, the goal of having "high performance" was introduced without conscious awareness. Half of the participants were asked to immediately solve word puzzles, while the remaining half were asked to first spend 5 minutes drawing a family tree before solving the word puzzles. Although this behavioral task was used to assess goal strength, a perceptual task (forming a judgment of a person) was used to assess semantic construct (as opposed to goal) accessibility. The results revealed that the semantic representation of the concept of "high performance" dissipates with time (weaker impact on judgment after the 5-minute delay); however, the behavioral impact increased after the delay (more puzzles were solved after delay rather than immediately). These results suggest that the goal representation contains a tension state that increases as time passes and the goal is not attained.

Whereas time serves to increase the tension associated with the goal representation, goal attainment will terminate it. Experiments have illustrated this by showing that goal-directed responding is brought to a halt after the goal is attained (e.g., Cesario, Plaks, & Higgins, 2006; Förster, Liberman, & Higgins, 2005; Koole et al., 1999; Liberman & Förster, 2000). My own research has illustrated this in the area of stereotype control. In one experiment, Moskowitz et al. (2011) gave participants the goal to control stereotyping by having them focus on a discrepancy in this area—writing about a time their own behavior violated the standard of being a fair, egalitarian, and nonprejudiced person. The tension instigated by this discrepancy energized goal-directed responding in the form of inhibition of stereotypes on a subsequent task. Stereotyping versus stereotype inhibition was assessed in a second phase of the experiment with a reaction time task in which words related to stereotypes of African American men followed images of African American versus White men. Before performing this task, half the participants spent time working on a filler task. The remaining participants spent the same amount of time on a task meant to resolve the discrepancy that had just been created—they wrote about instances of recent success at being egalitarian toward Black men. Thus, two groups of participants entered the reaction time phase of the experiment: those with discrepancies relating to being nonprejudiced who had only written about this issue once and those with the discrepancy introduced and then resolved by writing about this issue twice.

The results revealed support for the tension state being dissipated for the latter group, but persisting for the former group. People who never resolved the discrepancy responded to stereotype-relevant words slower when they followed faces of African American men than White men, indicating that stereotypes of African American men were being inhibited. However, participants who had contemplated success at being nonprejudiced showed the exact opposite effect. Ironically, these individuals were not inhibiting stereotypes, but were actually stereotyping when exposed to images of African American men. This illustrates the role of tension states associated with a goal in causing inhibition, as well as illustrating the cessation of inhibition when tension states are alleviated. It is important to further note that stereotype control as specified by the goal was brought to a halt by the people who spent twice the amount of time thinking about the goal (due to having written two essays about their performance in this domain). However, people who spent

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half the time thinking about the goal persisted at the goal because their thoughts, though less frequent, were restricted to focusing on their discrepancies. Tension reduction versus tension persistence distinguishes these groups, and goal alleviation versus goal pursuit (in the form of stereotyping vs. inhibition of stereotyping) followed, respectively. The individuals who attained the goal, or who had removed the discrepancy, stopped trying to attain the goal. With the tension released, the goal was also released, and with it the desire to inhibit stereotypes was replaced with heightened stereotyping.

Liberman and Förster (2000) provided another illustration of a goal-completion procedure shutting down the monitoring system, thus eliminating the tension and its consequent effects. Participants with an implicitly triggered goal who were allowed to satisfy the goal showed no evidence of goal-relevant responding. When there was no opportunity to satisfy the implicit goal, participants persisted in their goal-relevant responding (see also Bargh et al., 2001). Förster et al. (2005) similarly found that there was a stronger tension state when a goal had not been fulfilled, as illustrated by participants being faster at recognizing goal-relevant words in a lexical decision task. However, after having completed the goal these same words were responded to more slowly.

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Resources

The final principle of regulation raised by Shah and Gardner (2008) to be reviewed here is that resources for goal pursuit are finite and goals are in direct competition within a goal system for these shared but limited resources (e.g., Vohs et al., 2009). The notion of control as tapping a potentially exhaustible regulatory resource is a somewhat old idea (e.g., Kahneman, 1973; Kanfer, Ackerman, Murtha, Dugdale, & Nelson, 1994) that has been shown to constrain regulatory responses relating to physical and mental energy (Hockey, 1996; Wright & Brehm, 1989; Zijlstra, 1996) as well as executive functioning (e.g., Schmeichel & Baumeister, 2004). Any given goal that is being regulated is depleting this resource to some degree, and when depletion escalates to the point of the resource pool having been usurped, it results in a temporary loss in self-control ability (what has been called *ego depletion*). The effects of ego depletion are not restricted to the specific domain responsible for the depletion; it represents a general loss of ability to engage in self-control of any sort, ranging from resisting cookies to performing a Stroop task (e.g., Richeson & Trawalter, 2005; Vohs, Baumeister, & Ciarocco, 2005). Thus, to ensure that resources are available for simultaneous as well as future goal pursuits one must plan for future discrepancies much the way a family must not only allocate money for today's expenses but for next year's vacation and the children's college fund. One must anticipate the other goals in the system that may need to be pursued in the immediate future in order to allocate resources among one's goal pursuits efficiently.

However, it is important to note that ego depletion is a temporary state, with regulatory ability returning after rest or other interventions. Vohs et al. (2009) proposed that while the amount of regulatory strength one has in a given

moment is finite, there is not a finite pool in the sense that resources cannot be bolstered or strengthened, just as muscles are strengthened with exercise. For example, Gailliot, Plant, Butz, and Baumeister (2007) found that practice at exerting regulation made the resource pool more resistant to depletion. Their participants regulated their stereotypes by suppressing stereotypic thoughts at two points in time separated by 2 weeks. During this period some participants were in a "regulation practice" condition that allowed their regulatory muscles in general to develop through exercises such as using their nondominant hand when performing daily life activities (changing the channel, using a mouse, brushing teeth). The results revealed a benefit to stereotype control from practice at self-regulation. Recent research has attempted to identify the biological basis of this pool that could have such generalized effects on regulatory ability. Some evidence suggests that glucose levels are related to resources for self-regulation. In one experiment it was shown that increasing the amount of glucose in the blood (by consuming a glucose-rich drink) eliminated the depleting effects of engaging in control (Gailliot et al., 2007).

Finally, the limited nature of resources available for goal pursuit has a far older history than that provided by research relating to ego depletion. Allport (1954) described a principle of limited capacity in which humans were said to have restrictions to working memory introduced by dual task settings and stimulus overload (see also Bruner, 1957; Kahneman, 1973). These capacity restrictions and conditions of "cognitive load" have been a primary focus of research arising from dual process models in social psychology; models that reveal the effort required to pursue goals—such as correcting for biases, considering situations, being accountable, pursuing accuracy, thinking systematically, and not stereotyping (to name just a few goals)—are disrupted when cognitive resources are usurped by load (e.g., Brewer, 1988; Chaiken, Liberman, & Eagly, 1989; Fiske & Neuberg, 1990; Gilbert & Hixon, 1991; Gilbert, Pelham, & Krull, 1988; Tetlock, 1985; for a review, see Moskowitz, Skurnik, & Galinsky, 1999).

For example, people with the goal of being accurate in their judgments have been shown to overturn the effects of implicit sources of bias by engaging in "deeper" processing that rejects first available impressions arrived at in favor of a more complete and complex analysis. Neuberg (1989) revealed that people pursuing such goals are less impacted by expectations and instead seek information inconsistent with their expectations to incorporate into their view as the "operation" relevant to this goal. Thompson, Roman, Moskowitz, Chaiken, and Bargh (1994) revealed that people pursuing such goals are less impacted by accessible traits and instead form judgments that consider alternative and opposing qualities to describe a person aside from those that were primed. Kruglanski and Freund (1983) showed that teachers, presumably with chronic goals of being accurate in grading assignments, evaluate papers according to the content of the composition, not the color of the student's skin. However, in each of these examples, as with many others, resource restrictions undermine the ability to pursue the goal, eliminating the benefits otherwise afforded by deeper processing. Despite wanting to be accurate, resource limits prevent goal pursuit due to the inability to engage the effort to perform the compensatory responses required. This capacity limitation

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can be overcome when the compensatory response itself is implicit (e.g., Bargh & Thein, 1985), but, more generally, resource restrictions undercut efficacy, reducing perceived feasibility.

CONCLUSIONS

This chapter has addressed the basic building blocks of goal pursuit. The first focus was on defining, in concrete terms, the goal itself—its features and how it is represented in the mind. The next generation of research is attempting to map out the cognitive and affective components at a more structural level. What brain structures are involved in goal pursuit? How do goals, both vertically and horizontally, communicate? By what means is affect transferred, inhibition spread, and facilitation moved along the goal system? (For a review of current progress, see Satpute, Ochsner, & Badre, Chapter 2, this volume.)

The chapter's second focus was on the regulation of goals. The review revealed that regulation can involve effort and that this effort can exhaust resources. However, it also revealed that even after conscious effort has been disengaged from goal pursuit, regulation continues to occur outside of consciousness (such as when the solution to a problem one had been working on arrives at this point as if from out of the blue). It was even revealed, ironically, that the effort that is dedicated to bringing about a goal can at times be one of the obstacles to goal pursuit. The conscious trying associated with a goal, the feeling of exerting effort or of willing something, actually makes it less likely that one can attain that very goal. For example, thought suppression can lead to hyperaccessibility of the unwanted thoughts (e.g., Wegner, 1994). Thus, any model of goal pursuit needs to disentangle the effort dedicated to regulating a goal pursuit from the efficient processing also useful and necessary for regulating a desired goal.

Many conceptions of automaticity in responding have treated it as a source of error and bias (such as the use of heuristics in decision making; e.g., Tversky & Kahneman, 1974), whereas consciousness is seen as promoting accuracy. Other examinations have illustrated that implicit and explicit goal pursuit yield similar results (e.g., Chartrand & Bargh, 1996). Bargh and Huang (2009) highlighted the relevance of these issues for the field moving forward. They argued that goals utilize brain structures and processes developed separate from consciousness and earlier in our evolutionary past. While regulating the pursuit of a goal consciously makes use of the same underlying structures as those used by the evolutionarily older processes of unconscious goal regulation, it is possible that while using those structures, the outputs that are produced (cognitions, beliefs) are altered in a non-maximal (perhaps error-prone) way. Thus, in some instances we see nonconscious mechanisms of goal pursuit producing "better" outcomes for the individual than conscious pursuit, because consciousness introduces bias to processes that would work fine without it. Understanding when and how goal pursuit, benefits from consciousness, or is better left bereft of it, is certainly a topic of concern for the next wave of researchers now that we have firmly established that a role for the nonconscious does exist. Sorting through when and how these benefits accrue is at its genesis.

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REFERENCES

Aarts, H., Custers, R., & Holland, R. W. (2007). The nonconscious cessation of goal pursuit: When goals and negative affect are coactivated. *Journal of Personality and Social Psychology, 92*, 165–178.

Aarts, H., & Dijksterhuis, A. (2000). Habits as knowledge structures: Automaticity in goal-directed behavior. *Journal of Personality and Social Psychology, 78*(1), 53–63.

Aarts, H., & Dijksterhuis, A. (2003). The silence of the library: Environment, situational norm, and social behavior. *Journal of Personality and Social Psychology, 84*, 18–28.

Aarts, H., Dijksterhuis, A. P., & Midden, C. (1999). To plan or not to plan? Goal achievement of interrupting the performance of mundane behaviors. *European Journal of Social Psychology, 29*, 971–979.

Aarts, H., Gollwitzer, P. M., & Hassin, R. R. (2004). Goal contagion: Perceiving is for pursuing. *Journal of Personality and Social Psychology, 87*(1), 23–37.

Allport, G. W. (1954). *The nature of prejudice*. Reading, MA: Addison-Wesley.

Atkinson, J. W. (1964). *An introduction to motivation*. Princeton, NJ: Van Nostrand.

Bandura, A. (1989). Perceived self-efficacy in the exercise of personal agency. *Psychologist: Bulletin of the British Psychological Society, 2*, 411–424.

Bandura, A. (1997). *Self-efficacy. The exercise of control.* New York: Freeman.

Bandura, A., & Schunk, D. H. (1981). Cultivating competence, self-efficacy, and intrinsic interest through proximal self-motivation. *Journal of Personality and Social Psychology, 41*, 586–598.

Bargh, J. A. (1982). Attention and automaticity in the processing of self-relevant information. *Journal of Personality and Social Psychology, 43*, 425–436.

Bargh, J. A. (1990). Auto-motives: Preconscious determinants of social interaction. In E. T. Higgins & R. M. Sorrentino (Eds.), *Handbook of motivation and cognition: Foundations of social behavior* (Vol. 2, pp. 93–130). New York: Guilford.

Bargh, J. A., Chaiken, S., Govender, R., & Pratto, F. (1992). The generality of the automatic attitude activation effect. *Journal of Personality and Social Psychology, 62*, 893–912.

Bargh, J. A., Chen, M., & Burrows, L. (1996). Automaticity of social behavior: Direct effects of trait construct and stereotype activation on action. *Journal of Personality and Social Psychology, 71*(2), 230–244.

Bargh, J. A., Gollwitzer, P. M., Lee-Chai, A., Barndollar, K., & Trötschel, R. (2001). The automated will: Nonconscious activation and pursuit of behavioral goals. *Journal of Personality and Social Psychology, 81*(6), 1014–1027.

Bargh, J. A., & Huang, J. Y. (2009). The selfish goal. In G. B. Moskowitz & H. Grant Halvorson (Eds.), *The psychology of goals* (pp. 127–150). New York: Guilford.

Bargh, J. A., & Pratto, F. (1986). Individual construct accessibility and perceptual selection. *Journal of Experimental Social Psychology, 22*, 293–311.

Bargh, J. A., & Thein, R. D. (1985). Individual construct accessibility, person memory, and the recall-judgment link: The case of information overload. *Journal of Personality and Social Psychology, 49*, 1129–1146.

Baumeister, R. F., & Jones, E. E. (1978). When self-presentation is constrained by the target's prior knowledge: Consistency and compensation. *Journal of Personality and Social Psychology, 36*, 608–618.

Bayer, U., Achtziger, A., Gollwitzer, P. M., & Moskowitz, G. B. (2009). Responding to subliminal cues: Do if-then plans facilitate action preparation and initiation without conscious intent? *Social Cognition, 27*, 183–201.

Berridge, K. C. (2001). Reward learning: Reinforcement, incentives, and expectations. In D. L. Medin (Ed.), *The psychology of learning and motivation: Advances in research and theory* (Vol. 40, pp. 223–278). San Diego, CA: Academic Press.

Brandstätter, V., Lengfelder, A., & Gollwitzer, P. M. (2001). Implementation intentions and efficient action initiation. *Journal of Personality and Social Psychology, 81*, 946–960.

Brehm, J. W., & Self, E. A. (1989). The intensity of motivation. *Annual Review of Psychology, 40*, 109–131.

Brendl, M. C., & Higgins, E. T. (1996). Principles of judging valence: What makes events positive or negative? In M. Zanna (Ed.), *Advances in experimental social psychology* (pp. 95–160). San Diego, CA: Academic Press.

Brewer, M. B. (1988). A dual process model of impression formation. In T. K. Srull & R. S. Wyer (Eds.), *Advances in social cognition* (Vol. 1, pp. 1–36). Hillsdale, NJ: Erlbaum.

Brockner, J. (1992). The escalation of commitment to a failing course of action: Toward theoretical progress. *Academy of Management Review*, *17*, 39–61.

Bruner, J. S. (1957). On perceptual readiness. *Psychological Review, 64*, 123–152.

Cacioppo, J. T., Priester, J. R., & Berntson, G. G. (1993). Rudimentary determinants of attitudes: II. Arm flexion and extension have different effects on attitudes. *Journal of Personality and Social Psychology, 65*, 5–17.

Carlston, D. E., & Smith, E. R. (1996). Principles of mental representation. In E. T. Higgins & A. W. Kruglanski (Eds.), *Social psychology: Handbook of basic principles* (pp. 184–210). New York: Guilford.

Carver, C. S., & Scheier, M. F. (1981). *Attention and self-regulation: A control theory approach to human behavior*. New York: Springer.

Carver, C. S., & Scheier, M. F. (1990). Principles of self regulation: Action and emotion. In E. T. Higgins & R. M. Sorrentino (Eds.), *Handbook of motivation and cognition: Foundations of social behavior* (Vol. 2, pp. 3–52). New York: Guilford.

Carver, C. S., & Scheier, M. F. (1998). *On the self-regulation of behavior*. New York: Cambridge University Press.

Carver, C. S., & Scheier, M. F. (1999). Themes and issues in the self regulation of behavior. In R. S. Wyer (Ed.), *Perspectives on behavioral self regulation* (pp. 1–106). Mahwah, NJ: Erlbaum.

Cesario, J., Plaks, J. E., & Higgins, E. T. (2006). Automatic social behavior as motivated preparation to interact. *Journal of Personality and Social Psychology, 90*, 893–910.

Chaiken, S., Liberman, A., & Eagly, A. H. (1989). Heuristic and systematic information processing within and beyond the persuasion context. In J. S. Uleman & J. A. Bargh (Eds.), *Unintended thought* (pp. 212–252). New York: Guilford.

Chartrand, T. L., & Bargh, J. A. (1996). Automatic activation of impression formation and memorization goals: Nonconscious goal priming reproduces effects of explicit task instructions. *Journal of Personality and Social Psychology*, *71*(3), 464–478.

Chen, M., & Bargh, J. A. (1999). Consequences of automatic evaluation: Immediate behavioral predispositions to approach or avoid the stimulus. *Personality and Social Psychology Bulletin, 25*, 215–224.

Craik, K. J. W. (1947). Theory of the human operator in control systems: I. The operator as an engineering system. *British Journal of Psychology, 38*, 56–61.

Curtis, C. E., & D'Esposito, M. (2003). Persistent activity in the prefrontal cortex during working memory. *Trends in Cognitive Science,* 7(9), 415–423.

Custers, R. (2009). How does our unconscious know what we want? The role of affect in goal representations. In G. B. Moskowitz & H. Grant (Eds.), *The psychology of goals* (pp. 179–202). New York: Guilford.

Custers, R., & Aarts, H. (2005). Positive affect as implicit motivator: On the nonconscious operation of behavioral goals. *Journal of Personality and Social Psychology, 89*, 129–142.

Custers, R., & Aarts, H. (2007). Goal-discrepant situations prime goal-directed actions if goals are temporarily or chronically accessible. *Personality and Social Psychology Bulletin, 33*, 623–633.

Downloaded by [Karen Hudson] at 03:29 22 March 2015

Darley, J. M., & Gross, P. H. (1983). A hypothesis-confirming bias in labelling effects. *Journal of Personality and Social Psychology, 44*, 20–33.

Deci, E. L., & Ryan, R. M. (1991). A motivational approach to self: Integration in personality. In R. Dienstbier (Ed.), *Nebraska symposium on motivation* (Vol. 38, pp. 237–288). Lincoln: University of Nebraska Press.

Devine, P. G. (1989). Stereotypes and prejudice: Their automatic and controlled components. *Journal of Personality and Social Psychology, 56*, 5–18.

Devine, P. G., Plant, E. A., Amodio, D. M., Harmon-Jones, E., & Vance, S. L. (2002). The regulations of explicit and implicit race bias: The role of motivations to respond without prejudice. *Journal of Personality and Social Psychology, 82*(5), 835–848.

Duval, S., & Wicklund, R. A. (1972). *A theory of objective self-awareness*. New York: Academic Press.

Dweck, C. S. (1991). Self-theories and goals: Their role in motivation, personality, and development. In R. Dienstbier (Eds.), *Nebraska symposium on motivation* (Vol. 38, pp. 199–255). Lincoln: University of Nebraska Press.

Eder, A., & Rothermund, K. (2008). When do motor behaviors (mis)match affective stimuli? An evaluative coding view of approach and avoidance reactions. *Journal of Experimental Psychology: General, 137*, 262–281.

Elliot, A. J. (2008). *Handbook of approach and avoidance motivation*. Mahwah, NJ: Erlbaum.

Elliot, A. J., & Church, M. A. (1997). A hierarchical model of approach and avoidance achievement motivation. *Journal of Personality and Social Psychology, 72*, 218–232.

Elliott, E. S., & Dweck, C. S. (1988). Goals: An approach to motivation and achievement. *Journal of Personality and Social Psychology, 54*, 5–12.

Elliot, A. J., & Harackiewicz, J. M. (1996). Approach and avoidance achievement goals and intrinsic motivation: A mediational analysis. *Journal of Personality and Social Psychology, 70*, 461–475.

Elliot, A. J., McGregor, H. A., & Gable, S. L. (1999). Achievement goals, study strategies, and exam performance: A mediational analysis. *Journal of Educational Psychology, 91*, 549–563.

Emmons, R. A. (1992). Abstract versus concrete goals: Personal striving level, physical illness, and psychological well-being. *Journal of Personality and Social Psychology, 62*(2), 292–300.

Fazio, R. H., Sanbonmatsu, D. M., Powell, M. C., & Kardes, F. R. (1986). On the automatic activation of attitudes. *Journal of Personality and Social Psychology, 50*, 229–238.

Ferguson, M. J. (2007). On the automatic evaluation of end-states. *Journal of Personality and Social Psychology, 92*, 596–611.

Fergusson, M. J., & Bargh, A. J. (2004). Liking is for doing: The effects of goal pursuit on automatic evaluations. *Journal of Personality and Social Psychology, 87*(5), 557–572.

Ferguson, M. J., & Porter, S. C. (2009). Goals and (implicit) attitudes: A social-cognitive perspective. In G. B. Moskowitz & H. Grant (Eds.), *The psychology of goals* (pp. 447–479). New York: Guilford.

Festinger, L., & Carlsmith, J. M. (1959). Cognitive sequences of forced compliance. *Journal of Abnormal and Social Psychology, 58*, 203–210.

Fishbach, A., Friedman, R., & Kruglanski, A. W. (2003). Leading us not into temptation: Momentary allurements elicit overriding goal activation. *Journal of Personality and Social Psychology, 84*(2), 296–309.

Fishbach, A., Shah, J. Y., & Kruglanski, A. W. (2004). Emotional transfer in goal systems. *Journal of Experimental Social Psychology, 40*(6), 723–738.

Fishbach, A., & Trope, Y. (2008). Implicit and explicit counteractive self control. In J. Y. Shah & W. L. Gardner (Eds.), *Handbook of motivation science* (pp. 281–294). New York: Guilford.

Downloaded by [Karen Hudson] at 03:29 22 March 2015

Fishbach, A., Zhang, Y., & Koo, M. (2009). The dynamics of self-regulation. *European Review of Social Psychology, 20*, 315–344.

Fiske, S. T., & Neuberg, S. L. (1990). A continuum of impression formation, from category-based to individuating processes: Influences of information and motivation on attention and interpretation. In M. P. Zanna (Ed.), *Advances in experimental social psychology* (Vol. 23, pp. 1–74). New York: Academic Press.

Fitzsimons, G. M., & Bargh, J. A. (2003). Thinking of you: Nonconscious pursuit of interpersonal goals associated with relationship partners. *Journal of Personality and Social Psychology, 84*(1), 148–163.

Förster, J., & Liberman, N. (2001). The role of attribution of motivation in producing postsuppressional rebound. *Journal of Personality and Social Psychology, 81*, 377–390.

Förster, J., Liberman, N., & Higgins, E. T. (2005). Accessibility from active and fulfilled goals. *Journal of Experimental Social Psychology*, *41*(3), 220–239.

Förster, J., & Werth, L. (2009). Regulatory focus: Classic findings and new directions. In G. B. Moskowitz & H. Grant (Eds.), *The psychology of goals* (pp. 392–422). New York: Guilford.

Fujita, K., Trope, Y., Liberman, N., & Levin-Sagi, M. (2006). Construal levels and self-control. *Journal of Personality and Social Psychology, 90*(3), 351–367.

Gailliot, M. T., Plant, E. A., Butz, D. A., & Baumeister, R. F. (2007). Increasing self-regulatory strength can reduce the depleting effect of suppressing stereotypes. *Personality and Social Psychology Bulletin, 33*, 281–294.

Galinsky, A. D., & Moskowitz, G. B. (2007). Further ironies of suppression: Stereotype and counter-stereotype accessibility. *Journal of Experimental Social Psychology, 42*, 833–841.

Gill, M. J., & Andreychik, M. R. (2007). Explanation and intergroup emotion: Social explanations as a foundation of prejudice-related compunction. *Group Processes & Intergroup Relations, 10*, 87–106.

Gill, M. J., & Andreychik, M. R. (2009). Getting emotional about explanations: Social explanations and social explanatory styles as bases of prosocial emotions and intergroup attitudes. *Social and Personality Psychology Compass, 3*, 1–17.

Gilbert, D. T., & Hixon, J. G. (1991). The trouble of thinking: Activation and application of stereotypic beliefs. *Journal of Personality and Social Psychology, 60*, 509–517.

Gilbert, D. T., Pelham, B. W., & Krull, D. S. (1988). On cognitive business: When person perceivers meet person perceived. *Journal of Personality and Social Psychology, 54*, 733–740.

Gilovich, T. (1983). Biased evaluation and persistence in gambling. *Journal of Personality and Social Psychology*, *44*, 1110–1126.

Gollwitzer, P. M. (1990). Action phases and mind-sets. In E. T. Higgins & R. M. Sorrentino (Eds.), *Handbook of motivation and cognition* (Vol. 2, pp. 53–92). New York: Guilford.

Gollwitzer, P. M. (1993). Goal achievement: The role of intentions. In W. Stroebe & M. Hewstone (Eds.), *European review of social psychology* (Vol. 4, pp. 141–185). Chichester, U.K.: Wiley.

Gollwitzer, P. M. (1999). Implementation intentions: Strong effects of simple plans. *American Psychologist, 54*, 493–503.

Gollwitzer, P. M., & Moskowitz, G. B. (1996). Goal effects on action and cognition. In E. T. Higgins & A. Kruglanski (Eds.), *Social psychology: Handbook of basic principles* (pp. 361–399). New York: Guilford.

Gollwitzer, P. M., Wicklund, R. A., & Hilton, J. L. (1982). Admission of failure and symbolic self-completion: Extending Lewinian theory. *Journal of Personality and Social Psychology, 43*, 358–371.

Grant, H., & Dweck, C. S. (2003). Clarifying achievement goals and their impact. *Journal of Personality and Social Psychology, 85*, 541–553.

Downloaded by [Karen Hudson] at 03:29 22 March 2015

Hamilton, D. L., Katz, L. B., & Leirer, V. O. (1980). Cognitive representations of personality impressions: Organizational processes in first impression formation. *Journal of Personality and Social Psychology, 39*, 1050–1063.

Hassin, R. R., Aarts, H., Eitam, B., Custers, R., & Kleiman, T. (2009). Non-conscious goal pursuit and the effortful control of behavior. In E. Morsella, J. A. Bargh, & P. M. Gollwitzer (Eds.), *Oxford handbook of the psychology of action* (pp. 549–568). New York: Oxford University Press.

Hassin, R., Aarts, H., & Ferguson, M. J. (2005). Spontaneous goal inferences. *Journal of Experimental Social Psychology, 41*, 129–140.

Hastie, R., & Kumar, P. A. (1979). Person memory: Personality traits as organizing principles in memory for behavior. *Journal of Personality and Social Psychology, 37*, 25–38.

Higgins, E.T. (1987). Self-discrepancy theory: A theory relating self and affect. *Psychological Review, 94*, 319–340.

Higgins, E. T. (1989). Self-discrepancy theory: What patterns of self-beliefs cause people to suffer? In L. Berkowitz (Ed.), *Advances in experimental social psychology* (Vol. 22, pp. 93–136). New York: Academic Press.

Higgins, E.T. (1997). Beyond pleasure and pain. *American Psychologist, 52*, 1280–1300.

Higgins, E. T., Bargh, J. A., & Lombardi, W. (1985). Nature of priming effects on categorization. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 11*, 59–69.

Higgins, E. T., Grant, H., & Shah, J. (1999). Self-regulation and quality of life: Emotional and non-emotional life experiences. In D. Kahneman, E. Diener, & N. Schwarz (Eds.), *Well-being: The foundations of hedonic psychology* (pp. 244–266). New York: Russell Sage.

Higgins, E. T., King, G. A., & Mavin, G. H. (1982). Individual construct accessibility and subjective impressions and recall. *Journal of Personality and Social Psychology, 43*(1), 35–47.

Hockey, G. (1996). Energetical-control processes in the regulation of human performance. In W. Battmann & S. Dutke (Eds.), *Processes of the molar regulation of behavior* (pp. 271–287). Berlin: Pabst.

Hsee, C. K., Abelson, R. P., & Salovey, P. (1991). The relative weighting of position and velocity in satisfaction. *Psychological Science, 2*, 263–266.

Hyland, M. E. (1988). Motivational control theory: An integrative framework. *Journal of Personality and Social Psychology*, *55*(4), 642–651.

Jostmann, N. B., & Koole, S. L. (2009). When persistence is futile: A functional analysis of action orientation and goal disengagement. In G. B. Moskowitz & H. Grant (Eds.), *The psychology of goals* (pp. 337–361). New York: Guilford.

Kahneman, D. (1973). *Attention and effort*. Upper Saddle River, NJ: Prentice-Hall.

Kanfer, R., Ackerman, P., Murtha, T., Dugdale, B., & Nelson, L. (1994). Goal setting, conditions of practice, and task performance: a resource allocation perspective. *Journal of Applied Psychology*, *79*(6), 826–835.

Kay, A. C., Wheeler, C. S., Bargh, J. A., & Ross, L. D. (2004). Material priming: The influence of mundane physical objects on situational construal and competitive behavioral choice. *Organizational Behavior and Human Decision Processes, 95*, 83–96.

Klinger, E. (1975). Consequences of commitment to and disengagement from incentives. *Psychological Review*, *82*(1), 1–25.

Koole, S. L., Smeets, K., van Knippenberg, A., & Dijksterhuis, A. (1999). The cessation of rumination through self-affirmation. *Journal of Personality & Social Psychology, 77*, 111–125.

Kruglanski, A. W. (1996). Goals as knowledge structures. In M. Gollwitzer & J. A. Bargh (Eds.), *The psychology of action* (pp. 599–618). New York: Guilford.

Downloaded by [Karen Hudson] at 03:29 22 March 2015

Kruglanski, A. W., & Freund, T. (1983). The freezing and unfreezing of lay inferences: Effects on impressional primacy, ethnic stereotyping, and numerical anchoring. *Journal of Experimental Social Psychology, 19*, 448–468.

Kruglanski, A., Shah, J., Fishbach, A., Friedman, R., Chun, W., Sleeth-Keppler, D., et al. (2002). A theory of goal systems. In M. P. Zanna (Ed.), *Advances in experimental social psychology*, (Vol. 34, pp. 331–378). San Diego, CA: Academic Press.

Kuhl, J., & Beckmann, J. (Eds.). (1994). *Volition and personality: Action versus state orientation*. Seattle, WA: Hogrefe & Huber.

Lavender, T., & Hommel, B. (2007). Affect and action: Towards an event-coding account. *Cognition and Emotion, 21*, 1270–1296.

LeDoux, J. (1996). *The emotional brain*. New York: Simon & Schuster.

Lewin, K. (1935). *A dynamic theory of personality.* New York: McGraw-Hill.

Lewin, K. (1951). *Field theory in social science.* New York: Harper & Bros.

Lewin, K., Dembo, T., Festinger, L., & Sears, P. S. (1944). Level of aspiration. In J. M. Hunt (Ed.), *Personality and the behavioral disorders* (pp. 333–371). New York: Roland Press.

Liberman, L., & Dar, R. (2009). Normal and pathological consequences of encountering difficulties in monitoring progress toward goals. In G. B. Moskowitz & H. Grant (Eds.), *The psychology of goals* (pp. 277–303). New York: Guilford.

Liberman, N., & Förster, J. (2000). Expression after suppression: A motivational explanation of postsuppressional rebound. *Journal of Personality and Social Psychology,* 79, 190–203.

Liberman, N., Sagristano, M., & Trope, Y. (2002). The effect of temporal distance on level of mental construal. *Journal of Experimental Social Psychology, 38*, 523–534.

Libet, B. (1985). Unconscious cerebral initiative and the role of conscious will in voluntary action. *Behavioral & Brain Sciences, 8*(4), 529–566.

Locke, E. A., & Latham, G. P. (1990). *A theory of goal setting and task performance*. Englewood Cliffs, NJ: Prentice-Hall.

Macrae, C. N., Bodenhausen, G. V., & Milne, A. B. (1995). The dissection of selection in person perception: Inhibitory processes in social stereotyping. *Journal of Personality and Social Psychology, 69*, 397–407.

Macrae, C. N., Bodenhausen, G. V., Milne, A. B., & Jetten, J. (1994). Out of mind but back in sight: Stereotypes on the rebound. *Journal of Personality and Social Psychology, 67*, 808–817.

Mahler, V. (1933). Ersatzhandlungen verschiedenen Realitätsgrades. *Psychologische Forschung, 18*, 27–89.

Markus, H. R., & Kitayama, S. (1991). Culture and the self: Implications for cognition, emotion, and motivation. *Psychological Review, 98*, 224–253.

Markus, H., & Ruvolo, A. (1989). Possible selves: Personalized representations of goals. In L. A. Pervin (Ed.), *Goal concepts in personality and social psychology* (pp. 211–241). Hillsdale, NJ: Erlbaum.

Martin, L. L., & Tesser, A. (2009). Five markers of motivated behavior. In G. B. Moskowitz & H. Grant (Eds.), *The psychology of goals* (pp. 257–276). New York: Guilford.

McArthur, L. Z., & Baron, R. (1983). Toward an ecological theory of social perception. *Psychological Review, 90*, 215–238.

McClelland, D. C. (1953). *The achievement motive*. New York: Appleton-Century-Crofts.

Miller, G. A., Galanter, E., & Pribram, K. H. (1960). *Plans and the structure of behavior*. New York: Holt, Rinehart & Winston.

Monteith, M. J. (1993). Self-regulation of prejudiced responses: Implications for progress in prejudice reduction efforts. *Journal of Personality and Social Psychology, 65*, 469–485.

Monteith, M. J., Ashburn-Nardo, L., Voils, C. I., & Czopp, A. M. (2002). Putting the brakes on prejudice: On the development and operation of cues for control. *Journal of Personality and Social Psychology, 83*, 1029–1050.

Downloaded by [Karen Hudson] at 03:29 22 March 2015

Moskowitz, G. B. (1993). Individual differences in social categorization: The effects of personal need for structure on spontaneous trait inferences. *Journal of Personality and Social Psychology, 65*, 132–142.

Moskowitz, G. B. (2001). Preconscious control and compensatory cognition. In G. B. Moskowitz (Ed.), *Cognitive social psychology: The Princeton symposium on the legacy and future of social cognition* (pp. 333–358). Mahwah, NJ: Erlbaum.

Moskowitz, G. B. (2002). Preconscious effects of temporary goals on attention. *Journal of Experimental Social Psychology, 38*, 397–404.

Moskowitz, G. B. (2009). The compensatory nature of goal pursuit: From explicit action to implicit cognition. In G. B. Moskowitz & H. Grant (Eds.), *The psychology of goals* (pp. 304–336). New York: Guilford.

Moskowitz, G. B. (2010). On the control over stereotype activation and stereotype inhibition. *Social and Personality Psychology Compass, 4*(2), 140–158.

Moskowitz, G. B., & Gesundheit, Y. (2009). Goal priming. In G. B. Moskowitz & H. Grant (Eds.), *The psychology of goals* (pp. 203–233). New York: Guilford.

Moskowitz, G. B., Gollwitzer, P. M., Wasel, W., & Schaal, B. (1999). Preconscious control of stereotype activation through chronic egalitarian goals. *Journal of Personality and Social Psychology, 77*, 167–184.

Moskowitz, G. B., & Ignarri, C. (2009). Implicit volition and stereotype control. *European Review of Social Psychology, 20*, 97–145.

Moskowitz, G. B., & Li, P. (2011). Egalitarian goals trigger stereotype inhibition: A proactive form of stereotype control. *Journal of Experimental Social Psychology, 47*, 103–116.

Moskowitz, G. B., Li, P., Ignarri, C., & Stone, J. (2011). Compensatory cognition associated with egalitarian goals. *Journal of Experimental Social Psychology, 47*, 365–370.

Moskowitz, G. B., & Roman, R. J. (1992). Spontaneous trait inferences as self generated primes: Implications for conscious social judgment. *Journal of Personality and Social Psychology, 62*, 728–738.

Moskowitz, G. B., Salomon, A. R., & Taylor, C. M. (2000). Implicit control of stereotype activation through the preconscious operation of egalitarian goals. *Social Cognition, 18*, 151–177.

Moskowitz, G. B., Skurnik, I., & Galinsky, A. (1999). The history of dual process notions: The future of preconscious control. In S. Chaiken & Y. Trope (Eds.), *Dual process models in social psychology* (pp. 12–36). New York: Guilford.

Neuberg, S. L. (1989). The goal of forming accurate impressions during social interactions: Attenuating impact of negative expectancies. *Journal of Personality and Social Psychology,* 56, 374–386.

Nuttin, J. (1980). *Motivation, planning, and action*. Leuven, Belgium: Leuven University Press.

Oettingen, G. (2000). Expectancy effects on behavior depend on self-regulatory thought. *Social Cognition, 18*, 101–129.

Plant, E. A., & Devine, P. G. (1998). Internal and external motivation to respond without prejudice. *Journal of Personality and Social Psychology, 75*(3), 811–832.

Powers, W. T. (1973). *Behavior: The control of perception*. Chicago: Aldine.

Richeson, J. A., & Trawalter, S. (2005). Why do interracial interactions impair executive function? A resource depletion account. *Journal of Personality and Social Psychology, 88*, 934–947.

Scheier, M. F., & Carver, C. S. (1983). Self-directed attention and the comparison of self with standards. *Journal of Experimental Social Psychology, 19,* 205–222.

Schmeichel, B. J., & Baumeister, R. F. (2004). Self-regulatory strength. In R. F. Baumeister & K. D. Vohs (Eds.), *Handbook of self-regulation: Research, theory, and applications* (pp. 84–98). New York: Guilford.

Downloaded by [Karen Hudson] at 03:29 22 March 2015

Shah, J. (2003a). Automatic for the people: How representations of significant others implicitly affect goal pursuit. *Journal of Personality and Social Psychology, 84*(4), 661–681.
Shah, J. (2003b). The motivational looking glass: How significant others implicitly affect goal appraisals. *Journal of Personality and Social Psychology, 85*(3), 424–439.
Shah, J. Y., Friedman, R., & Kruglanski, A. (2002). Forgetting all else: on the antecedents and consequences of goal shielding. *Journal of Personality and Social Psychology, 83*(6), 1261–1280.
Shah, J. Y., & Gardner, W. L. (2008). *Handbook of motivation science*. New York: Guilford.
Shah, J. Y., Hall, D., & Leander, N. P. (2009). Moments of motivation: Towards a model of regulatory rotation. In G. B. Moskowitz & H. Grant (Eds.), *The psychology of goals* (pp. 234–254). New York: Guilford.
Shah, J. Y., & Kruglanski, A. W. (2002). Priming against your will: How accessible alternatives affect goal pursuit. *Journal of Experimental Social Psychology, 38*, 368–383.
Shah, J. Y., & Kruglanski, A. W. (2003). When opportunity knocks: Bottom-up priming of goals by means and its effects on self-regulation. *Journal of Personality and Social Psychology, 84*(6), 1109–1122.
Shiffrin, R. M., & Schneider, W. (1977). Controlled and automatic human information processing: II. Perceptual learning, automatic attending, and a general theory. *Psychological Review, 82*(2), 127–190.
Srull, T. K., & Wyer, R. S. (1979). The role of category accessibility in the interpretation of information about persons: Some determinants and implications. *Journal of Personality and Social Psychology, 37*, 1660–1672.
Steele, C. M. (1988). The psychology of self-affirmation: Sustaining the integrity of the self. In L. Berkowitz (Ed.), *Advances in experimental social psychology* (Vol. 21, pp. 261–302). New York: Academic Press.
Steele, C. M., Spencer, S. J., & Lynch, M. (1993). Self-image resilience and dissonance: The role of affirmational resource. *Journal of Personality and Social Psychology, 64*, 885–896.
Stone, J., Wiegand, A. W., Cooper, J., & Aronson, E. (1997). When exemplification fails: Hypocrisy and the motive for self-integrity. *Journal of Personality and Social Psychology, 72*(1), 54–65.
Tetlock, P. E. (1985). Accountability: The neglected social context of judgment and choice. *Research in Organizational Behavior, 7*, 297–332.
Thompson, E. P., Roman, R. J., Moskowitz, G. B., Chaiken, S., & Bargh, J. A. (1994). Accuracy motivation attenuates covert priming effects: The systematic *re*processing of social information. *Journal of Personality and Social Psychology, 66*, 474–489.
Tipper, S. P. (1985). The negative priming effect: Inhibitory priming by ignored objects. *Quarterly Journal of Experimental Psychology, 37*, 571–590.
Tolman, E. C. (1932). *Purposive behavior in animals and men.* Oxford, Engl.: Appleton-Century.
Treisman, A., & Geffen, G. (1967). Selective attention: Perception or response? *Quarterly Journal of Experimental Psychology, 19*, 1–17.
Trope, Y., & Liberman, N. (2000). Time-dependent changes in preferences. *Journal of Personality and Social Psychology, 79*, 876–889.
Trope, Y., & Liberman, N. (2003). Temporal construal. *Psychological Review, 110*, 403–421.
Turner, M. L., & Engle, R. W. (1989). Is working memory capacity task dependent? *Journal of Memory and Language, 28*, 127–154.
Tversky, A., & Kahneman, D. (1974). Judgment under uncertainty: Heuristics and biases. *Science, 185*, 1124–1131.
Tversky, A., & Kahneman, D. (1981). The framing of decisions and the psychology of choice. *Science, 211*, 453–458.
Uleman, J. S., & Moskowitz, G. B. (1994). Unintended effects of goals on unintended inferences. *Journal of Personality and Social Psychology, 66*, 490–501.

Downloaded by [Karen Hudson] at 03:29 22 March 2015

Vohs, K. D., & Baumeister, R. (2004). Ego depletion, self-control, and choice. In J. Greenberg, S. L. Koole, and T. Pyszczynski (Eds.), *Handbook of experimental existential psychology* (pp. 398–410).

Vohs, K. D., Baumeister, R. F., & Ciarocco, N. J. (2005). Self-regulation and self-presentation: Regulatory resource depletion impairs impression management and effortful self-presentation. *Journal of Personality and Social Psychology, 88*, 632–657.

Vohs, K. D., Kaikati, A. M, Kerkhof, P., & Schmeichel, B. J. (2009). Self-regulatory resource depletion: A model for understanding the limited nature of goal pursuit. In G. B. Moskowitz & H. Grant (Eds.), *The psychology of goals* (pp. 423–446). New York: Guilford.

Wegner, D. M. (1994). Ironic processes of mental control. *Psychological Review, 101*, 34–52.

Wegner, D. M., & Bargh, J. A. (1998). Control and automaticity in social life. In D. T. Gilbert, S. T. Fiske, & G. Lindzey (Eds.), *The handbook of social psychology* (4th ed., Vol. 1, pp. 446–496). Boston, MA: McGraw-Hill.

Wegner, D. M., & Erber, R. (1992). The hyperaccessibility of suppressed thoughts. *Journal of Personality and Social Psychology, 63*, 903–912.

Wegner, D. M., & Pennebaker, J. W. (1993). Changing our minds: An introduction to mental control. In D. M. Wegner & J. W. Pennebaker (Eds.), *Handbook of mental control* (pp. 1–12). Englewood Cliffs, NJ: Prentice-Hall.

Wegner, D. M., Schneider, D. J., Carter, S., & White, L. (1987). Paradoxical effects of thought suppression. *Journal of Personality and Social Psychology, 53*, 5–13.

Wegner, D. M., & Wheatley, T. (1999). Apparent mental causation: Sources of the experience of will. *American Psychologist, 54*(7), 480–492.

Weiner, B. (1972). *Theories of motivation: From mechanism to cognition*. Chicago: Rand McNally.

Wicklund, R. A., & Gollwitzer, P. M. (1981). Symbolic self-completion, attempted influence, and self-deprecation. *Basic and Applied Social Psychology, 2*, 89–114.

Wicklund, R. A., & Gollwitzer, P. M. (1982). *Symbolic self-completion.* Hillsdale, NJ: Erlbaum.

Wiener, N. (1948). Cybernetics: Or control and communication in the animal and the machine. Cambridge, MA: MIT University Press.

Wilensky, R. (1983). *Planning and understanding*. Reading, MA: Addison-Wesley.

Wortman, C. B., & Brehm, J. W. (1975). Response to uncontrollable outcomes: An integration of reactance theory and the learned helplessness model. In L. Berkowitz (Ed.), *Advances in experimental social psychology* (Vol. 8, pp. 278–336). New York: Academic Press.

Wright, R. A., & Brehm, J. W. (1989). Energization and goal attractiveness. In L. A. Pervin (Ed.), *Goal concepts in personality and social psychology* (pp. 169–210). Hillsdale, NJ: Erlbaum.

Wrosch, C., & Heckhausen, J. (1999). Control processes before and after passing a developmental deadline: Activation and deactivation of intimate relationship goals. *Journal of Personality and Social Psychology*, *77*(2), 415–427.

Zeigarnik, B. (1927). Das Behalten erledigter und unerledigter Handlungen [The retention of completed and uncompleted actions]. *Psychologische Forschung, 9*, 1–85.

Zijlstra, F. R. H. (1996). Effort as energy regulation. In W. Battmann & S. Dutke (Eds.), *Processes of the molar regulation of behavior* (pp. 219–235). Lengerich, Germany: Pabst Science Publishers.

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2

The Neuroscience of Goal-Directed Behavior

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If you ask average Americans to list their goals (as they are by the website http://www.43things.com) their answers run the gamut from "being happy" to "going on a road trip with no predetermined destination" (Table 2.1). Although people's goals vary widely in what they aim to achieve and the obstacles that would be involved, they all have a few things in common. For one, they describe activities and outcomes with an abstractness and complexity far greater than what nonhuman animals probably would ever conceive. For another, it is clear that achieving any of their goals requires a system that can translate these abstract goals for a future state of the world into concrete actions in the present moment that are thought would get them there. This is no easy task. Not only must abstract goals (e.g., stop procrastinating) be translated into intermediate goals and actionable subgoals, but typically these (sub)goals require behaving in a way contrary to our ingrained habits and tendencies (e.g., turn off the television until the book chapter is finished).

If we are interested in studying what brain mechanisms enable people to achieve their goals using these and other processes, then the types of goals we end up studying are necessarily a good bit simpler than "getting a tattoo" or "going to Europe." As such, a critical assumption behind this approach is that the neural systems studied in well-controlled laboratory settings are the same as those that are used to achieve more realistic and complicated goals in real life. For instance, one common goal is to quit smoking, in which individuals experience conflict

TABLE 2.1 Ten Popular Goals Listed on the Website http://www.43things.com

1.	Lose weight.
2.	Stop procrastinating.
3.	Write a book.
4.	Fall in love.
5.	Be happy.
6.	Get a tattoo.
7.	Drink more water.
8.	Go on a road trip with no predetermined destination.
9.	Get married.
10.	Travel the world.

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between craving cigarettes and their goal to curb their habit (Tiffany, 1990). In the laboratory, conflicts between goals and habitual tendencies are assessed by relatively simple tasks, such as the Stroop (1935) task, that are thought to depend on the ability to guide thought and behavior based on an internally maintained goal, which is known as *cognitive control*. In the Stroop task, as illustrated in Figure 2.1, individuals are asked to name the ink color that words are written in rather than saying the word. Our habitual tendency is to read words, and so conflict ensues as one is trying to override the habitual response with the instructed or goal-driven response to name the ink color. The assumption is that the kind of conflict that is experienced in this task is to some degree like the conflict experienced when trying to resist a cigarette, another piece of cake, or an angry impulse, and therefore engages the same neural systems involved in goal-directed behavior in the real world. In other words, the cognitive neuroscience approach involves breaking down goal-directed behavior into a set of constituent cognitive processes engaged in simple goal-directed laboratory tasks. It is these processes that laboratory tasks and everyday goals have in common.

This chapter provides a brief overview of the cognitive neuroscience of goal-directed behavior. We start by laying out some key functions that are required of

Column 1	Column 2
Red	**Green**
Purple	**Red**
Blue	**Purple**
Green	**Blue**
Purple	**Green**
Blue	**Purple**

Figure 2.1 **(See color insert.)** The Stroop task. The Stroop task illustrates the conflict task ensues when habits and task goals are at odds with each other. The task goal is to name the ink color of the words. For column 1, little conflict is produced because the responses produced by habitual tendencies to read the words are the same as those produced by the task goal of naming the ink colors. However, for column 2 habitual tendencies and task goals promote different responses, thereby eliciting greater conflict.

a system supporting cognitive control and the evidence from simple motor tasks for implementation of these functions in the brain. We then extend our discussion beyond the control of motor responses to consider the mechanisms that support cognitive control of memory and emotion. Finally, we highlight some of the open questions in this field.

CORE FUNCTIONS OF A CONTROL SYSTEM

Consider for a moment a system of neurons that fires in response to sensory changes in the environment, produces a cascade of firing patterns through the brain, and terminates with a behavioral response (Figure 2.2). The behavioral response then elicits a change in the environment that ultimately produces a positive or negative outcome, which in turn strengthens or weakens that particular cascade of connections from input to output. After multiple such events, the mapping between a sensory event and a behavior that produces a positive outcome would be strengthened. As a consequence of this process, the mappings from a particular sensory event to certain responses would be stronger than the mappings from that event to other responses.

An individual with this simple network can learn to engage in behaviors that usually help him or her, avoid behaviors that usually hurt, and ignore dimensions of the world that are usually irrelevant. For instance, over time the individual may learn to eat apples, avoid mosquitoes, and pay no mind to small bushes. At first, the association that maps seeing the apple to eating it may be weak. But through repeatedly receiving stronger positive outcomes for eating the apple relative to the other behaviors, this mapping becomes the strongest one. A simple network of this sort can also learn that some events or behaviors lead to others that may help or hurt the individual. For instance, shaking a tree is associated with falling apples that can then be eaten.

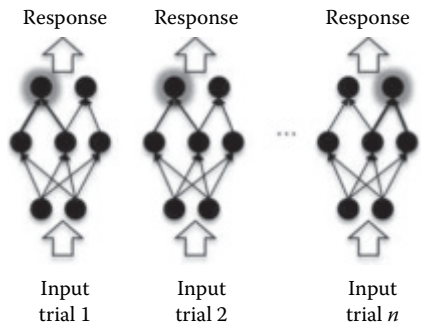


Figure 2.2 Schematic of a simple stimulus-driven system. A simple stimulus-driven system, as represented by the simplified network above, may modify its connections over time to produce a more desirable stimulus response association. On trial 1, preexisting patterns (the thicker arrows on trial 1) produce a particular response (the shaded circle) to a given input. If over successive trials this pattern yields a maladaptive outcome, intermediary connections between this response given the input will be weakened and alternative responses may be strengthened to shift toward a more adaptive response.

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For such a system, behavioral choice occurs strictly as a consequence of the stimuli that are encountered and their strongest associations. In this sense, the system is stimulus driven. Often, however, these strong associations are inappropriate, even damaging, given our goals and broader context. For instance, eating an apple may not always be the best idea if you have diabetes. In this case, how do we choose a weakly associated behavioral response when doing so is demanded by our broader context or goals?

An influential model of cognitive control that attempts to account for some aspects of controlled behavior is the biased-competition model (Desimone & Duncan, 1995; Miller & Cohen, 2001). This model begins by assuming that when presented with a stimulus, multiple response pathways are activated. For instance, seeing an apple may be associated with behaviors to eat it, as well as to juggle it, avoid it, or to give it to a friend. Left to its own devices, these pathways will compete for expression by mutually inhibiting one another until the strongest pathway succeeds in influencing behavior. In this case, the strongest pathway would be to eat the apple. To select an alternative pathway, a goal must be represented and internally maintained. This goal exerts its influence by biasing the goal-relevant pathway over any stronger ones (Figure 2.3). For example, someone with diabetes may represent and maintain the goal to avoid sugary foods, which biases against the dominant apple-eating pathway in favor of another snack.

To achieve this basic ability, biased competition models share a set of core functions that we will consider here, along with their putative neural correlates:

1. Control systems have a "working memory," or the ability to internally maintain goals and contextual information important for engaging in goal-appropriate behavior.
2. Control systems require a means of "adaptive gating" in order to let only goal-relevant information into working memory and keep goal-irrelevant information out.

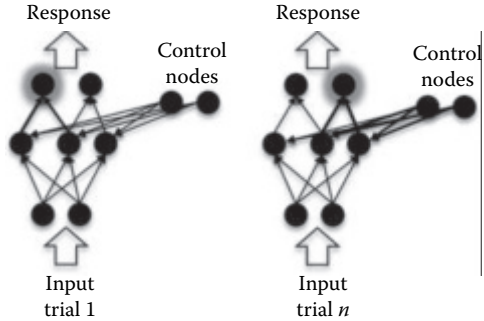


Figure 2.3 Schematic of a simple control system. A goal-driven system, as represented by the simplified network above, requires control nodes to maintain goal information (e.g., task instructions). According to the biased-competition model (Miller & Cohen, 2001), these nodes select for and strengthen the weaker pathway, which in turn gains enough strength to inhibit the stronger pathway such that the weaker pathway can be expressed.

3. Control systems require a mechanism to select goal-relevant and inhibit goal-irrelevant associations as a consequence of maintaining a goal.
4. Control systems require a means of determining when control needs to be deployed.

Although we recognize that these functions are likely to be just a subset of several central functions that go into a control system, we focus on them because they are among the most important functions highlighted in the literature to date.

Working Memory: Keeping Goals in Mind

One remarkable capacity we have is the ability to maintain goals internally and for extended periods of time. In other words, goals can be maintained without requiring an external stimulus to remind us to do so. A simple stimulus-driven system (as in Figure 2.2) is incapable of accomplishing this behavior. If such a system were given the instruction "don't eat apples" but a few minutes later is shown one, it is likely to eat it simply because there is no inherent mechanism that can maintain this instruction over those minutes. It simply cannot maintain the goal. Hence, a system capable of following goals requires a means to maintain internally an online representation of information over time and in the absence of external reminders. Which neural regions could subserve this ability?

The ability to internally maintain information over a transient delay period has been studied in working memory tasks. In such tasks, a set of items (e.g., objects, words, locations) is presented that is relevant for a future response. These items then disappear, requiring individuals to maintain them internally over a delay (typically a few seconds), upon which a probe is presented in which individuals must use their memory for the maintained items to make the correct response.

In now classic studies involving single-cell recording in primates, cells in the lateral prefrontal cortex (PFC) have been shown to respond to holding information across a delay period in which the stimulus was no longer present in the environment (Funahashi, Bruce, & Goldman-Rakic, 1989; Fuster, 1973; Goldman-Rakic, 1987). That is, they fired when the information was presented and continued to fire after the information disappeared until it was used to make a relevant response. Further, damage to the dorsolateral PFC causes delay-related impairments; if there is no delay, there is no impairment, but incorporating a brief delay of just a few seconds results in impairments (Buckley et al., 2009; Funahashi, Bruce, & Goldman-Rakic, 1993; Rushworth, Nixon, Eacott, & Passingham, 1997). This specifically implicates the dorsolateral PFC in the ability to maintain information over a delay period, rather than a more general deficit in representing the stimulus or required response because these remain intact without a delay. Human neuroimaging studies examining working memory activity have also shown activity in the lateral PFC (see Figure 2.4 for approximate locations of Brodmann's areas and Figure 2.5 for locations of functional activations related to working memory; Curtis & D'Esposito, 2003; Wager & Smith, 2003).

Following from this, an important question is whether maintenance circuits in the lateral PFC are domain general, such that the same areas are capable of

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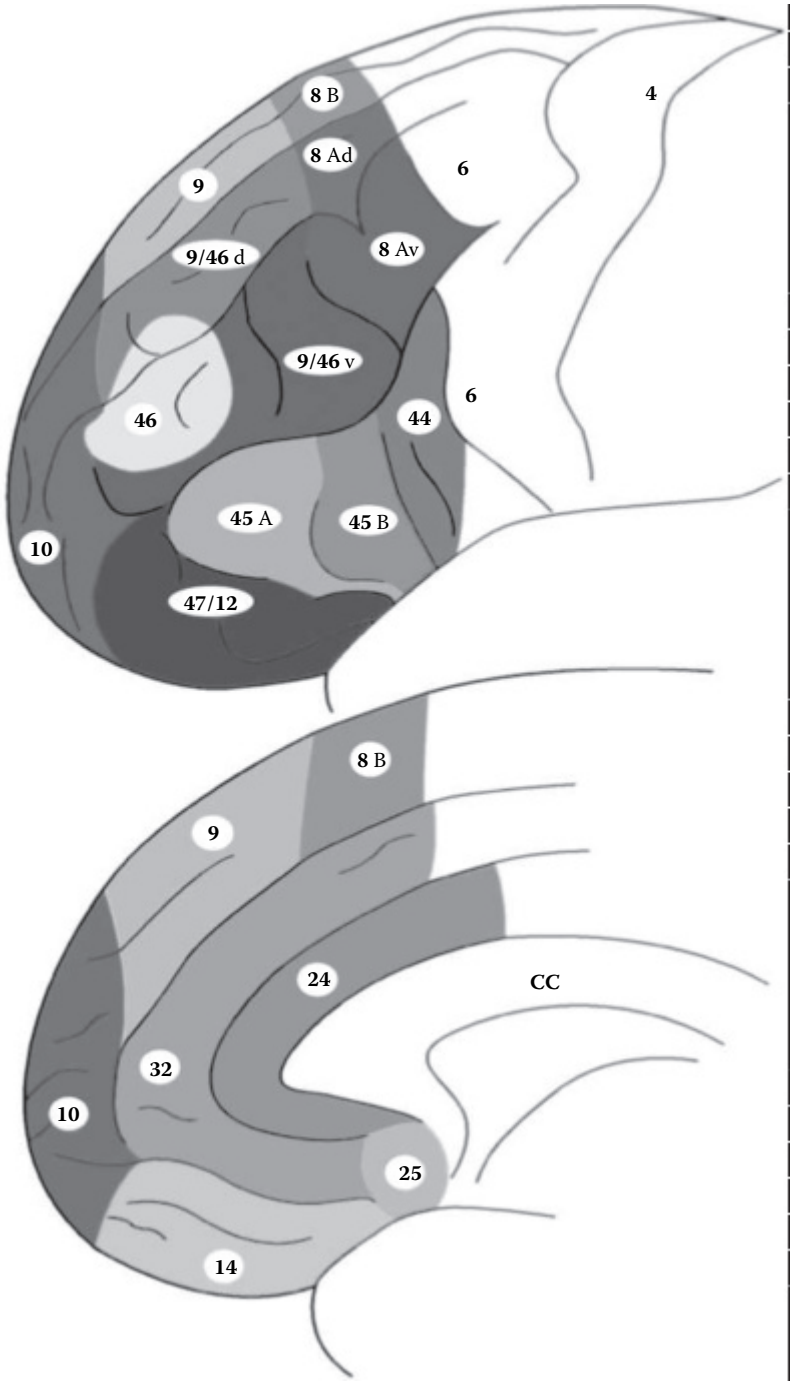


Figure 2.4 **(See color insert.)** Approximate outline of Brodmann's areas in human prefrontal cortex.

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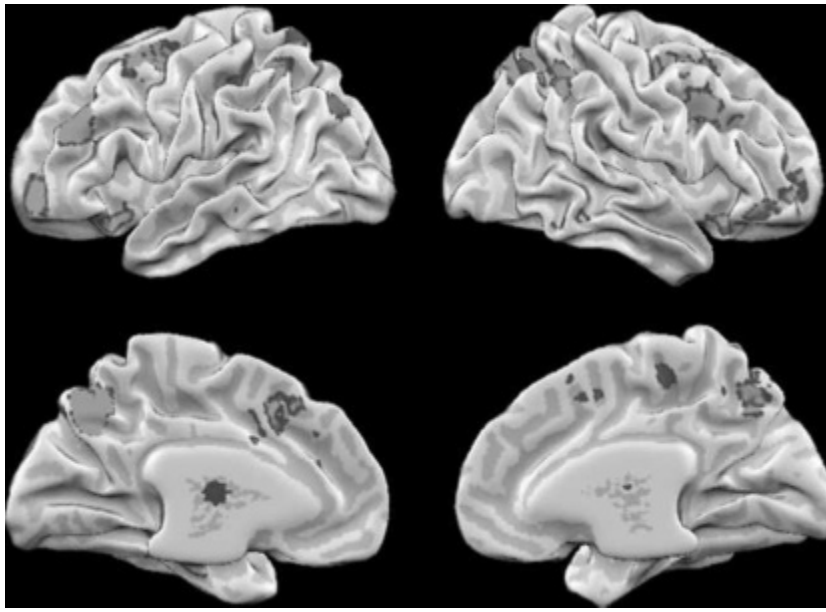


Figure 2.5 **(See color insert.)** Neural regions active in a meta-analysis of working memory studies. Activations across 60 imaging studies of working memory combined a meta-analysis. (Courtesy of Wager, Phan, Liberzon, & Taylor, 2003.)

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maintaining various sorts of information, or whether they are domain specific, such that different areas of the lateral PFC maintain information for spatial, object, or verbal domains (Baddeley, 2003; Baddeley & Hitch, 1974; Goldman-Rakic, 1987, 1999). Cell-recording studies in primates have shown that individual neurons selectively maintain spatial and object information (Wilson, O'Scalaidhe, & Goldman-Rakic, 1993), but also that several neurons integrate across these two domains (Rainer, Asaad, & Miller, 1998a), and particularly so when the task goals require them to (Rainer, Asaad, & Miller, 1998b; Rao, Rainer, & Miller, 1997; Wallis, Anderson, & Miller, 2001).

Though working memory studies illustrate that information can be held internally over delay periods, information in these studies is typically arbitrary (e.g., a set of dots in particular locations). But how might this ability relate to goal-driven behavior? One possibility is that the lateral PFC is involved in maintaining the goals themselves in the form of an instructional set or stimulus-response mapping. To examine this, Macdonald, Cohen, Stenger, and Carter, (2000) had participants complete a Stroop task in which instructions to either name the color of the word or to simply read the word were given prior to the presentation of each word. Results showed that activity in the lateral PFC was related to the instruction cue, prior to the presentation of a colored word. In another study, participants were presented with four different cues that signaled which set of stimulus-response rules were relevant (Bunge, Kahn, Wallis, Miller, & Wagner, 2003). For two rules, the match and nonmatch rules, the instruction cue indicated whether individuals

should make a target response if the subsequently presented stimulus and probe match or do not match. For the other two, they were instructed to make a left or right button press response regardless of the stimulus and probe. The first two rules had greater complexity of stimulus-response mappings relative to the simple response rules. Their results showed that the lateral PFC was sensitive to greater rule complexity as well as maintaining these rules over a delay. Working memory functions in the lateral PFC, then, could be useful for maintaining instructions and goals for implementing goal-directed behavior.

Adaptive Gating: Updating Goals

A system of neurons that actively maintains information online must have some mechanism to update its contents when that information is no longer required. Without such a mechanism, it would likely persevere on whatever goal it has in mind, even though it is no longer relevant, or conversely, it would be unable to keep salient but irrelevant information out of working memory. The basal ganglia has been hypothesized to play this role. Frontrostriatal loops, connections that loop through structures within the striatum and the prefrontal cortex (Alexander, Delong, & Strick, 1986), may serve a gating function that (a) prevents irrelevant information from interfering with the maintenance of relevant information, and (b) allows relevant information to update the contents of working memory (Braver & Cohen, 2000; Frank, Loughry, & O'Reilly, 2001; Miller & Cohen, 2001).

The general idea is as follows. Activation of thalamic connections to prefrontal cortex opens a gate for new information to enter active memory. However, thalamic input to the prefrontal cortex is generally inhibited by the globus pallidus. This allows the prefrontal cortex to maintain information robustly rather than being continuously updated. When an update is in order, the basal ganglia inhibits the globus pallidus, thereby disinhibiting the thalamic input to the prefrontal cortex and allowing the prefrontal cortex to update the contents of working memory. This model places the basal ganglia in the central role for controlling the updating of the lateral PFC (Hazy, Frank, & O'Reilly, 2006). Supporting this, McNab and Klingberg (2008) found that greater activity in the basal ganglia predicted whether lateral parietal regions involved in the maintenance of information additionally responded to irrelevant information.

The frontostriatal loops are dopaminergic, and central to this model is the multifaceted role of dopamine. In the lateral PFC, dopamine has more of a tonic influence on neural firing, whereas in the striatum, dopamine has a relatively more phasic influence on neural firing (Grace, 1991). This is due to several factors that differentiate the lateral PFC and the striatum, including the type and distribution of dopaminergic receptors, the presence of enzymes that break down dopamine, and reuptake mechanisms (Cools, 2006). It has been suggested that the tonic and phasic aspects of dopamine relate to the ability to maintain and update information, respectively (Braver & Cohen, 2000; Cohen, Braver, & Brown, 2002). Importantly, these two abilities are inherently competitive. That is, the ability to actively maintain information over delays and despite distractions is opposed by the ability to update what information is being maintained. The relative influence of

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tonic and phasic aspects of dopamine is believed to modulate the balance between the opposing alternatives. Indeed, modulation of the dopaminergic system has shown tradeoffs between maintenance and updating mechanisms (Bilder, Volavka, Lachman, & Grace, 2004; Cools, 2006; Mehta, Swainson, Ogilvie, Sahakian, & Robbins, 2001) supporting this idea.

Selection and Inhibition: Implementing Goals

The functions of internally maintaining goals and being able to update them aside, a goal-driven system must also have a way of using this information to influence behavior. Implementing control is thought to occur by selecting weaker pathways over stronger ones. This type of control is modulatory in that the control system guides connections within the stimulus-driven system. In other words, the system exerts influence over existing associative connections, but does not house or maintain the newly formed or reinforced associations in the long term.

A few key lines of evidence support the role of the lateral prefrontal cortex in the implementation of control (Miller & Cohen, 2001). First, the prefrontal cortex has reciprocal connections with much of the posterior cortex and subcortical regions (Pandya & Barnes, 1987; Petrides & Pandya, 1999; Petrides & Pandya, 2001). This indicates that the PFC is well positioned to exert a modulatory influence on the rest of the brain. Second, the PFC is commonly active under conditions in which a stimulus-driven response must be overridden by a goal-driven response, as in the Stroop task or a variety of other tasks requiring cognitive control (Wager, Jonides, & Reading, 2004). Third, damage to the PFC leads to deficits in the ability to exert control. This is evidenced by patients with frontal lobe damage who show reduced goal-driven behaviors (lethargy; Stuss & Benson, 1984), an inability to update to a new goal after having learned an earlier one (perseveration; Milner, 1963), and a tendency to be easily distracted and controlled by environmental stimuli (Chao & Knight, 1995), leading to stimulus-driven and stereotypic behaviors (a striking example of this is patients' automatic tendency to grasp tools even though it's not contextually appropriate; Lhermitte, 1983; Shallice, Burgess, Schon, & Baxter, 1989). Importantly, damage to the lateral PFC does not generally influence the ability to perceive or produce well-learned behaviors (Milner, 1963; Stuss & Benson, 1984). This indicates that the PFC is necessary for modulating weaker connections between sensory representations and motor outputs but is not required for the basic abilities to perceive stimuli, produce motor behaviors, or to store connections that produce well-learned or stereotypic behaviors.

Fourth, neural responses in the lateral PFC have several intriguing properties. Whereas neurons in the visual cortex respond to specific kinds of stimuli (e.g., line orientations in particular locations), neurons in the lateral PFC can acquire responses to stimuli, motor responses, or classes or categories of stimuli depending on the goals of the task (Bichot, Schall, & Thompson, 1996; Freedman, Riesenhuber, Poggio, & Miller, 2001; Watanabe, 1992). In addition, these neurons show response profiles to abstract relational rules, such as to select matching or nonmatching pairs of objects, which can be dissociated from specific stimuli or responses (Asaad, Rainer, & Miller, 2000; Wallis, Anderson, & Miller, 2001;

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White & Wise, 1999). Human neuroimaging studies have corroborated these results, illustrating greater activity in the lateral PFC to learning, maintaining, and representing stimulus-response mapping rules (Bunge, 2004). These findings suggest that lateral PFC neurons rapidly update their response profiles based on what is goal relevant. And fifth, elimination of PFC connections to posterior regions has been shown to eliminate modulatory influence in posterior cortical regions (Tomita, Ohbayashi, Nakahara, Hasegawa, & Miyashita, 1999). This result directly implicates the PFC in modulatory control.

An open question is what kinds of mechanisms guide this modulation? That is, exerting control may involve amplifying weaker pathways, inhibiting stronger pathways, or both. In the biased-competition model, prefrontal cortex is believed to amplify weaker associations with the consequence being that these weaker associations are then activated enough to locally inhibit the stronger associations (Desimone & Duncan, 1995; Miller & Cohen, 2001). Egner and Hirsch (2005) examined this hypothesis. They showed experimental participants faces of actors and politicians with names of other actors or politicians overlaid upon them. In different conditions, subjects were instructed to attend either to the names or the faces and to indicate whether the target was a politician or an actor. In the congruent condition, the name and face were both of the same category (e.g., a picture of Bill Clinton with the name Fidel Castro overlaid upon it, both being politicians). In the incongruent condition, these were mismatched (e.g., a picture of Bill Clinton with the name Al Pacino overlaid upon it, one being a politician and the other an actor). They isolated activity in the fusiform face area, an area of the fusiform cortex that responds more specifically to faces (Kanwisher, McDermott, & Chun, 1997), and reasoned that if control occurred by amplification, then as control increases when instructed to pay attention to faces over names, increasing activity should be found in the fusiform face area. They found this to be the case. Activity in the fusiform face area increased when attending to faces with increasing control demands. They further examined whether control produced inhibition, too. For this, they reasoned that if control occurred by inhibition, then when names were attended to and faces were distractors there should be decreased activity in the fusiform with increasing control. However, the results did not support this hypothesis. Increasing control when attending to names had little effect on activity in the fusiform face area. Hence, their results suggest that control occurs through amplification of relevant information.

However, as noted by Aron (2007), functional neuroimaging results alone are insufficient for determining whether activation or inhibition is occurring in these regions because blood flow responses may relate to either process. Further, Aron remarks that inhibitory biological processes are commonly found throughout the body, suggesting that cognitive control through direct inhibitory mechanisms, while not hypothesized by current biased-competition models, is a reasonable means for exerting control. Much of the support for this notion comes from studies of response inhibition. Response inhibition has been examined by go/no-go and stop signal tasks (e.g., Rubia et al., 2001). In the go/no-go task, individuals are presented with a "go" stimulus roughly 80% of the time for which they simply press a button. This creates a tendency to push the button on the majority of trials.

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For the remaining 20% of trials, a no-go stimulus is shown for which they withhold or inhibit a response. Comparing the results of these trials with "go" trials shows which regions are involved in response inhibition. The stop signal task is similar in that individuals are again presented with trials in which they make a simple response to a presented stimulus. In some trials, however, a sound alerts them to not press the button, thereby requiring them to withhold or inhibit their intended response.

Neuroimaging studies using these tasks have shown a network of regions, including the lateral PFC, the dorsomedial PFC, and the anterior cingulate cortex (ACC), that are associated with inhibition over noninhibition trials (Liddle, Kiehl, & Smith, 2001; Rubia et al., 2001). However, a specific role has been ascribed to the right ventrolateral PFC for its involvement in response inhibition based on convergent findings from connectivity and neuropsychological studies (Aron, Robbins, & Poldrack, 2004). Greater damage to the right ventrolateral PFC produces greater deficits in stop signal task performance, and although damage to other regions of the PFC was also correlated to performance, these correlations did not hold up after controlling for the relationship in the right ventrolateral PFC (Aron, Fletcher, Bullmore, Sahakian, & Robbins, 2003). These findings have been corroborated in neuroimaging studies, which have shown that successful inhibition was related to right ventrolateral PFC activity, whereas other commonly active regions, including the dorsolateral PFC and the dorsomedial PFC/frontopolar cortex, were more associated with failures to inhibit, which may reflect error detection (Menon, Adleman, White, Glover, & Reiss, 2001; Rubia, Smith, Brammer, & Taylor, 2003). Following the neural circuitry involved in response inhibition, Aron et al. (2004) suggested that connections between the right ventrolateral PFC to the premotor cortex and the basal ganglia were responsible for successful response inhibition. Such direct connections were not apparent in the dorsolateral PFC, further supporting the specific role of the right ventrolateral PFC in response inhibition. In general, this set of findings provides good evidence for inhibitory processes occurring in cortex. But the results of response inhibition studies notwithstanding, alternative accounts have been offered (for a discussion see Aron, 2007), and whether cognitive control is implemented by selection processes or both selection and inhibition processes is currently being explored.

Another point to consider is that control can be implemented at different moments in the information-processing stream. Early in the processing stream, control may be used to attentionally select (or perhaps inhibit) what information is more or less available to influence behavior. This is referred to as *attentional control*, and it involves biasing how incoming information is processed. Neural regions involved in attentional control have been studied by directed attention paradigms, in which individuals are cued to attend to a particular stimulus dimensions, such as a specific spatial location, feature (e.g., directions of motion, colors), or kind of object (e.g., houses or faces). Neural regions involved in attentional control should represent and internally maintain this cue over a delay period prior to stimulus presentation and should modulate activity in subordinate areas that respond to these stimulus dimensions. The superior frontal gyrus putatively in the vicinity of the frontal eye field (FEF) and the intraparietal sulcus (IPS) both show sustained

response patterns for preparatory signals over delay periods, indicating their involvement in attentional control (Corbetta & Shulman, 2002). And activity in these regions precedes and modulates activity in the sensory cortex (Bressler, Tang, Sylvester, Shulman, & Corbetta, 2008; Reynolds & Chelazzi, 2004). Late in the processing stream, control may help bias the selection (or inhibition) of a particular response over another. The response inhibition studies, as reviewed above, indicate that the right ventrolateral PFC is critically involved in this late stage of control.

Finally, in between early and late stages, control may involve reconsidering the information that is currently held in mind through selection or inhibitory processes. Across this spectrum, the dorsolateral PFC seems to be commonly engaged. In a meta-analysis of 47 imaging studies of control examining several different paradigms, ranging from paradigms involving greater attentional control to those involving greater response control, Nee, Wager, and Jonides (2007) found that the dorsolateral PFC was commonly activated across tasks, suggesting that this area may be central to all stages.

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Conflict Monitoring: Signaling the Need for Control

The ability to maintain information and implement control does not necessarily imply the ability to know when control should and should not be implemented. How does the system know when to exert more or less control? One plausible mechanism to signal a greater need for control is to monitor for conflict between different candidate response pathways. Consider a case like the Stroop task wherein the correct pathway is color naming but where we have a habitual tendency to read words. As both the habitual and goal-relevant pathways are likely to be potentiated upon presentation of a colored word, there will be conflict between them. Thus, one way to signal control is to monitor for this conflict and up-regulate control once it is detected. If the selection mechanisms are successful and the goal-relevant pathway wins the competition, then there will no longer be conflict and thus no longer a need for control. Computational models of cognitive control that employ a simple conflict monitoring system have been designed that can regulate the need for control (Botvinick, Cohen, & Carter, 2004). Such models are useful because they show that control can be regulated without the need for a homunculus, or "little man," inside the brain that simply "knows" when to engage in control.

Comparing neural activity for conditions that involve more conflict to those that involve less conflict may reveal regions that underlie such a mechanism. In the Stroop task, comparing conditions involving attending to the color of the word versus those involved in attending to the word itself reveals activity in the dorsal ACC (BA 24/32 at the rostral end; Pardo, Pardo, Janer, & Raichle, 1990; Nee, Wager, & Jonides, 2007). Given its association with conflict conditions, some have proposed that the dorsal ACC may support a conflict monitoring function (Botvinick et al., 2004; Carter & van Veen, 2007; Ridderinkhof, Ullsperger, Crone, & Nieuwenhuis, 2004).

Importantly, conflict monitoring refers to the *change* in how much control is needed, not simply whether a conflict is apparent. Thus, if the ACC is involved in conflict monitoring, it should track the level of conflict rather than simply signaling the presence of conflict. Testing this idea, Botvinick et al. (2004) had participants

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complete sets of trials in a flanker task involving congruent trials, which require less control, and incongruent trials, which require greater control. They reasoned that if the dorsal ACC is just sensitive to conflict across the board, then it should respond uniformly to incongruent trials. Alternatively, if the dorsal ACC is involved in conflict monitoring, then it should respond to the change in the need for control. This could be shown by comparing activity to incongruent trials that were preceded by congruent trials with activity to incongruent trials that were preceded by other incongruent trials. In the former case, the difference between the control required for the preceding congruent trial to the present incongruent one is large, whereas in the latter case, this difference is small. They found that dorsal ACC activity responded to the change in conflict, suggesting it plays a role in conflict monitoring.

This account of conflict monitoring involves reactive adjustments to control. That is, only when a change in conflict is detected is increased control subsequently implemented. However, increasing control in such a reactive manner may not suit every circumstance, particularly for situations in which making an error is costly or speed is at a premium. Alternatively, anticipating the upcoming need for control can be effortful and demanding. Ideally, appropriate levels of control would be engaged in the anticipation of circumstances that are more likely to result in errors. This idea was advanced by Brown and Braver (2005). They found that the dorsal ACC responded strongest to a context that was associated with a high likelihood of errors compared to contexts associated with a lower likelihood of errors. Moreover, over several trials dorsal ACC activity tracked with learning the likelihood of producing errors rather than detecting conflict. Their results suggest that the dorsal ACC is broadly involved in detecting the likelihood of errors and thereby uses this information to adjust proactively the amount of control required.

Further experiments have examined the link between the dorsal ACC and the lateral PFC in implementing control. If dorsal ACC activity modulates the need for greater control, then this should be shown to subsequently influence activity in the lateral PFC and enhance behavioral performance. Imaging results support these predictions (Carter & van Veen, 2007; Kerns et al., 2004). Additionally, damage to the ACC results in a poorer ability to adjust control based on the previous trial (di Pellegrino, Ciaramelli, & Ladavas, 2007). Overall, these results support the role of the dorsal ACC in detecting the likelihood of making errors and subsequently promoting the lateral PFC to exert greater control in such situations.

Summary

A control system requires several functions to modulate behavior successfully. Much of the work over the past few decades has examined their neural correlates. One key function is the internal maintenance of information over a delay and in a fashion that is resistant to distraction. This information can be used to implement control and guide behavior. Implementing control can occur at early stages, as in selective attention, or at late stages, as in response inhibition. The dorsolateral PFC is commonly engaged at both ends of the spectrum. Attentional control additionally engages the superior frontal gyrus (putatively in the frontal eye field) and the

intraparietal sulcus, and response inhibition more specifically relies on the right ventrolateral PFC. Signaling the need for greater control may involve detecting conflict between response pathways. The dorsal ACC responds to this conflict and subsequently modulates the dorsolateral PFC to implement greater control. The contents of working memory must be updated when currently held information is no longer relevant or the presence of new goal-relevant information must be maintained. This updating is regulated by the basal ganglia through frontostriatal loops. The relative balance between maintaining and updating information is modulated by the tonic and phasic influences of dopamine in the lateral PFC and the striatum.

The purpose of this section was to provide an overview of some modal neural regions involved in cognitive control. In reference to everyday goals though, it is also worth pointing out that several of the tasks used to examine cognitive control fail to capture other aspects of goal-directed behavior, such as the self-initiation of goals, the motivation to do so, the social and emotional quality of many of our most important goals, and the abstract level at which self-initiated goals seem to be defined (Carver & Scheier, 1998; Higgins, 1997, 1998; Vallacher & Wegner, 1987). For instance, goals in the Stroop task are represented as specific, motivationally neutral, stimulus-response mappings (i.e., see a word, name the color), whereas common goals people have are represented with far greater emotional weight and abstractness (e.g., to be a good father). In these cases, it is difficult to specify precisely what the stimulus and response mappings are and to control the specific emotions and motivations that are key to its success. Importantly, this difference does not falsify the approach. Rather, it highlights several avenues for integrating aspects such as emotion and motivation into a more complete model of a control system. To further examine whether the systems described in this section generalize to other areas of research, we now turn to research on the neural bases of cognitive control in memory and emotion regulation.

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COGNITIVE CONTROL OF MEMORY

We often try to remember things we have forgotten or forget things we have remembered. For instance, we may actively try to recall simply where the car was parked last, facts such as state capitals, or fond memories of friends or family. Or we may try to forget events that are no longer relevant, as in where the car was parked a week ago, facts that were remembered incorrectly, or the more embarrassing and negative moments in our lives. Stimulus-driven and goal-driven processes may also characterize these cases. For memory, stimulus-driven processes involve the automatic retrieval of associates based on the cues provided. Goal-driven processes then involve attenuating these stronger associative pathways and selecting for weaker but goal-relevant ones to be expressed.

Implementation of Control in Memory

Suppose one is trying to remember songs produced by a given pop star. The mere mention of her name may result in one or even several of her songs being effortlessly retrieved through stimulus-driven processes. But at other times, one may want to

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retrieve a less commonly known song. In this case, the weaker the association is, the more memory control would be required to allow alternative weaker paths to be expressed and thereby retrieve the song. The ability to produce more associates beyond what is spontaneously provided is referred to as *controlled retrieval*.

In the lab, controlled retrieval can be assessed through manipulations of associative strength. Associative strength refers to how tightly interconnected two concepts may be to each other. For instance, perhaps in many people's minds, pizza is strongly associated with soda, weakly associated with french fries, and not associated with airplanes. In one task paradigm that manipulates associative strength (Wagner, Paré-Blagoev, Clark, & Poldrack, 2001), a cue word is presented with two probe words below. One of the probes is the target response and the other is a distractor. The participant is to choose the probe (ostensibly the target probe) that best matches the cue based on the overall relatedness of the cue to the probe. The key manipulation is to vary the associative strength between the cue and the target probe, and so the degree to which related information comes to mind, with minimal search. For instance, if "apple" was the cue and "orange" and "wrench" were the targets, one would match "apple" with "orange" as these are more related semantically than "apple" and "wrench." As the association becomes weaker, this places a greater demand on controlled retrieval to access information to assess the match. In this case, replacing "orange" with "tomato" may require greater controlled retrieval. That is, matching "apple" with "tomato" may require greater retrieval demand to obtain the relevant related information.

However, this particular paradigm may be limited in that it also involves additional processes or alternative strategies beyond controlled retrieval. For instance, an alternative strategy is that individuals compare the relative strengths of both targets to the cue using only the information that has been spontaneously retrieved rather than retrieving additional information. To circumvent the drawbacks of any given task paradigm, it is helpful to employ different task paradigms to address the same question. As such, retrieval demands have also been manipulated by priming paradigms (Neely, 1977, 1991; Tulving & Schacter, 1990). Priming refers to the finding that a prime stimulus can influence how a subsequent target stimulus is processed, even though the prime stimulus is technically irrelevant to the task. For instance, in a lexical decision task (Gold et al., 2006), subjects are to classify whether a target stimulus is a word (e.g., "atlas") or a nonword (e.g., "amige"). The primary interest is reaction time to the word trials (the nonword trials are fillers). Prior to the target, a prime is presented that can be semantically related to the word or neutral (e.g., "map" for the prime related to "atlas," or repeatedly presenting the word "blank" for all neutral primes). Primes that are semantically related to the target facilitate processing the target as shown by lower reaction times. By facilitating processing, they reduce demands on retrieval of semantic information when making the lexical decision judgment on the target word. Hence, activity that is greater for the neutral prime condition relative to the related prime condition should show areas that are related to retrieval demands.

An additional feature of this paradigm is that priming can occur automatically, such that a prime presented soon before the target (e.g., approximately 200 ms before) nonetheless facilitates processing the target, and through more

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controlled routes if the delay between the prime and the target is long enough to allow for them (e.g., approximately 1 s before; Neely, 1977, 1991). Hence, comparing priming effects (effects of unrelated versus related primes on processing the target) for longer versus shorter delays reveals which neural regions are specifically associated with controlled retrieval. Relative to the task paradigm described earlier involving the probe and two targets, the priming paradigm is more streamlined in its engagement of controlled retrieval. That is, it does not engage additional comparison processes between items. Combined, both task paradigms show that increasing controlled retrieval demands produces greater activation in the left anterior ventrolateral PFC (approximately BA 47), implicating this region in controlled retrieval (Badre, Poldrack, Paré-Blagoev, & Insler, 2005; Badre & Wagner, 2007; Buckner, 2003; Gold et al., 2006; Wagner et al., 2001).

As more information becomes retrieved, one may begin selecting for information that is more pertinent to the goal. Using the example of remembering a specific song by a pop star, relevant information such as other song titles or albums or the year the forgotten song may have been associated with may be selected for, whereas irrelevant information such as the latest gossip or hairstyle about them, which may not (or may, depending on your associates) help one remember, may be selected against. This ability to choose specific goal-relevant information from that which has been provided by retrieval processes is referred to as *selection* (of memory).

Demands on selection can be increased when the judgment involves choosing along a specific feature or dimension. In a similar task paradigm as above for controlled retrieval, matching items on specific dimensions such as "size," "texture," or "color" instead of general relatedness would place greater demands on selection. This is because a relatedness judgment does not specify which dimension is relevant to making the decision. By contrast, a size judgment requires selecting information about size and against information that is irrelevant to size. Perhaps consistent with the greater selection demands required for the feature decision, comparison of a feature to a relatedness decision results in activation in the midventrolateral PFC (approximately BA 45).

Selection demands are even greater when the associative strength is contrary to the correct match based on the current retrieval rule. For instance, if the dimension were "texture," then "apple" may be better matched with "table," because both are similarly smooth. This choice would additionally involve having to select against the more general associative strength that "apple" has to "orange" and is associated with greater activation in the midventrolateral PFC.

Priming paradigms can also be used to examine selection processes. Here, selection demands are increased when the prime is unrelated to the target and hence activates additional irrelevant information that must be selected against, rather than selected for, when accessing information about the target for making a lexical decision. That is, when an unrelated prime is presented prior to the target (e.g., "lap" prior to "atlas"), it interferes with processing the target word relative to the neutral prime (again repeatedly presenting the prime "blank" for all neutral trials). Comparing interfering versus neutral primes in the longer versus

shorter delay periods should activate neural regions that are related to selection processes. Selection demands manipulated in these ways result in increased neural activity in a more posterior region of the left ventrolateral PFC (approximately BA 45, see Figure 2.4; Badre et al., 2005; Badre & Wagner, 2007; Thompson-Schill, D'Esposito, Aguirre, & Farah, 1997).

Finally, in the event that one no longer wants the pop star's song running through his or her mind, the person may try to actively suppress or inhibit it. Neural regions subserving the inhibition of memory have been explored using directed forgetting paradigms. Directed forgetting refers to intentionally putting something out of memory that has already been placed there, and these task paradigms simply involve instructing individuals to forget an association.

A study by Anderson et al. (2004) used a modified directed forgetting paradigm, the Think/No Think task, to investigate the neural regions involved in suppression of memory. Participants first learned word pairs (e.g., ordeal-roach). Then, while undergoing scanning, individuals were presented with one of the words (e.g., ordeal-_____) and simultaneously instructed based on the color of the word whether to retrieve (Think) or suppress (No Think) retrieval of the associate. Behavioral responses showed a suppression effect in an independent probe. In the probe, a cue and a word fragment were presented together (e.g., ordeal-r_ _c_), and participants were to complete the fragment with the first word that came to mind. Relative to control items, fragments were more frequently completed with the associated words in the Think trials. In the No Think trials, fewer associates were produced relative to the control items. This suggests that an active suppression is occurring, rather than just weaker memory strength.

Comparing the No Think versus the Think trials showed activity in several regions similar to those in response inhibition, including the dorsolateral PFC, the ventrolateral PFC, the ACC, and even motor areas including the pre–supplementary motor area (SMA), the dorsal premotor cortex, and the putamen (Anderson et al., 2004). Furthermore, they found that activity in the hippocampus, which is normally related to successful memory retrieval, was significantly reduced in the No Think condition. This further suggests that active suppression was occurring.

Of course, trying to forget simple word associates and trying to forget emotional events may be vastly different. Addressing this to some degree, another neuroimaging study extended these results to the pairings of faces with affectively negative images (Depue, Curran, & Banich, 2007). This study showed that memory suppression was related to greater activity in the right lateral PFC and decreased activity in the hippocampus, amygdala, and posterior sensory regions. The greater involvement of the right lateral PFC is further supported by an event-related potential (ERP) study (Hanslmayr, Leipold, Pastotter, & Bauml, 2009). In brain-damaged patients, however, damage to the left or right lateral PFC resulted in an inability to show directed forgetting effects, though the right ventrolateral PFC ironically showed a pattern of better memory for the to-be-forgotten items than the to-be-remembered items (Conway & Fthenaki, 2003). In general, the evidence suggests that memory inhibition may also rely on the same right lateral PFC region as response inhibition.

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Mnemonic Conflict

Just as with conflict detection in response control, memory control may also involve conflict from competing mnemonic associates. Is the ACC also involved in detecting this conflict? Mnemonic conflict may be enhanced when retrieved mnemonic associates conflict with regard to the response or outcome they promote. An example of this involves proactive interference. In proactive interference, irrelevant prior information that was recently active interferes with mnemonic information that is relevant for the current trial.

Working memory tasks have been modified to examine the influence of proactive interference on neural activity (Badre & Wagner, 2005; Bunge, Ochsner, Desmond, Glover, & Gabriel, 2001; D'Esposito, Postle, Jonides, & Smith, 1999; Jonides, Smith, Marshuetz, Koeppe, & Reuter-Lorenz, 1998; Nee, Jonides, & Berman, 2007; Thompson-Schill, et al., 1997). Similar to standard working memory tasks, participants are shown a set of six letters to maintain over a brief delay of 3 s. Then, a probe consisting of a single letter is presented, and participants had to indicate whether the probe was among those in the set. However, rather than presenting a fresh set of letters on the following trial, three of the letters in the prior set were included among the six letters in the subsequent set. Hence, whether the subsequent probe was in both sets, only in the current set, only in the prior set, or in neither set was manipulated. Behaviorally, reaction time is slower when the probe was only in the prior set relative to when the probe was in neither set, illustrating proactive mnemonic interference. Intriguingly, though imaging results consistently engage lateral PFC regions involved in the cognitive control of memory, increased activation in the dorsal ACC was not consistently found. These initial results suggest that dorsal ACC activity may specifically reflect response conflict rather than mnemonic conflict.

EMOTION REGULATION

Emotion regulation is our ability to control when, how, and to what extent we express our affective responses to a stimulus or event. For instance, we may try to reduce the fear and anxiety that is experienced when having to give a public speech, taking an exam, or jumping off the diving board for the first time. Alternatively, we may try to increase other emotions, as when having the explicit intention to savor and "get the most out of" a bite of chocolate cake or when trying to show more empathy for a friend's misfortune than we may initially experience. Hence, emotion regulation can involve both up-regulating and down-regulating emotional responses depending on our goals and can target emotional responses that range from mild to overwhelming, as when having to control anxiety or drug cravings in psychiatric or substance-using populations.

The initial thoughts and feelings one has toward an event are typically (though not always) stimulus-driven responses. For instance, upon seeing a spider, one might feel a rapid surge of arousal and fear and respond by jumping away, freezing, or screaming. This initial response to the spider results from an initial appraisal

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of it as potentially threatening within the context of any current or ongoing goals, wants, or chronic needs. Emotion regulation then involves attenuating or altering this appraisal to allow for alternative behavioral reactions (e.g., approaching the spider, capturing it, and setting it free outside).

Implementing Emotion Regulation

Multiple strategies may be used to attenuate this emotional reaction. As with cognitive control, these strategies can also be organized along a continuum where control processes may exert influence across early to late stages of the emotion generation process (Ochsner & Gross, 2005). At the early stage, selective attention can be used to influence how emotional or nonemotional aspects of a stimulus are brought into the appraisal process. For instance, while running a race, a competitor may selectively attend to the finish line and the anticipation of crossing it and away from the pain in his or her body. The context also shapes how we attend and respond to affective information in the environment. Whereas in most situations seeing someone in pain may draw attention toward to that person, in the context of a race one might actively ignore the grimaces of others in the service of the goal to win. Other common examples include not looking down when walking across a narrow bridge or avoiding interactions with homeless individuals. Selective attention can be said to influence the impact of the initial appraisal by preventing it from taking full effect at the outset.

Experiments that examine selective attention typically involve attending to nonaffective information as the goal and then examining how task-irrelevant affective information interferes with this goal. For example, in the emotional Stroop task, words with affective content (e.g., "death") produce greater interference in color-naming than neutral words (e.g., "library"). Better performance on the task then involves selectively greater attention to the color of the words and lesser attention to the affective content of the words (Bishop, Duncan, Brett, & Lawrence, 2004; Bush, Luu, & Posner, 2000; Compton et al., 2003; Shin et al., 2001; Vuilleumier, Armony, Driver, & Dolan, 2001; Whalen et al., 1998). A few have further examined conflict within affective information, for instance, by showing a fearful facial expression with the word "happy" written across it and having participants name the expression (Egner, Etkin, Gale, & Hirsch, 2008; Etkin, Egner, Peraza, Kandel, & Hirsch, 2006). Although differential activity to conflict has been found in several regions involved in emotional processing such as the amygdala and the ventral striatum, most consistent across studies and paradigms has been the ventromedial prefrontal cortex, suggesting that this area may play a special role in resolving affective conflict (Egner et al., 2008; Etkin et al., 2006). Ochsner, Hughes, Robertson, Cooper, and Gabrieli (2009) directly compared neural regions involved in both cognitive and affective conflict resolution and found that the ventromedial prefrontal cortex was specifically involved in resolving affective conflict, whereas the ventrolateral PFC was involved in resolving cognitive conflict. In common, both domains engaged the dorsal ACC and the dorsolateral PFC (Egner et al., 2008; Ochsner et al., 2009).

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A second cognitive emotion regulation strategy targets the appraisal process itself and uses control processes to *reappraise* or reinterpret the meaning of a stimulus. Reappraisal takes advantage of the fact that situations can be construed in multiple different ways. Consider scoring poorly on an important exam, such as the LSAT. An initial appraisal may lead to feelings of dread. Reappraisal would involve rethinking the event so as to increase or diminish its emotional impact. For example, to diminish its influence, one might subsequently consider that it can always be retaken, that law school was not the right match anyway, or that such exams do not really measure intelligence. Each of these thoughts involves reappraising the initial appraisal of the event so as to alter its emotional impact.

Correspondingly, experimental studies investigating reappraisal typically involve presenting individuals with affectively laden images or videos and instructing them to think of the stimulus in such a way as to enhance or reduce the initial emotional reaction to it. These studies have shown a common network of regions being involved in both increasing or decreasing emotional responses, including the lateral PFC and the dorsal ACC (Eippert et al., 2007; Goldin, McRae, Ramel, & Gross, 2008; Ochsner et al., 2004; Ochsner & Gross, 2005; Phan et al., 2005).

Given that these areas are involved in regulating emotions, then ostensibly a set of regions involved in triggering emotional responses should show corresponding changes, too. Two key areas involved in triggering emotion include the amygdala and the insular cortex (Kober et al., 2008). These areas show decreased activity when individuals are instructed to down-regulate feelings and increased activity when instructed to up-regulate feelings (Beauregard, Lévesque, & Bourgouin, 2001; Goldin et al., 2008; Ochsner et al., 2004). Moreover, increased activity in response to regulation in lateral prefrontal regions is associated with decreased activity in regions that are responsive to emotion, including the amygdala and the ventral striatum (Lieberman et al., 2007; Ochsner, Bunge, Gross, & Gabrieli, 2002).

A third cognitive regulation strategy targets the response phase of the emotional response by suppressing, amplifying, or otherwise altering the behavioral manifestation of emotional responses. The most commonly studied use of response control is the control of facial expression so as to not let anyone else know what emotions are being experienced. *Expressive suppression*, as it is called, is momentarily effective at reducing emotional expressivity but does so at the cost of increasing physiological arousal and impairing memory, presumably because one pays less attention to a stimulus and more to his or her own face (Gross & Levenson, 1993; Richards & Gross, 2000). Via facial feedback, there is some evidence that expressive suppression can influence emotional experience as well, albeit not to the same extent as reappraisal (Davis, Senghas, & Ochsner, 2009, 2010; Goldin et al., 2008; Lévesque et al., 2003).

Imaging studies of expressive suppression show that when participants keep their face from exhibiting an emotional response while viewing affective stimuli, a familiar network of regions is activated, including the ventrolateral PFC, the dorsolateral PFC, and the dorsal ACC (Goldin et al., 2008; Lévesque et al., 2003). There are also likely to be important differences between expressive suppression and reappraisal. For instance, expressive suppression involves inhibition of motor

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responses such as facial expressions, whereas reappraisal may involve the retrieval of information that could be used to bias how an emotional event is perceived. In expressive suppression, the emphasis is on concealing the behavioral response to felt emotions, not on changing one's appraisal of an event as arousing and affecting. Consistent with this, activity in the amygdala and insular cortex, though reduced by reappraisal, was not reduced by suppression (Goldin et al., 2008).

Against the backdrop of prior work, one expectation may be that the right ventrolateral PFC is involved in inhibitory control when one expressively suppresses, whereas the left ventrolateral PFC is involved in selection of new stimulus interpretations that help increase or decrease emotional responses when one reappraises. In one study that directly compared expressive suppression and reappraisal, Goldin et al. (2008) found that engagement of control regions differed based on the strategy, but this interacted with time. Early in presentation of the emotional stimulus, there was greater activity in control regions (the lateral PFC and the dorsal ACC) for the reappraisal condition, whereas late in the spectrum it was reversed. Moreover, greater early ventrolateral PFC activity in reappraisal was left-sided, and although greater late ventrolateral PFC activity in suppression also engaged left ventrolateral PFC, it also significantly activated the right ventrolateral PFC. These results suggest that the right ventrolateral PFC may be involved in inhibitory control of emotion, too, and matches the notion that behavioral suppression occurs at a late stage of the processing stream.

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Affective Conflict

How does the system know when to exert greater regulatory control over feelings? In response control, the need for control is signaled by response conflict, which increases when the stimulus-driven response and the goal-driven response are at odds with each other. Similarly, affective conflict may occur when undesirable affective information or emotional feelings interfere with a desired goal-driven response. For instance, while trying to give a speech, the sight of yawning audience members or the feelings of choking up may signal affective conflict that must be overcome.

A handful of studies have examined the neural correlates of affective conflict. A central question of this research is whether regions that are involved in affective conflict overlap with those in cognitive conflict. In general, these studies have found activity in the dorsal ACC corresponding to affective conflict (Egner et al., 2008; Haas, Omura, Constable, & Canli, 2006; Ochsner et al., 2009). Two studies included cognitive and affective conflict conditions within the same experiment, allowing for more direct comparisons. In Egner et al. (2008), individuals were shown words superimposed over faces. The faces were either male or female with either fearful or happy facial expressions. Similarly, the overlaid words could be "male" or "female," "happy," or "fear." In the gender task, the task was to indicate whether the face was male or female, and conflict was enhanced by superimposing the opposing word over the face (e.g., the word "female" over a male face) relative to a congruent word. In the expression task, it was the same except for facial expressions. Ochsner et al. (2009) used an affective variant of the flanker task, in

which individuals were shown three words and categorized whether the central word (e.g., "triumph") was positive or negative. Affective conflict was assessed by comparing when the flanker words were of the opposing valence as the central word (e.g., "triumph" surrounded above and below by "torture"), relative to the congruent condition (e.g., "triumph" surrounded by "ecstasy"). The cognitive version involved judging neutral words for whether they were fruits or metals. Both tasks showed overlapping activity in the dorsal ACC for affective and cognitive conflict. This suggests a common role for the dorsal ACC in conflict detection across affective and cognitive domains.

Summary

Although there is much less research examining the neural regions involved in emotion regulation, the available evidence suggests that there is considerable overlap between these regions as those involved in cognitive control. In both cases, the dorsal ACC is responsive to conflict and the dorsolateral PFC is involved in implementing control. But there are differences in the control network, too. In particular, ventromedial prefrontal cortex may have a unique role in controlling emotional conflict, which makes sense given its strong connectivity to subcortical structures involved in emotion (Ongur & Price, 2000). Another difference is simply the posterior regions that are being regulated. In stimulus-response mapping tasks, this involves modulating activity in visual, parietal, and motor cortex. In emotion regulation, this involves the amygdala, insular cortex, and potentially several other regions involved in emotional experience.

FUTURE DIRECTIONS

In the introduction to this chapter, we raised the question of what kinds of behavior count as goal-directed behavior and what kinds do not. The point of raising the question was to introduce a prominent cognitive neuroscience perspective in approaching the question of goals. We contrasted goal-directed behavior with that which is stimulus driven and aligned the ability to override habits (e.g., quitting smoking) with overriding automatic responses in lab tasks (e.g., the Stroop task). We then outlined some key functions required of such a control system, specified the neural regions that may underlie this system, and asked whether they generalize across other domains of control.

Overall, neural regions involved in memory control and emotion regulation are generally shared with those involved in the control of simple stimulus-response mappings. Broadly speaking, lateral PFC and dorsal ACC regions responded to recruitment of control processes. This suggests that the network of regions involved in cognitive control is common across multiple sorts of domains, which in turn suggests it may be generalized to the everyday goals that people pursue.

However, there are also threads from each domain that suggest greater fractionation of the control network into regions that support more specific processes. For instance, in memory control the evidence suggests that the anterior ventrolateral PFC and the midventrolateral PFC may subserve distinct functions related

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to controlled retrieval and selection, respectively. And in emotion regulation, in addition to the dorsal ACC, the ventromedial prefrontal cortex also responds to affective conflict. Also, ambiguity remains in how to map some of the central functions involved in control onto each of these domains. In the case of emotion regulation, for example, it is unclear what information the control network is representing.

Future studies may attempt to distinguish various possibilities. For instance, we recently conducted a study that examined which neural regions were sensitive to heightened emotional arousal, attention to emotion, and categorization of emotional states (Satpute, Shu, Weber, Roy, Ochsner, 2010). We found that increasing the emotional intensity of the stimulus led to greater activity in several regions, including the amygdala, the periaquaductal gray, and the insular cortex, all known to be involved in greater emotional arousal. However, we further found that the dorsomedial PFC and the ventrolateral PFC, commonly activated across studies manipulating emotional intensity (Kober et al., 2008), were selectively activated to directing attention to emotion and categorizing emotional states, respectively. Hence, these areas represent different aspects of experiencing an emotional event (Barrett, 2006) and therefore may play different roles when individuals regulate their emotional responses.

In general, few experiments have directly attempted to integrate the network of regions that underlie cognitive control across domains, and future experiments that do so would be helpful in determining whether the control network is domain general or domain specific to levels of control. On a broader level however, it is important to note that goal-directed behavior involves a larger set of phenomena than can be captured by the functions we have highlighted and the tasks used to investigate them. That is, we have focused on the ability of a control system to override stimulus-driven behavior. Task paradigms used to study this aspect of goal-directed behavior typically involve giving participants a set of instructions to follow and a condition in which these instructions are at odds with their automatic tendencies. In a reductive sense, the experiments are studying the ability of individuals to merely follow instructions. Even in emotion regulation tasks, individuals are instructed to up- or down-regulate their emotions, regardless of what their own personal goals might be in reaction to the stimuli. But, considering what is involved when pursuing real-world goals as listed in Table 2.1, several other factors must also be critical. In the following sections, we review a few of these factors as future directions. Finally, much of what we have covered so far has been in the service of uncovering the neural mechanisms involved in goal-directed behavior. But, to point the finger the other way, how might knowledge of these neural systems subsequently inform our psychological understanding of goal-directed behavior? Has mapping out a neural system involved in goal-directed behavior helped us to understand the psychology and behavior of individuals?

Motivation in Goal-Directed Behavior

Beyond attempting to control stimulus-driven habits, goal-directed behavior can be thought of as behavior that is motivated by the personal wants, needs, or desires

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of an individual. This perspective has been the focus of research in social psychology and affective neuroscience. For instance, in experiments on stereotyping and prejudice, individuals are often presented with task conditions in which using stereotypes can help (or hurt) behavioral performance. It could be thought that individuals would simply follow task instructions, which essentially renders these experiments analogous to studies of semantic categorization more generally. However, individuals can also be sensitive to their use of stereotypes in these experiments. Indeed, individuals who are motivated to be egalitarian show distinct patterns of behavioral performance from those who are not (Moskowitz, Golwitzer, Wasel, & Schaal, 1999). This particular case highlights the distinction between the perspectives of goal-directed behavior as following task instructions from that of following one's personal wants, needs, or desires.

This aspect of goal-directed behavior has also been examined in reinforcement learning (Sutton & Barto, 1998). Here, goal-directed behavior has been defined as associations between a response and a desired outcome. This is held in contrast to associations between a stimulus and a response, which form the basis of habits. A paradigmatic example to distinguish these associations involves devaluation, in which behavioral responses are measured to an outcome that is no longer as desirable as it once was. Consider eating popcorn while watching a movie. Initially, one might be hungry, and so the response of reaching into the bag and eating some kernels produces the desired outcome. During the movie, one might keep snacking away at the popcorn, only to suddenly realize that at some point he or she was no longer hungry, and, moreover, that he or she was no longer hungry about 10 handfuls ago. Continuing this behavior even though the outcome is no longer desirable is attributed to the formation of a stimulus-response association, or habit. The bag of popcorn calls forth the behavior even though the outcome is no longer desirable. In contrast, goal-directed behavior is defined as when the response–outcome association is driving behavior instead. Using such devaluation paradigms, imaging and lesion studies have shown that response–outcome associations are associated with and rely on the orbitofrontal cortex (Balleine & O'Doherty, 2010; Gottfried, O'Doherty, & Dolan, 2003; Valentin, Dickinson, & O'Doherty, 2007). Hence, this area may be integral for assessing the motivational significance that a goal carries and potentially the extent to which it is ultimately pursued.

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Goal Abstraction and Hierarchies

What about the abstract nature of goals, such as those indicated in Table 2.1? Goals can be considered as part of an action hierarchy (Vallacher & Wegner, 1987). These can be traversed by simply asking how and why an action occurs. Take "being a good father" as an example. Asking how takes us down a level to more concrete descriptions of behaviors, whereas asking why takes us up a level to more abstract descriptions of behaviors. Compare "by helping my child learn to read" versus "in order to help them be happy," respectively. Most of the experiments reviewed above examining goal-directed behavior have operationalized rules as low-level and concrete stimulus-response mappings. The Stroop

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task, working memory tasks, and others are all examples of this. But clearly the system must be able to accommodate representations of actions at multiple different levels.

In a set of experiments designed to test the neural regions involved in goal abstractness, Badre and Wagner (2007) showed that increasingly anterior regions of the lateral PFC were engaged as action representations became more abstract. Across all conditions, participants chose to press one of two buttons. In the low-level response control condition, individuals were presented with a colored frame that surrounded a fixation cross. They simply pressed one button for a set of colors and another button for a different set of colors. Hence, the colors directly controlled which response to make. This was taken up one level to have the colors represent feature control. Individuals were presented with different features, that is, shapes within the frames. How they responded to the shapes, however, depended on the color of the frame. Hence, the colors indicated which response to make when presented with the features. This study matches the notion of going up and down in an action hierarchy. In a sense, the colors controlled the meaning of the features, just as "being a good father" controls the meaning of "helping my child to read" or "quitting smoking" controls the meaning of "avoiding bars." And just as each level can increase or decrease in abstraction, Badre and Wagner (2007) implemented similar procedures to incorporate higher and lower levels in the hierarchy to encompass four distinct levels.

Neural activity tracked with the abstractness of the control that was implemented. The highest level of abstraction achieved in their study showed greater activity in the frontal pole. The lowest level of abstraction, response control, showed greater activity in the dorsal premotor area. Several prior experiments and theories have also postulated a caudal to rostral organization of lateral prefrontal cortex corresponding to increasing goal abstraction (reviewed in Badre, 2008). This notion provides a more unified view of lateral prefrontal organization by suggesting that regions that are caudal to the ventrolateral PFC are involved in lower-levels of control, whereas regions rostral to the ventrolateral PFC are involved in higher-levels of control.

Individual Difference Applications of the Model of Cognitive Control

A benefit of this model of cognitive control is that it raises several new possibilities to describe how individuals vary in their behavior. That is, how does variation in personality, age, or gender relate to components of the cognitive control system, such as activity in the lateral PFC or anterior cingulate? And how might this in turn relate to differences in behavior?

As we age, our ability to exert cognitive control gradually becomes worse. This is indexed by poorer performance on a host of tasks requiring executive control (Balota, Dolan, & Duchek, 2000; Moscovitch & Winocur, 1992; Salthouse, 1990). It could be the case that this simply reflects a general decline in all cognitive abilities across the board with aging. However, as noted below, neuroscience models of cognitive control suggest that different elements of the system tradeoff against one another, such that deficits in the operation of one element of the system may actually produce benefits in the operation of the other. This raises an intriguing

question: Might there be cases in which older adults actually outperform younger adults?

This was shown in an experiment by Braver, Satpute, Rush, Racine, and Barch (2005). In their experiment, letters were shown on the screen one at a time. The instructions were to make a target response to the letter X if it was preceded by the letter A. Otherwise, a nontarget response was required. This produces four trial types referred to as AX trials (the target trials), and BX, AY, and BY trials, all of which indicate nontarget responses. To engage maintenance demands, a delay of a few seconds was placed between the letters, such that individuals had to maintain which letter they had just seen in order to respond correctly to the subsequent letter. Eighty percent of the trials were AX trials, promoting the expectation of target responses. The BY trials were relatively low conflict, because both the cue letter B and the subsequent letter Y promote nontarget responses.

The critical trials were the BX and AY trials. Relative to the BY trials, both produce a greater tendency to incorrectly make a target response because each has an element of the predominant AX stimulus. However, they do so for very different reasons. In the BX trials, the cue letter B basically indicates that no matter which letter is shown next, a nontarget response should be made. The better one is at maintaining the instruction that the cue letter B signifies, the less influenced they are even when an X appears. For these trials, younger adults outperform older adults, consistent with younger adults' greater working memory maintenance abilities.

For the AY trials, stronger maintenance of the letter cue A coupled with the fact that 80% of the trials are AX trials produces a greater tendency to make a target response. Hence, when the subsequent letter ends up being a Y, conflict ensues and it becomes more difficult to subsequently make a nontarget response. For AY trials then, the model suggests that a poorer maintenance ability actually leads to better performance on these trials. Indeed, older adults outperformed younger adults on the AY trials. Hence, the same failure to maintain the letter cue impairs older adults' ability on BX trials but aids their ability on AY trials. This finding illustrates a unique behavioral prediction made from a computational model that was inspired by neural mechanisms.

Apart from examining control processes during aging and development, a few studies have begun examining how to integrate neural models of cognitive control with basic personality theory. For instance, how might factors such as anxiety and neuroticism or extraversion and introversion relate to individual differences in the components of cognitive control, such as the ability to maintain or update information or sensitivity to errors or conflict? Might variability in these processes relate to traditional self-report measures of personality?

In one study, Eisenberger, Lieberman, and Satpute (2005) addressed how neuroticism may relate to neural activity in the cognitive control network. To obtain neural measures, participants completed the odd-ball task. In this task, individuals are presented with letters one at a time. The majority of these letters, 80%, were Xs, for which the participant made no response. Any letter other than X was considered an odd-ball due to its infrequency, and participants were to make a target response to them. Comparing odd-balls to non-odd-balls in this task engages

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neural regions involved in cognitive control, including the dorsal ACC and lateral prefrontal cortex.

Neuroticism is intended to capture the tendency for some people to experience greater negative affect than others across situations. Negative affect can be thought of as indexing conflict and errors, as we tend to experience negative feelings when things go awry from what we intended or wished to happen. Given the dorsal ACC's role in being sensitive to conflict and errors, it makes sense then that more neurotic individuals may have greater sensitivity in dorsal ACC. Indeed, this is what research has found.

The relationship between personality, neural activity, and cognitive control produces a number of intriguing questions. Eisenberger et al. (2005) further suggested that differences in neural reactivity may provide a better measure of individual differences than self-report measures. Indeed, self-report measures, though reliably related to actual behaviors, are only modestly so (Back, Schmukle, & Egloff, 2009). This may in part be due to several biases that can occur when people complete questionnaires about themselves. In contrast, neural measures may be less susceptible to these biases and more directly related to the underlying cognitive operations that distinguish individuals from one another (Eisenberger et al., 2005). In addition, this raises the possibility that standard descriptions of personality traits may be usefully reinterpreted in terms of neurocognitive processes, such as heightened sensitivity to errors or error likelihood in neuroticism.

Another study found that highly anxious individuals tended to show greater transient activity in the cognitive control network, whereas low anxiety individuals showed greater sustained activity (Fales et al., 2008). That is, whereas low anxiety individuals engaged control regions consistently during the course of a demanding working memory task, highly anxious individuals showed greater fluctuations to the onset of each individual trial. Fales et al. interpret sustained and transient activation as reflecting proactive and reactive control strategies, respectively. This suggests that highly anxious individuals may have difficulty maintaining attentional concentration on the task and hence resort to reaction to each stimulus as it arises rather than anticipating and maintaining a steady amount of control required more generally.

A limitation to these studies is the lack of a behavioral relationship that corroborates the interpretation of neural activity. Although personality has been related to differential activity in these neural regions, it has not been related to changes in behavioral performance on the cognitive control tasks. Without this link, it is unclear what the personality–behavior correlations reflect. For instance, an obvious expectation may be that individuals who show greater reactivity to errors in the dorsal ACC would subsequently adjust cognitive control resources more drastically and, therefore, influence behavioral performance on subsequent trials more readily. Without experiments to illustrate connections between personality, neural activity, and behavioral performance on measures of cognitive control, it is unclear how to interpret the relationships between personality and neural activity that have been found. Ultimately, the studies currently suggest the potential for describing personality in ways that are more reflective of the underlying cognitive processes.

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Goal-Directed Behavior in the Absence of Awareness

A particularly fascinating behavioral finding that has received little attention in neuroscience is that goals can be activated without awareness (Bargh, Gollwitzer, Lee-Chai, Barndollar, & Troetschel, 2001; Chartrand & Bargh, 1996; Custers & Aarts, 2010). That is, individuals can be primed to engage in goal-directed behavior without forming an explicit intention to do so. Chartrand and Bargh (1996) illustrated this effect using an impression formation goal. They capitalized on a well-established finding that when people are shown a list of behaviors (e.g., "went skiing," had a party," etc.) and are instructed explicitly to form an impression of another individual rather than just memorize the list of behaviors, they show both better memory as well as a tendency to cluster concepts together into a trait-like representation (Hamilton, Katz, & Leirer, 1980). Chartrand and Bargh (1996) asked whether such effects were also observed if subjects were primed with the goal to form an impression rather than explicitly instructed to pursue it. In one experiment, they primed subjects subliminally with words that were related to the goal of forming an impression of another person (e.g., "opinion," "personality," "evaluate," etc.) or just memorizing (e.g., "remember," "retain," "memory," etc.). They asked subjects to then complete a second ostensibly unrelated task in which they were presented with the list of behaviors. Their results showed that priming subjects with words related to impression formation resulted in greater overall memory and tendencies to cluster the behaviors around traits. Hence, the results suggest that subliminal priming of goal-related words can produce the same effects as instructing subjects explicitly to pursue the goal.

It could be argued though that such effects are simply due to stimulus-driven processes. That is, priming these concepts may lead to automatic activations that ultimately lead to this sort of behavior without further requiring an impression-formation goal to be activated. However, experiments by Bargh et al. (2001) suggest otherwise. They reasoned that one central difference between the priming of goals versus nongoal concepts is that activation of nongoal concepts should naturally attenuate over time, whereas activation of goal-related concepts should increase over time so long as the goal is not being accomplished. That is, goals involve the pursuit and striving to acquire an outcome and that over time this motivation maintains or even increases in strength until the goal is achieved or otherwise relinquished. They found that priming subjects with goal-related words resulted in greater motivation to accomplish the task after a longer delay rather than after a shorter delay. These studies and others have provided strong evidence that goals can be activated without awareness.

Although the behavioral findings are compelling, very little is known about whether neural pathways involved in goal-directed behavior can also be engaged without awareness (Custers & Aarts, 2010). Indeed, we know of only one study to date that has examined this question directly. Lau and Passingham (2007) investigated whether cues that resemble task instructions can influence the engagement of prefrontal cortical regions involved in cognitive control, particularly when processed without awareness. In their task, subjects performed a simple task in which they were shown a cue (the outline of a square or diamond) that indicated whether to process a subsequent word either for semantic or

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phonological content (i.e., abstractness, or number of syllables). They argued that the neural regions that subserve semantic and phonological processing engage different control regions in prefrontal cortex, including an anterior ventrolateral PFC region for semantic control and the ventral premotor cortex for phonological control. Prior to this instruction cue, a prime was presented subliminally that either matched the subsequent instruction cue or not (i.e., a filled-in square or diamond). Their experiment tests whether the prime engages only perceptual encoding processes or extends its influence into regions involved in cognitive control. If this latter hypothesis were true, this would predict that subliminal cues that resemble instructions automatically engage neural regions involved in cognitive control pertaining to the relative tasks. And indeed, this is what they found. The prime when presented subliminally engaged prefrontal regions that were involved in phonological or semantic control, regardless of the actual instruction cue. Behavioral results mirrored this such that congruent primes facilitated performance and incongruent primes interfered with performance. Hence, Lau and Passingham's study indicates that at least some neural regions underlying control processes can be engaged subliminally.

Overall though, more experiments in this area would be useful to examine the extent to which neural regions involved in cognitive control, including the lateral PFC and the dorsal ACC, can be engaged and implement control without awareness or intent. Along this line, Custers and Aarts (2010) have suggested that unconscious goals may be engaged through at least two distinct routes. In one, goal-related cues activate action representations that subsequently initiate pursuit of a goal as part of the neural code that represents an action. In another, these cues influence the reward value for various outcomes in the world and thereby influence the motivation to obtain these rewards. Intriguingly, prior studies have shown that neural regions involved in both action representation and reward value can be engaged subliminally, though it has yet to be shown that such activity promotes goal-directed behavior.

CONCLUSIONS

In the cognitive neuroscience approach to goal-directed behavior, the brain is considered to implement various processes that allow for the representation and maintenance of a goal and selection of goal-relevant information and behaviors. These processes have been studied by designing precise but low-level cognitive tasks that aim to manipulate their involvement, and thereby assess neural regions that may participate in these processes. Although the tasks themselves may seem far afield from the way we pursue our everyday goals, it is notable that more complex cases such as memory control and emotion regulation show overlapping neural circuitry. Current research continues to refine these models of cognitive control by examining how various regulatory regions interact and to extend this model to several other domains. For example, although not reviewed in this chapter, a great deal of this work has already been applied to clinical populations, many of which show differences in behavioral ability to perform specific processes as measured by these low level tasks (Braver, Barch, & Cohen, 1999; Ochsner, 2008). This approach has

produced a wealth of knowledge as to how the brain accomplishes goal-directed behavior. Beyond attaining greater precision on how the control network interacts, future directions may also aim to explore the generality of this network, how it fractionates into additional subprocesses in various domains, and how it incorporates other aspects of goal-directed behavior such as reward learning, goal abstraction, and individual differences.

REFERENCES

Downloaded by [Karen Hudson] at 03:29 22 March 2015

Alexander, G. E., DeLong, M. R., & Strick, P. L. (1986). Parallel organization of functionally segregated circuits linking basal ganglia and cortex. *Annual Review of Neuroscience, 9*, 357–381.

Anderson, M. C., Ochsner, K. N., Kuhl, B., Cooper, J., Robertson, E., Gabrieli, S. W., … Gabrieli, J. D. E. (2004). Neural systems underlying the suppression of unwanted memories. *Science, 303*, 232–235.

Aron, A. R. (2007). The neural basis of inhibition in cognitive control. *Neuroscientist, 13*, 214–228.

Aron, A. R., Fletcher, P. C., Bullmore, E. T., Sahakian, B. J., & Robbins, T. W. (2003). Stop-signal inhibition disrupted by damage to right inferior frontal gyrus in humans. *Nature Neuroscience, 6*, 115–116.

Aron, A. R., Robbins, T. W., & Poldrack, R. A. (2004). Inhibition and the right inferior frontal cortex. *Trends in Cognitive Sciences, 8*, 170–177.

Asaad, W. F., Rainer, G., & Miller, E. K. (2000). Task-specific neural activity in the primate prefrontal cortex. *Journal of Neurophysiology, 84*, 451–459.

Back, M. D., Schmukle, S. C., & Egloff, B. (2009). Predicting actual behavior from the explicit and implicit self-concept of personality. *Journal of Personality and Social Psychology, 97*, 533–548.

Baddeley, A. D. (2003). Working memory: Looking back and looking forward. *Nature Reviews Neuroscience, 4*, 829–839.

Baddeley, A. D., & Hitch, G. (1974). Working memory. *Psychology of Learning and Motivation, 8*, 47–89.

Badre, D. (2008). Cognitive control, hierarchy, and the rostro-caudal organization of the frontal lobes. *Trends in Cognitive Sciences, 12*, 193–200.

Badre, D., Poldrack, R., Paré-Blagoev, E., & Insler, R. (2005). Dissociable controlled retrieval and generalized selection mechanisms in ventrolateral prefrontal cortex. *Neuron, 37*, 907–918.

Badre, D., & Wagner, A. D. (2005). Frontal lobe mechanisms that resolve proactive interference. *Cerebral Cortex, 15*, 2003–2012.

Badre, D., & Wagner, A. D. (2007). Left ventrolateral prefrontal cortex and the cognitive control of memory. *Neuropsychologia, 45*, 2883–2901.

Balleine, B. W., & O'Doherty, J. P. (2010). Human and rodent homologies in action control: Corticostriatal determinants of goal-directed and habitual action. *Neuropsychopharmacology, 35*, 48–69.

Balota, D. A., Dolan, P. O., & Duchek, J. M. (2000). Memory changes in healthy older adults. In E. Tulving & F. I. M. Craik (Eds.), *The Oxford handbook of memory* (pp. 395–409). New York: Oxford University Press.

Bargh, J. A., Gollwitzer, P. M., Lee-Chai, A. Y., Barndollar, K., & Troetschel, R. (2001). The automated will: Nonconscious activation and pursuit of behavioral goals. *Journal of Personality and Social Psychology, 81*, 1014–1027.

Barrett, L. F. (2006). Solving the emotion paradox: categorization and the experience of emotion. *Personality and Social Psychological Review, 10*, 20–46.

Beauregard, M., Lévesque, J., & Bourgouin, P. (2001). Neural correlates of conscious self-regulation of emotion. *Journal of Neuroscience, 21*, RC165.

Bichot, N. P., Schall, J. D., & Thompson, K. G. (1996). Visual feature selectivity in frontal eye fields induced by experience in mature macaques. *Nature, 381*, 697–699.

Bilder, R. M., Volavka, J., Lachman, H. M., & Grace, A. A. (2004). The catechol-o-methyltransferase polymorphism: Relations to the tonic-phasic dopamine hypothesis and neuropsychiatric phenotypes. *Neuropsychopharmacology, 29*, 1943–1961.

Bishop, S., Duncan, J., Brett, M., & Lawrence, A. D. (2004). Prefrontal cortical function and anxiety: Controlling attention to threat-related stimuli. *Nature Neuroscience, 7*, 184–188.

Botvinick, M. M., Cohen, J. D., & Carter, C. S. (2004). Conflict monitoring and anterior cingulate cortex: an update. *Trends in Cognitive Sciences, 8*, 539–546.

Braver, T. S., Barch, D. M., & Cohen, J. D. (1999). Cognition and control in schizophrenia: A computational model of dopamine and prefrontal function. *Biological Psychiatry, 46*, 312–328.

Braver, T. S., & Cohen, J. D. (2000). On the control of control: The role of dopamine in regulating prefrontal function and working memory. *Attention and Performance, 18*, 713–737.

Braver, T. S., Satpute, A. B., Rush, B. K., Racine, C. A., & Barch, D. M. (2005). Context processing and context maintenance in healthy aging and early stage dementia of the Alzheimer's type. *Psychology and Aging, 20*, 33–46.

Bressler, S. L., Tang, W., Sylvester, C. M., Shulman, G. L., & Corbetta, M. (2008). Top-down control of human visual cortex by frontal and parietal cortex in anticipatory visual spatial attention. *Journal of Neuroscience, 28*, 10056–10061.

Brown, J. W., & Braver, T. S. (2005). Learned predictions of error likelihood in the anterior cingulate cortex. *Science, 307*, 1118–1121.

Buckley, M., Mansouri, F., Hoda, H., Mahboubi, M., Browning, P., Kwok, S., … Tanaka, K. (2009). Dissociable components of rule-guided behavior depend on distinct medial and prefrontal regions. *Science, 325*, 52–58.

Buckner, R. L. (2003). Functional-anatomic correlates of control processes in memory. *Journal of Neuroscience, 23*, 3999–4004.

Bunge, S. A. (2004). How we use rules to select actions: A review of evidence from cognitive neuroscience. *Cognitive, Affective, and Behavioral Neuroscience, 4*, 564–579.

Bunge, S. A., Burrows, B., & Wagner, A. D. (2004). Prefrontal and hippocampal contributions to visual associative recognition: interactions between cognitive control and episodic retrieval. *Brain and Cognition, 56*, 141–152.

Bunge, S. A., Hazeltine, E., Scanlon, M. D., Rosen, A. C., & Gabrieli, J. D. E. (2002). Dissociable contributions of prefrontal and parietal cortices to response selection. *NeuroImage, 17*, 1562–1571.

Bunge, S. A., Kahn, I., Wallis, J. D., Miller, E. K., & Wagner, A. D. (2003). Neural circuits subserving the retrieval and maintenance of abstract rules. *Journal of Neurophysiology, 90*, 3419–3428.

Bunge, S. A., Ochsner, K. N., Desmond, J. E., Glover, G. H., & Gabrieli, J. D. E. (2001). Prefrontal regions involved in keeping information in and out of mind. *Brain, 124*, 2074–2086.

Bush, G., Luu, P., & Posner, M. I. (2000). Cognitive and emotional influences in anterior cingulate cortex. *Trends in Cognitive Sciences, 4*, 215–222.

Carter, C. S., & van Veen, V. (2007). Anterior cingulate cortex and conflict detection: An update of theory and data. *Cognitive, Affective, and Behavioral Neuroscience, 7*, 367–379.

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Carver, C. S., & Scheier, M. F. (1998). *On the self-regulation of behavior*. New York: Cambridge University Press.

Chao, L. L., & Knight, R. T. (1995). Human prefrontal lesions increase distractibility to irrelevant sensory inputs. *Neuroreport, 6*, 1605–1610.

Chartrand, T. L., & Bargh, J. A. (1996). Automatic activation of impression formation and memorization goals: Nonconscious goal priming reproduces effects of explicit task instructions. *Journal of Personality and Social Psychology, 71*, 464–478.

Cohen, J. D., Braver, T. S., & Brown, J. W. (2002). Computational perspectives on dopamine function in prefrontal cortex. *Current Opinion in Neurobiology, 12*, 223–229.

Compton, R. J., Banich, M. T., Mohanty, A., Milham, M. P., Herrington, J., Miller, G. A., … Heller, W. (2003). Paying attention to emotion: An fMRI investigation of cognitive and emotional Stroop tasks. *Cognitive, Affective and Behavioral Neuroscience, 3*, 81–96.

Conway, M. A., & Fthenaki, A. (2003). Disruption of inhibitory control of memory following lesions to the frontal and temporal lobes. *Cortex, 39*(4–5), 667–686.

Cools, R. (2006). Dopaminergic modulation of cognitive function-implications for L-dopa treatment in Parkinson's disease. *Neuroscience and Biobehavioral Reviews, 30*, 1–23.

Corbetta, M., & Shulman, G. L. (2002). Control of goal-directed and stimulus-driven attention in the brain. *Nature Reviews Neuroscience, 3*, 201–215.

Curtis, C. E., & D'Esposito, M. (2003). Persistent activity in the prefrontal cortex during working memory. *Trends in Cognitive Sciences, 7*, 415–423.

Custers, R., & Aarts, H. (2010). The unconscious will: How the pursuit of goals operates outside of conscious awareness. *Science, 329*, 47–50.

Davis, J. D., Senghas, A., & Ochsner, K. N. (2009). Inhibiting facial expressions of emotion can decrease the strength of emotional experience. *Journal of Research in Personality, 43*, 822–829.

Davis, J. D., Senghas, A., & Ochsner, K. N. (2010). The effects of Botox injections on emotional experience. *Emotion, 10*, 433–440.

Depue, B. E., Curran, T., & Banich, M. T. (2007). Prefrontal regions orchestrate suppression of emotional memories via a two-phase process. *Science, 317*, 215–219.

Desimone, R., & Duncan, J. (1995). Neural mechanisms of selective visual attention. *Annual Review of Neuroscience, 18*, 193–222.

D'Esposito, M., Postle, B. R., Jonides, J., & Smith, E. E. (1999). The neural substrate and temporal dynamics of interference effects in working memory as revealed by event-related functional MRI. *Proceedings of National Academy of Sciences, 96*, 7514–7516.

di Pellegrino, G., Ciaramelli, E., & Làdavas, E. (2007). The regulation of cognitive control following rostral anterior cingulate cortex lesion in humans. *Journal of Cognitive Neuroscience, 19*, 275–286.

Egner, T., Etkin, A., Gale, S., & Hirsch, J. (2008). Dissociable neural systems resolve conflict from emotional versus nonemotional distracters. *Cerebral Cortex, 18*, 1475–1484.

Egner, T., & Hirsch, J. (2005). Cognitive control mechanisms resolve conflict through cortical amplification of task-relevant information. *Nature Neuroscience, 8*, 1784–1790.

Eippert, F., Veit, R., Weiskopf, N., Erb, M., Birbaumer, N., & Anders, S. (2007). Regulation of emotional responses elicited by threat-related stimuli. *Human Brain Mapping, 28*, 409–423.

Eisenberger, N. I., Lieberman, M. D., & Satpute, A. B. (2005). Personality from a controlled processing perspective: An fMRI study of neuroticism, extraversion, and self-consciousness. *Cognitive, Affective, and Behavioral Neuroscience, 5*, 169–181.

Etkin, A., Egner, T., Peraza, D. M., Kandel, E. R., & Hirsch, J. (2006). Resolving emotional conflict: A role for the rostral anterior cingulate cortex in modulating activity in the amygdala. *Neuron, 51*, 871–882.

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Fales, C. L., Barch, D. M., Burgess, G. C., Schaefer, A., Mennin, D. S., Gray, J. R., & Braver, T. S. (2008). Anxiety and cognitive efficiency: differential modulation of transient and sustained neural activity during a working memory task. *Cognitive, Affective, and Behavioral Neuroscience, 8*, 239–253.

Frank, M. J., Loughry, B., & O'Reilly, R. C. (2001). Interactions between frontal cortex and basal ganglia in working memory: a computational model. *Cognitive, Affective, and Behavioral Neuroscience, 1*, 137–160.

Freedman, D. J., Riesenhuber, M., Poggio, T., & Miller, E. K. (2001). Categorical representation of visual stimuli in the primate prefrontal cortex. *Science, 291*, 312–316.

Funahashi, S., Bruce, C. J., & Goldman-Rakic, P. S. (1989). Mnemonic coding of visual space in the monkey's dorsolateral prefrontal cortex. *Journal of Neurophysiology, 61*, 331–349.

Funahashi, S., Bruce, C. J., & Goldman-Rakic, P. S. (1993). Dorsolateral prefrontal lesions and oculomotor delayed-response performance: evidence for mnemonic "scotomas." *Journal of Neuroscience, 13*, 1479–1497.

Fuster, J. M. (1973). Unit activity in prefrontal cortex during delayed-response performance: Neuronal correlates of transient memory. *Journal of Neurophysiology, 36*, 61–78.

Gold, B. T., Balota, D. A., Jones, S. J., Powell, D. K., Smith, C. D., & Andersen, A. H. (2006). Dissociation of automatic and strategic lexical-semantics: functional magnetic resonance imaging evidence for differing roles of multiple frontotemporal regions. *Journal of Neuroscience, 26*, 6523–6532.

Goldin, P. R., McRae, K., Ramel, W., & Gross, J. J. (2008). The neural bases of emotion regulation: Reappraisal and suppression of negative emotion. *Biological Psychiatry, 63*, 577–586.

Goldman-Rakic, P. S. (1987). Circuitry of primate prefrontal cortex and regulation of behavior by representational memory. In F. Plum (Ed.), *Handbook of physiology: The nervous system* (pp. 373–417). Bethesda, MD: American Physiological Society.

Goldman-Rakic, P. S. (1999). Neural basis of working memory. In R. A. Wilson & F. C. Keil (Eds.), *The MIT encyclopedia of cognitive sciences*. Cambridge: MIT Press.

Gottfried, J. A., O'Doherty, J., & Dolan, R. J. (2003). Encoding predictive reward value in human amygdala and orbitofrontal cortex. *Science, 301*, 1104–1107.

Grace, A. A. (1991). Phasic versus tonic dopamine release and the modulation of dopamine system responsivity. *Neuroscience, 41*, 1–24.

Gross, J. J., & Levenson, R. W. (1993). Emotional suppression: Physiology, self-report, and expressive behavior. *Journal of Personality and Social Psychology, 64*, 970–986.

Haas, B. W., Omura, K., Constable, R. T., & Canli, T. (2006). Interference produced by emotional conflict associated with anterior cingulate activation. *Cognitive, Affective, and Behavioral Neuroscience, 6*, 152–156.

Hamilton, D. L., Katz, L. B., & Leirer, V. O. (1980). Organizational processes in impression formation. In R. Hastie, T. M. Ostrom, E. B. Ebbesen, R. S. Wyer, Jr., D. L. Hamilton, & D. E. Carlston (Eds.), *Person memory: The cognitive basis of social perception*. Hillsdale, NJ: Erlbaum.

Hanslmayr, S., Leipold, P., Pastotter, B., & Bauml, K.-H. (2009). Anticipatory signatures of voluntary memory suppression. *Journal of Neuroscience, 29*, 2742–2747.

Hazy, T. E., Frank, M. J., & O'Reilly, R. C. (2006). Banishing the homunculus: making working memory work. *Neuroscience, 139*, 105–118.

Higgins, E. T. (1997). Beyond pleasure and pain. *American Psychologist, 52*, 1280–1300.

Higgins, E. T. (1998). Promotion and prevention: Regulatory focus as a motivational principle. In M. P. Zanna (Ed.), *Advances in experimental social psychology* (Vol. 30, pp. 1–46). New York: Academic Press.

Jonides, J., Smith, E. E., Marshuetz, C., Koeppe, R. A., & Reuter-Lorenz, P. A. (1998). Inhibition in verbal working memory revealed by brain activation. *Proceedings of the National Academy of Sciences, USA, 95*, 8410–8413.

Kanwisher, N., McDermott, J., & Chun, M. M. (1997). The fusiform face area: A module in human extrastriate cortex specialized for face perception. *Journal of Neuroscience, 17*, 4302–4311.

Kerns, J., Cohen, J., MacDonald, A. W. I., Cho, R., Stenger, V., & Carter, C. (2004). Anterior cingulate conflict monitoring and adjustments in control. *Science, 303*, 1023.

Kober, H., Barrett, L. F., Joseph, J., Bliss-Moreau, E., Lindquist, K., & Wager, T. D. (2008). Functional grouping and cortical-subcortical interactions in emotion: A meta-analysis of neuroimaging studies. *NeuroImage, 42*, 998–1031.

Lau, H. C., & Passingham, R. E. (2007). Unconscious activation of the cognitive control system in the human prefrontal cortex. *Journal of Neuroscience, 27*, 5805–5811.

Lévesque, J., Eugène, F., Joanette, Y., Paquette, V., Mensour, B., Beaudoin, G., … Beauregard, M. (2003). Neural circuitry underlying voluntary suppression of sadness. *Biological Psychiatry, 53*, 502–510.

Lhermitte, F. (1983). "Utilization behaviour" and its relation to lesions of the frontal lobes. *Brain, 106*, 237–255.

Liddle, P. F., Kiehl, K. A., & Smith, A. M. (2001). Event-related fMRI study of response inhibition. *Human Brain Mapping, 12*, 100–109.

Lieberman, M. D., Eisenberger, N. I., Crockett, M. J., Tom, S. M., Pfeifer, J. H., & Way, B. M. (2007). Putting feelings into words: Affect labeling disrupts amygdala activity in response to affective stimuli. *Psychological Science, 18*, 421–428.

MacDonald, A. W., Cohen, J. D., Stenger, V. A., & Carter, C. S. (2000). Dissociating the role of the dorsolateral prefrontal and anterior cingulate cortex in cognitive control. *Science, 288*, 1835–1838.

McNab, F., & Klingberg, T. (2008). Prefrontal cortex and basal ganglia control access to working memory. *Nature Neuroscience, 11*, 103–107.

Mehta, M. A., Swainson, R., Ogilvie, A. D., Sahakian, J., & Robbins, T. W. (2001). Improved short-term spatial memory but impaired reversal learning following the dopamine D(2) agonist bromocriptine in human volunteers. *Psychopharmacology, 159*, 10–20.

Menon, V., Adleman, N. E., White, C. D., Glover, G. H., & Reiss, A. L. (2001). Error-related brain activation during a Go/NoGo response inhibition task. *Human Brain Mapping, 12*, 131–143.

Miller, E. K., & Cohen, J. D. (2001). An integrative theory of prefrontal cortex function. *Annual Review of Neuroscience, 24*, 167–202.

Milner, B. (1963). Effects of different brain lesions on card sorting: The role of the frontal lobes. *Archives of Neurology, 9*, 90–100.

Moscovitch, M., & Winocur, G. (1992). The neuropsychology of memory and aging. In F. I. M. Craik & T. A. Salthouse (Eds.), *Handbook of aging and cognition* (pp. 315–372). Hillsdale, NJ: Erlbaum.

Moskovitz, G. B., Golwitzer, P. M., Wasel, W., & Schaal, B. (1999). Preconscious control of stereotype activation through chronic egalitarian goals. *Journal of Personality and Social Psychology, 77*, 167–184.

Nee, D. E., Jonides, J., & Berman, M. G. (2007). Neural mechanisms of proactive interference-resolution. *NeuroImage, 38*, 740–751.

Nee, D. E., Wager, T. D., & Jonides, J. (2007). Interference resolution: Insights from a meta-analysis of neuroimaging tasks. *Cognitive, Affective, and Behavioral Neuroscience, 7*, 1–17.

Neely, J. H. (1977). Semantic priming and retrieval from lexical memory: Roles of inhibitionless spreading activation and limited-capacity attention. *Journal of Experimental Psychology: General, 106*, 226–254.

Neely, J. H. (1991). Semantic priming effects in visual word recognition: A selective review of current findings and theories. In D. Bresner and G. W. Humphreys (Eds.), *Basic processes in reading: Visual word recognition*. Hillsdale, NJ: Erlbaum.

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Ochsner, K. N. (2008). The social-emotional processing stream: Five core constructs and their translational potential for schizophrenia and beyond. *Biological Psychiatry, 64*, 48–61.
Ochsner, K. N., Bunge, S. A., Gross, J. J., & Gabrieli, J. D. E. (2002). Rethinking feelings: an fMRI study of the cognitive regulation of emotion. *Journal of Cognitive Neuroscience, 14*, 1215–1229.
Ochsner, K. N., & Gross, J. J. (2005). The cognitive control of emotion. *Trends in Cognitive Sciences, 9*, 242–249.
Ochsner, K. N., Hughes, B., Robertson, E. R., Cooper, J. C., & Gabrieli, J. D. E. (2009). Neural systems supporting the control of affective and cognitive conflicts. *Journal of Cognitive Neuroscience, 21*, 1842–1855.
Ochsner, K. N., Ray, R. D., Cooper, J. C., Robertson, E. R., Chopra, S., Gabrieli, J. D. E., & Gross, J. J. (2004). For better or for worse: neural systems supporting the cognitive down- and up-regulation of negative emotion. *NeuroImage, 23*, 483–499.
Ongur, D., & Price, J. L. (2000). The organization of networks within the orbital and medial prefrontal cortex of rats, monkeys and humans. *Cerebral Cortex, 10*, 206–219.
Pandya, D. N., & Barnes, C. L. (1987). Architecture and connections of the frontal lobe. In E. Perecman (Ed.), *The frontal lobes revisited*. New York: IRBN Press.
Pardo, J. V., Pardo, P. J., Janer, K. W., & Raichle, M. E. (1990). The anterior cingulate cortex mediates processing selection in the Stroop attentional conflict paradigm. *Proceedings of the National Academy of Sciences, USA, 87*, 256–259.
Petrides, M., & Pandya, D. N. (1999). Dorsolateral prefrontal cortex: comparative cytoarchitectonic analysis in the human and the macaque brain and corticocortical connection patterns. *European Journal of Neuroscience, 11*, 1011–1136.
Petrides, M., & Pandya, D. N. (2001). Comparative cytoarchitectonic analysis of the human and the macaque ventrolateral prefrontal cortex and corticocortical connection patterns in the monkey. *European Journal of Neuroscience, 16*, 291–310.
Phan, K. L., Fitzgerald, D. A., Nathan, P. J., Moore, G. J., Uhde, T. W., & Tancer, M. E. (2005). Neural substrates for voluntary suppression of negative affect: a functional magnetic resonance imaging study. *Biological Psychiatry, 57*, 210–219.
Rainer, G., Asaad, W. F., & Miller, E. K. (1998a). Memory fields of neurons in the primate prefrontal cortex. *Proceedings of the National Academy of Sciences, USA, 95*, 15008–15013.
Rainer, G., Assad, W. F., & Miller, E. K. (1998b). Selective representation of relevant information by neurons in the primate prefrontal cortex. *Nature, 393*, 577–579.
Rao, S. C., Rainer, G., & Miller, E. K. (1997). Integration of what and where in the primate prefrontal cortex. *Science, 276*, 821–824.
Reynolds, J. H., & Chelazzi, L. (2004). Attentional modulation of visual processing. *Annual Review of Neuroscience, 27*, 611–647.
Richards, J. M., & Gross, J. J. (2000). Emotion regulation and memory: The cognitive costs of keeping one's cool. *Journal of Personality and Social Psychology, 79*, 410–424.
Ridderinkhof, K. R., Ullsperger, M., Crone, E. A., & Nieuwenhuis, S. (2004). The role of the medial frontal cortex in cognitive control. *Science, 306*, 443–447.
Rubia, K., Russell, T., Overmeyer, S., Brammer, M. J., Bullmore, E. T., Sharma, T., … Taylor, E. (2001). Mapping motor inhibition: conjunctive brain activations across different versions of Go/No-Go and stop tasks. *NeuroImage, 13*, 250–261.
Rubia, K., Smith, A. B., Brammer, M. J., & Taylor, E. (2003). Right inferior prefrontal cortex mediates response inhibition while mesial prefrontal cortex is responsible for error detection. *NeuroImage, 20*, 351–358.
Rushworth, M. F., Nixon, P. D., Eacott, M. J., & Passingham, R. E. (1997). Ventral prefrontal cortex is not essential for working memory. *Journal of Neuroscience, 17*, 4829–4838.
Salthouse, T. A. (1990). Working memory as a processing resource in cognitive aging. *Developmental Review, 10*, 101–124.

Downloaded by [Karen Hudson] at 03:29 22 March 2015

Satpute, A. B., Shu, J., Weber, J., Roy, M., & Ochsner, K. (2010). Disentangling the neural regions involved in the categorization of and attention to emotional experience. *Society for Neuroscience Abstracts*.

Shallice, T., Burgess, P. W., Schon, F., & Baxter, D. M. (1989). The origins of utilization behaviour. *Brain, 112*, 1587–1598.

Shin, L. M., Whalen, P. J., Pitman, R. K., Bush, G., Macklin, M. L., Lasko, N. B., … Rauch, S. L. (2001). An fMRI study of anterior cingulate function in posttraumatic stress disorder. *Biological Psychiatry, 50*, 932–942.

Stroop, J. R. (1935). Studies of interference in serial verbal reactions. *Journal of Experimental Psychology, 18*, 643–662.

Stuss, D. T., & Benson, D. F. (1984). Neuropsychological studies of the frontal lobes. *Psychological Bulletin, 95*, 3–28.

Sutton, R. S., & Barto, A. G. (1998). *Reinforcement learning: An introduction*. Cambridge, MA: MIT Press.

Thompson-Schill, S. L., D'Esposito, M., Aguirre, G. K., & Farah, M. J. (1997). Role of left inferior prefrontal cortex in retrieval of semantic knowledge: a reevaluation. *Proceedings of the National Academy of Sciences, USA, 94*, 14792–14797.

Tiffany, S. T. (1990). A cognitive model of drug urges and drug-use behavior: Role of automatic and nonautomatic processes. *Psychological Review, 97*, 147–168.

Tomita, H., Ohbayashi, M., Nakahara, K., Hasegawa, I., & Miyashita, Y. (1999). Top-down signal from prefrontal cortex in executive control of memory retrieval. *Nature, 401*, 699–703.

Tulving, E., & Schacter, D. L. (1990). Priming and human memory systems. *Science, 247*, 301–306.

Valentin, V. V., Dickinson, A., & O'Doherty, J. P. (2007). Determining the neural substrates of goal-directed learning in the human brain. *Journal of Neuroscience, 27*, 4019–4026.

Vallacher, R. R., & Wegner, D. M. (1987). What do people think they're doing? Action identification and human behavior. *Psychological Review, 94*, 3–15.

Vuilleumier, P., Armony, J. L., Driver, J., & Dolan, R. J. (2001). Effects of attention and emotion on face processing in the human brain: an event-related fMRI study. *Neuron, 30*, 829–841.

Wager, T. D., Jonides, J., & Reading, S. (2004). Neuroimaging studies of shifting attention: A meta-analysis. *NeuroImage, 22*, 1679–1693.

Wager, T. D., Phan, K. L., Liberzon, I., & Tayor, S. F. (2003). Valence, gender, and lateralization of functional brain anatomy in emotion: A meta-analysis of findings from neuroimaging. *NeuroImage, 19*, 513–531.

Wager, T. D., & Smith, E. E. (2003). Neuroimaging studies of working memory: A meta-analysis. *Cognitive, Affective, and Behavioral Neuroscience, 3*, 255–274.

Wagner, A. D., Paré-Blagoev, E. J., Clark, J., & Poldrack, R. A. (2001). Recovering meaning: Left prefrontal cortex guides controlled semantic retrieval. *Neuron, 31*, 329–338.

Wallis, J. D., Anderson, K. C., & Miller, E. K. (2001). Single neurons in prefrontal cortex encode abstract rules. *Nature, 411*, 953–978.

Watanabe, M. (1992). Frontal units of the monkey coding the associative significance of visual and auditory stimuli. *Experimental Brain Research, 89*, 233–247.

Whalen, P. J., Bush, G., McNally, R. J., Wilhelm, S., McInerney, S. C., Jenike, M. A., & Rauch, S. L. (1998). The emotional counting Stroop paradigm: A functional magnetic resonance imaging probe of the anterior cingulate affective division. *Biological Psychiatry, 44*, 1219–1228.

White, I. M., & Wise, S. P. (1999). Rule-dependent neuronal activity in the prefrontal cortex. *Experimental Brain Research, 126*, 315–335.

Wilson, F. A. W., O'Scalaidhe, S. P., & Goldman-Rakic, P. S. (1993). Dissociation of object and spatial processing domains in primate prefrontal cortex. *Science, 260*, 1955–1958.

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3

Basic Goal Distinctions

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Every day, from the time we wake up in the morning until the time we go to bed, goals influence our thoughts, feelings, and actions. For instance, our achievement goals may determine what time we get up in the morning to start working, and our health goals may direct whether we choose chocolate chip pancakes or granola for breakfast. Impression management goals may impact the clothes we wear and the hairstyle we choose. How fast we drive between daily activities may be affected by goals related to punctuality or safety. Beyond these mundane daily activities, goals influence broader actions and decisions such as what major we pursue in college, who we choose to date, or how we manage our finances. We as organisms are fundamentally goal driven and structure our social worlds around these desires and concerns (for a review, see Fishbach & Ferguson, 2007). Given the importance of goals in life, it is unsurprising then that the study of goals has been a primary area of investigation in psychology for decades.

What are goals exactly? Goals are mental representations of desired end states. They represent those outcomes that people understand they want. This understanding may be explicit and conscious—that is, people may be able to declare and explain what exactly it is they want. However, people may also pursue and be influenced by goals they are not even aware they have (for reviews, see Bargh, 1990; McClelland, Koestner, & Weinberger, 1989; Schultheiss & Brunstein, 2010). That people are pursuing such goals is evident only from the judgments and decisions they make, the behaviors they engage in, and their emotional, cognitive, and behavioral reactions to various outcomes.

Goals can differ on a number of dimensions, and these differences play an important role in determining why the same outcome can impact people in dramatically different ways. To better classify and understand these differences, researchers have proposed and refined a number of conceptual goal distinctions. For the uninitiated reader, the quantity and heterogeneity of goal terminology and

theoretical frameworks can be intimidating and overwhelming. In this chapter, we review some of the most fundamental goal distinctions, comparing and contrasting them when appropriate, and discuss their implications for people's thoughts, feelings, and behavior. Where apt, we refer readers to chapters in the present volume that discuss these issues in more depth. What follows is not an exhaustive review, but rather a general introduction of basic concepts designed to provide a basis for further intellectual inquiry.

ABSTRACT VERSUS CONCRETE GOALS

Many goals that people pursue on a daily basis are geared toward achieving specific objectives, such as making a cup of coffee or walking the dog around the neighborhood. Others refer to much more general, global objectives, such as being a responsible person. These goals differ in their degree of abstraction (Carver & Scheier, 1982, 1990; Kruglanski et al., 2002; Rachlin, 1995; Trope & Liberman, 2003; Vallacher & Wegner, 1987). Concrete goals detail specific, tangible rewards achieved by particular behaviors in response to particular contexts. Abstract goals, in contrast, reflect more global, general aims that transcend specific situations and apply to multiple contexts. These latter goals can rarely be fully achieved by any one act and are generally revealed across a broader pattern of behavior (Rachlin, 1995). The goal to be a responsible person, for example, cannot be completely and fully attained simply by walking the dog once, but rather requires multiple behaviors (e.g., arriving punctually at work, cooking for one's children, driving only when not inebriated, etc.) across multiple situations (e.g., at work, in the kitchen, returning from the bar). The operation and fulfillment of abstract goals thus require appreciating the intangible commonalities or core concerns across a wide range of behaviors in diverse situations.

Some have suggested that the most abstract goals, such as one's identity goals (e.g., to be a scholar), can never be fully attained (Wicklund & Gollwitzer, 1982). Unlike more concrete goals, which often have tangible desired outcomes (e.g., the goal to make a cup of coffee is achieved when one successfully has a mug of coffee in hand), many abstract goals by their very nature lack specific criteria by which to gauge goal progress or status. Identities are highly abstract concepts with no tangible attainment standards. Instead, they are manifest only when socially recognized by others. Because what it means to be or to have a particular identity can change with social context, one's sense of identity-goal attainment is dynamic. For example, at what point is one a "scholar"? One might fulfill an identity goal to be a scholar when he or she receives an academic position at a research university. Such goal fulfillment, however, can readily be undermined by the presence of more senior, respected colleagues. The social comparison to these readily recognizable scholars may render one with a decreased sense of being a "scholar" and may lead to a sense of identity-goal failure. These senior scholars themselves may experience a sense of identity-goal failure in the presence of a more highly recognized, Nobel prize–winning researcher. What it means to be a scholar has no concrete, specific standard, and thus attainment of this identity is a continual quest. The lack of specific criteria with which to gauge goal success or failure may extend to abstract

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goals beyond identity goals. The goals to be healthy or happy can be considered examples of such goals. Without definitive criteria, whether one is healthy or is happy may become a subjective perception that shifts and fluctuates depending on the comparison standard used.

Long-Term Versus Short-Term Goals

That abstract goals tend to require multiple behaviors across many instances may suggest some level of correspondence between abstract versus concrete goals and what might be referred to as long-term versus short-term goals. The terms *long term* and *short term*, however, are vague and can be distinguished in a number of ways. One way that the terms long term and short term are used, for example, refers to the point in time in which one begins goal-relevant action. The goal to pay one's taxes on time might be considered more long term if set a year versus a month in advance. In both cases, goal-relevant action may take place around the same time relative to the tax submission deadline. Yet, in the former relative to the latter, the person set a long-term rather than short-term goal because the (same) action is to be initiated in the more distant future.

A second way that the terms long term and short term are used refers to the point in time in which one successfully attains goal-relevant rewards. Investing money into a certificate of deposit at a bank, for example, requires a predetermined duration of time to mature. This investment might be considered a long-term goal in that the reward to be reaped by the investment will not come to fruition until some fixed point in the future. In this context, it is not when the goal-relevant action is initiated that determines its long-term rather than short-term nature, but when the rewards of those actions are attained.

A third way that the distinction between long term versus short term is used is to differentiate goals not on the basis of the specific point in time at which one must initiate goal-relevant action, nor the point in time in which the rewards of goal attainment are reaped. Instead, long term versus short term appears to reference a more general sense that some goals require some duration of time to pass before success or failure can even be assessed. For example, the goal to be healthy may reflect such a long-term rather than short-term goal. In this instance, long term does not refer to when the goal-relevant action is initiated. Presumably, to be healthy, one needs to initiate health-promoting behavior in the immediate here and now. The use of long term here also does not refer to when the goal-relevant rewards are attained. As discussed earlier, there is no specific time point at which one has finally achieved the goal of health. In reference to the health goal, long term refers more generally to the notion that whether one has been successful at "health" can only be appreciated when considering broader rather than narrower durations of time. Conceptually, however, the use of long term in this way is problematic as it leaves undefined what is meant by the reference to time. Duration is determined by the length of time between start and end points, but the end point of goals such as "health" cannot be readily identified. Without specification of these time points, any reference to duration is vague and ill-defined. Using the term *abstract* in such instances may be more precise and appropriate than using long term. The tendency

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to refer to such goals as long term exists only because these goals are cross-situational and may involve many behaviors (i.e., they are abstract). However, the fact that these goals must be pursued across both immediate and future instances suggests that the long-term label is inaccurate and may promote confusion,

One should similarly not mistakenly equate abstract goals with those goals that either start or finish in the near versus distant future. Research does suggest that abstraction is associated with greater temporal distance (Bar-Anan, Liberman, & Trope, 2006; Liberman, Trope, McCrea, & Sherman, 2007; for reviews, see Liberman, Trope, & Stephan, 2007; Trope & Liberman, 2003). That is, there is some correspondence between thinking of one's more abstract goals and thinking of more temporally distant rewards and outcomes (Fujita, 2008; Fujita, Trope, Liberman, & Levin-Sagi, 2006). This does not mean, however, that abstract goals are necessarily initiated or achieved at time points farther from the present than concrete goals. It is possible to have short-term abstract goals and long-term concrete goals. By illustration, one can imagine pursuing the abstract goal of "being nice" to someone both in the near and distant future. One can strive to "be nice" to one's in-laws, irrespective of whether they will be visiting tomorrow or a year from now. "Being nice" can also reap goal-related rewards in both the near and distant future. One can, moreover, imagine planning very concrete goals to be enacted both in the near and distant future, such as making specific travel plans for next week versus next month (see also reviews of research on implementation intentions, Gollwitzer, Barry, & Oettingen, Chapter 4, this volume; Sheeran & Webb, Chapter 5, this volume).

Those who discuss long-term versus short-term goals should thus explicitly state to which meaning of the terms they refer to avoid potential confusion and lack of clarity. For example, scholars should explicitly state whether long term versus short term refers to the timing of the initiation of goal-relevant action or to the timing of the receipt of goal-relevant rewards. It should also be clear that abstract versus concrete goals are not synonymous with long-term versus short-term goals. Time is not a defining feature that distinguishes abstract from concrete goals. This distinction between time and abstraction needs to be maintained to avoid conceptual vagaries and improper specification.

Means Versus Ends

Further clarification on the distinction between abstract and concrete goals comes from the recognition that goals are represented hierarchically (Carver & Scheier, 1982, 1990; Kruglanski et al., 2002; Vallacher & Wegner, 1987; see also Moskowitz, Chapter 1, this volume). Researchers have conceptually distinguished subgoals versus goals and means versus ends to reflect this hierarchical representation. Means or subgoals are specific, concrete goals that serve to attain more general, abstract goals or ends. Note that the distinction between means versus ends (or subgoals vs. goals) is inherently relative. Any means serving a particular end (e.g., "eat more vegetables" to attain the goal of "being healthy") may in turn serve as an end for an even more subordinate means (e.g., "chop carrots" to attain the goal of "eat more vegetables"). Thus, in accomplishing more specific means, people can make

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progress in the pursuit of more abstract ends (see also Fishbach & Finkelstein, Chapter 7, this volume). For this reason, many goal theorists have suggested that the setting of more concrete, specific goals promotes performance over setting only more abstract goals (Locke & Latham, 1990).

One implication of hierarchical goal representations is that the same behavior can be identified at multiple levels of abstraction (Vallacher & Wegner, 1985, 1987; see also Moskowitz, Chapter 1, this volume). For example, the act of eating vegetables can be identified more concretely as "chewing carrots" or more abstractly as "being healthy." The level at which people identify any particular behavior reflects an information tradeoff between more abstract versus more concrete identifications. Although more abstract identifications of a behavior promote greater comprehensive understanding of an action's causal effects, socially conveyed meanings, and self-evaluative implications, more concrete identifications provide the more specific information necessary to perform that behavior. Goal theorists assume people generally try to identify behaviors as abstractly as they can (Vallacher & Wegner, 1985, 1987). However, when these abstract identifications fail to provide sufficient informational guidance for the execution of a behavior (particularly when the behavior is difficult, complex, or novel), more concrete action construals become increasingly prepotent. Trying to drink coffee out of a cumbersome mug, for example, promotes construing coffee drinking concretely as "swallowing" rather than abstractly as "promoting a caffeine habit" (Wegner, Vallacher, Macomber, Wood, & Arps, 1984). Research has further shown that how abstractly or concretely one identifies a behavior has important consequences for the execution of that behavior. Whereas performance on easy tasks is enhanced with more abstract identifications, performance on difficult tasks is enhanced with more concrete identifications (Vallacher, Wegner, & Somoza, 1989).

One should not mistake the means versus ends (subgoals vs. goals) distinction as being synonymous with the distinction between concrete versus abstract goals. When discussing the terms concrete and abstract, most researchers have compared and contrasted goals within a single goal hierarchy (Carver & Scheier, 1982, 1990; Gollwitzer, 1999; Kruglanski et al., 2002; Vallacher & Wegner, 1985, 1987). That is, they examine the relations between specific means and the ends that they serve. When concrete and abstract goals are represented in the same single goal hierarchy, the terms concrete versus abstract are indeed interchangeable with means versus ends (subgoals vs. goals). The comparison between abstract and concrete goals, however, need not be limited to means-ends relationships within a given goal hierarchy. That is, it is possible to compare abstract versus concrete goals that are represented in two distinguishable goal hierarchies.

Consider, for example, a hungry dieter presented with a piece of indulgent chocolate cake. The dieter's hunger is likely to activate a goal to eat the cake. At the same time, however, the dieter's weight-loss goals are equally likely to be activated (Fishbach, Friedman, & Kruglanski, 2003; Papies, Stroebe, & Aarts, 2008; see also Mann & Ward, 2004; Stroebe, 2008). In this situation, the dieter experiences a conflict between the more concrete goal to eat the cake to satisfy his hunger and the more abstract goal of losing weight. Whereas the concrete eating goal can be achieved in a single act (i.e., eating the cake), the more abstract weight-loss goal

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requires multiple acts across many situations (i.e., dietary restraint until sufficient weight is lost). People experience their social worlds concretely, and thus it is frequently easier to pursue and achieve concrete goals (Locke & Latham, 1990). The pursuit of these more concrete goals, however, may undermine the pursuit of more valued abstract goals, particularly when salient concrete goals do not correspond with one's more abstract goals. In situations like the hungry dieter choosing a snack, the readily attainable concrete goals (e.g., eating cake) stand in stark contrast to relatively intangible abstract goals (e.g., being thin). Given the simplicity of pursuing these more concrete goals, in situations where abstract and concrete goals conflict, people frequently choose to act in ways that undermine their more abstract goals. When people can proverbially "see the big picture" and consider the more global implications of their actions, however, they are more likely to pursue abstract rather than concrete goals (Fujita, 2008; Fujita, Trope, & Liberman, 2006, 2010; Metcalfe & Mischel, 1999; Mischel, Shoda, & Rodriguez, 1989). Understanding the factors that promote abstract versus concrete goal pursuit may thus help to illuminate why people fail so often to achieve their lofty aims and aspirations.

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APPROACH VERSUS AVOIDANCE ORIENTATIONS

The distinction between approach versus avoidance is one of the most fundamental in goals research (Atkinson, 1957; Carver & Scheier, 1982; Elliot, 1999; Harmon-Jones, 2003; Higgins, 1997; Hull, 1938; Lewin, 1935; Miller, 1944; Thorndike, 1935). Despite the centrality of this goal distinction, there is considerable heterogeneity in the ways that the terms *approach* and *avoidance* have been used in the literature. In what follows, we distinguish approach versus avoidance from two related distinctions: (a) behavioral activation versus inhibition, and (b) promotion versus prevention regulatory foci.

Note, however, much of the theorizing on the concepts of approach versus avoidance (as well as behavioral activation vs. inhibition and promotion vs. prevention) does not apply to goals per se, but rather motivational systems or orientations. Goals are cognitive representations of broader, more abstract motivational systems (Elliot, 2006; Fishbach & Ferguson, 2007). Each goal specifies an end point and guides people's behavior to or away from that end point. Motivational systems or orientations, by contrast, guide people more generally to pursue or forestall a particular class of end points. As will be discussed below, for example, an approach motivational orientation guides people to focus on positive outcomes, whereas an avoidance motivational orientation guides them to focus on negative outcomes (Carver & Scheier, 1982, 1990; Elliot, 1999, 2006). Similarly, whereas a motivational orientation toward behavioral activation promotes action and movement, behavioral inhibition halts ongoing action (Gray, 1971, 1990). Finally, a motivational orientation toward promotion encourages sensitivity to gains, whereas a motivational orientation toward prevention promotes sensitivity to losses (Higgins, 1997). These motivational orientations define a set of possible end points, and goals serve to identify and pursue specific end points within this set. Thus, although distinct from goals per se, motivational orientations and systems clearly play a critical role in the types of goals that people pursue.

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Approach Versus Avoidance

That people are motivated to approach pleasure and avoid pain is an observation that scholars from the ancient Greeks through the 17th- and 18th-century British philosophers to 20th-century psychologists have noted. People's basic inclination to maximize pleasure and minimize pain has been referenced by theorists in almost every field of motivational research, including evaluation and attitudes (Cacioppo & Berntson, 1994), learning (Hull, 1943; Miller, 1944; Thorndike, 1935), decision making (Heath, Larrick, & Wu, 1999; Kahneman & Tversky, 1979), and achievement motivation (Atkinson, 1957; Elliot, 1999). A central tenet of the approach versus avoidance distinction that these various scholars have proposed is that avoidance is not merely the opposite of approach: The motivational properties of avoiding punishment are distinct from those of approaching reward.

Motivation researchers propose that approach motivation promotes actions that minimize the discrepancy between one's current state and some desired end state (Carver & Scheier, 1982, 1990; Elliot, 1999, 2006). People seek to reduce the psychological distance between where they currently are and some more positive state in which they would like to be (Lewin, 1935; Miller, 1944). Goal progress is maintained through the operation of a negative discrepancy feedback loop (Carver & Scheier, 1982, 1990). Specifically, goal striving is initiated and sustained to the extent that there is a mismatch between one's current state and some more desired state. Once this discrepancy is minimized, goal striving ceases. As approach orients people to desired states, those who are approach motivated are more sensitive to the presence versus absence of rewards and positive outcomes.

Avoidance motivation, on the other hand, promotes actions that maximize the discrepancy between one's current state and some undesired end state. People seek to increase the psychological distance between where they currently are and some more negative state in which they would not like to be. Goal progress is maintained through the operation of a positive discrepancy feedback loop. Specifically, goal pursuit is initiated when matches between and one's current state to an undesired state are detected. Note that in contrast to negative feedback discrepancy loops, positive discrepancy loops entail maximizing a discrepancy, a process that lacks a well-defined end point. Thus avoidance goals have no definitive criterion with which to judge when to cease goal-striving efforts. As avoidance orients people to undesired states, those who are avoidance motivated are more sensitive to the presence and absence of punishments and negative outcomes.

In addition to these structural differences, approach and avoidance motivations differ in their dynamic properties as well. Approach and avoidance motivations increase as distance to rewards and punishments decrease, respectively. The gradient of avoidance motivation, however, is much steeper (Miller, 1944; see also Heath et al., 1999; Kahnemann & Tversky, 1979). That is, motivation to avoid punishment increases more per unit of decreasing distance than motivation to approach reward. Those who are motivated by avoidance, as a result, experience much more acute and variable changes in the strength of their motivation than those who are motivated by approach.

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Both the structural and dynamic properties that distinguish approach and avoidance suggest that the behavior of those motivated by avoidance will be more variable and chaotic than those motivated by approach. For example, whereas approach motivation focuses people on a specific end state and promotes only those actions that reduce the discrepancy between one's current state and that desired end state, avoidance motivation promotes *any* behavior that enhances the discrepancy between one's current state and an undesired end state. To illustrate, consider the following example, borrowed from Miller (1944). When rats are placed in the proximity of a food reward, their behavior is fairly predictable: They move directly to the food. When rats are placed in an area associated with electric shocks, however, their behavior is more chaotic and less predictable. Motivated by fear, these rats will engage in any number of varied behaviors, including running in all directions, clawing the floor in an effort to dig themselves out, attempting to scale the walls of the testing chamber, and simply sitting and shaking with fear. Examples of this diffuse, chaotic behavior are observable in the behavior of humans as well. Atkinson (1957), for example, illustrated that whereas those motivated by approach tend to select tasks of medium difficulty, those motivated by avoidance vacillate between selecting tasks of either the lowest or highest difficulty. Similarly, whereas academic approach motivation predicts sustained effort toward achievement, academic avoidance motivation promotes both the complete withdrawal of effort (e.g., self-handicapping; Berglas & Jones, 1978; Jones & Berglas, 1978) and overmotivated effort (e.g., subjective overachievement; Jones & Berglas, 1978; Oleson, Poehlmann, Yost, Lynch, & Arkin, 2000). Avoidance motivation thus promotes a much more varied, less coherent set of behaviors, promoting any and all actions that increase the psychological distance from some undesired end state.

Much has been written about the implications of approach and avoidance on subjective well-being and mental health. Researchers have suggested that the sensitivity to the presence and absence of negative outcomes associated with avoidance motivation predisposes people to more negative mental states. The sensitivity to the presence and absence of positive outcomes associated with approach, in contrast, tends to promote more positive mental states. Indeed, empirical research has demonstrated that relative to approach, avoidance motivation is systematically linked to greater negative affectivity (Elliot & Sheldon, 1997; Elliot & Thrash, 2002), greater dissatisfaction with interpersonal relationships (Gable, 2006; Impett, Gable, & Peplau, 2005; Impett, Strachman, Finkel, & Gable, 2008), lower subjective well-being (Coats, Janoff-Bulman, & Alpert, 1996; Elliot & Sheldon, 1997), and poorer physical and mental health (Elliot, Gable, & Mapes, 2006; Elliot & Sheldon, 1998).

More recent treatments of the approach versus avoidance distinction have attempted to integrate the notion of goal hierarchies (Elliot, 2006; Elliot & Church, 1997). These perspectives distinguish motives, traits, and temperaments from goals, suggesting that goals are specific means through which people express and satisfy these broader characteristics. Past research has tended to focus on the consequences of adopting approach goals in service of approach motivation and avoidance goals in the service of avoidance motivation. The important contribution

of these new hierarchical treatments of approach and avoidance is the assertion that there is not necessarily a one-to-one correspondence between the type of goal one pursues and its underlying motivational orientation. It is theoretically possible to pursue approach goals that are motivated by avoidance, just as it is possible to pursue avoidance goals that are motivated by approach. For example, one might strive for good grades out of fear of failure. Alternatively, an athlete might try to avoid bad grades in a class to secure maximal playing time in a game. By understanding the complex interplay between motives and goals, these newer theoretical developments hold great promise in enhancing the understanding of the effects of approach versus avoidance in goal pursuit.

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Behavioral Activation Versus Inhibition

A related distinction to approach versus avoidance is that of behavioral activation versus inhibition. The foundations of this conceptual distinction can largely be traced to Gray's (1971, 1990) psychobiology model of emotion. This model posits three biological systems that regulate emotion and behavior: the behavioral activation system (BAS), the behavioral inhibition system (BIS), and the fear-flight system. BAS is theorized to be sensitive to rewards and nonpunishments. Its activation promotes motivated, goal-directed behavior. BIS, in contrast, is theorized to be sensitive to conditioned punishment and nonrewards. Its activation stops ongoing behavior, increases arousal, and enhances attention to threatening stimuli. The third system, fear-flight, is sensitive to unconditioned aversive stimuli and promotes defensive aggression or escape. Of the three systems, BIS and BAS have received the most research scrutiny. The fear-flight system is perhaps the least well-understood system and is frequently explicitly omitted from theoretical discussion (Carver & White, 1994; Harmon-Jones & Allen, 1997).

That BAS and BIS have differential sensitivity to positive and negative stimuli may suggest to some that behavioral activation versus inhibition is synonymous with approach versus avoidance. Assuming such equivalence between these goal distinctions, however, potentially overlooks several important theoretical differences. Note, for example, that early formulations of approach versus avoidance motivation theorized that approach motivation is sensitive to the *presence or absence of rewards*, whereas avoidance motivation is sensitive to the *presence or absence of punishment* (Hull, 1943; Miller, 1944). In contrast, BAS is theorized to increase sensitivity to the *presence of reward or the absence of punishment*, whereas BIS is theorized to increase sensitivity to the *presence of punishment or the absence of reward*. BIS and BAS, therefore, are primarily geared toward responding to the valence of outcomes, rather than to reward and punishment per se. It should be noted, however, that not all scholars conceptualize approach versus avoidance to be about sensitivity to rewards versus punishments (Cacioppo & Berntson, 1994, 1999; Elliot, 1999, 2006; Harmon-Jones, 2003; Higgins, 1997). More contemporary reconceptualizations of approach versus avoidance as differential sensitivity to positivity and negativity are more consistent with the theoretical basis of behavioral activation versus inhibition and may provide for more suitable grounds for integrating the two conceptual distinctions.

Nevertheless, beyond differential sensitivity to various environmental stimuli, behavioral activation versus inhibition also has different implications for immediate action than approach versus avoidance motivation. Approach motivation promotes movement toward desired end states, whereas avoidance motivation promotes movement away from aversive states. In contrast, BAS promotes any goal-directed action, whether it be approach or avoidance. BIS, on the other hand, inhibits and stops all ongoing action. It promotes assessment of possible threats and prepares the organism for vigorous action. Although BIS enhances sensitivity to negative and aversive stimuli while preparing the organism to act, it does not compel any particular action. Any active avoidance behavioral response is theorized to require BAS. Thus, although it may be tempting to map the approach versus avoidance distinction directly onto behavioral activation versus inhibition, doing so would overlook critical differences and potentially promote erroneous conclusions.

As with approach versus avoidance motivation, behavioral activation versus inhibition has been proposed as having differential effects on mental health and well-being. Indeed, BAS and BIS were first proposed to understand better the biological bases of fear and anxiety (Gray, 1971, 1990; see also Fowles, 1993). BIS more than BAS appears to be associated with negative affectivity (Carver & White, 1994) and has been linked to negative mental health outcomes (Johnson, Turner, & Iwata, 2003; Turner, Beidel, & Wolff, 1996). Although BAS has traditionally been linked to better mental health and well-being, it may not always promote positive emotional states. Activation of BAS may also promote negative emotional states such as anger, which represents a negative emotional state associated with strong behavioral activation (Carver & Harmon-Jones, 2009; Harmon-Jones & Allen, 1998).

Promotion Versus Prevention

Regulatory focus theory (Higgins, 1997) proposes another distinction that is related to the approach versus avoidance distinction: promotion versus prevention. Promotion is a motivational orientation born from a fundamental concern for nurturance. A promotion focus tunes people to the attainment of ideals, wishes, and desires. Promotion makes people concerned with the presence and absence of gains, rendering them particularly sensitive to positive rather than negative changes from neutrality or the status quo. Prevention, in contrast, is a motivational orientation born from a fundamental concern for security. A prevention focus tunes people to the fulfillment of duties and obligations. Prevention makes people concerned with the presence and absence of losses, rendering them particularly sensitive to negative rather than positive shifts from the status quo (Higgins, 1997).

It is important to note how promotion versus prevention differs from traditional notions of approach versus avoidance motivation (Higgins, 1997; Scholer & Higgins, 2008). Classic models propose that people approach reward and avoid punishment (Hull, 1943; Miller, 1944). In contrast, regulatory focus theory argues that what constitutes a reward (i.e., what is positive) and what constitutes a punishment (i.e., what is negative) depends on regulatory focus. That is, whether outcomes are positive versus negative hinges on whether these

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outcomes are understood as gains or losses relative to one's status quo. Whereas a promotion focus enhances sensitivity to gains (positive) versus nongains (negative), a prevention focus enhances sensitivity to nonlosses (positive) versus losses (negative). People's regulatory focus and their construal of outcomes as gains or losses are thus critical to specify a priori what they will consider to be rewards (and hence approach) and punishments (and hence avoid). Note that regulatory focus theory explicitly suggests that approach and avoidance are evident in both promotion and prevention orientations. Under promotion, people approach gains and avoid nongains. Under prevention, people approach nonlosses and avoid losses. What distinguishes promotion versus prevention is neither valence nor direction, but rather an orientation to gains or losses (i.e., changes by addition to or subtraction from one's current state).

Although not necessarily true of all treatments of approach and avoidance (Elliot, 1999, 2006), as noted earlier, most models generally suggest that approach is beneficial and avoidance detrimental to goal pursuit. Such prescriptive implications are explicitly absent from regulatory focus theory with respect to promotion and prevention. Both promotion and prevention represent different orientations toward the pursuit of goals, but one is not necessarily more effective or better than the other. For example, when making speed–accuracy tradeoffs, promotion is associated with a preference for speed at the cost of accuracy, whereas prevention is associated with a preference for accuracy at the cost of speed (Förster, Higgins, & Bianco, 2003). Promotion may be more effective in situations requiring greater sensitivity to errors of omission rather than commission, whereas prevention is likely to be more effective in situations requiring greater sensitivity to errors of commission rather than omission (Crowe & Higgins, 1997; cf. Scholer, Stroessner, & Higgins, 2008).

In addition to differences in performance, many treatments of approach versus avoidance suggest that approach goals promote well-being, whereas avoidance goals promote mental health problems (cf., Elliot, 1999, 2006). In contrast, regulatory focus theory suggests that both promotion and prevention may cause negative mental health outcomes. However, the kind of problems that people are likely to face will differ as a function of regulatory focus (Higgins, Bond, Klein, & Strauman, 1986; Higgins, Shah, & Friedman, 1997; Strauman & Higgins, 1987, 1988). Those who are predominantly promotion oriented are more likely to experience sadness and dejection as a function of the lack of fulfillment of their nurturance needs, and thus are more likely to evidence depression in response to chronic goal failure. Those who are predominantly prevention oriented, on the other hand, are more likely to experience agitation and apprehension as a function of the lack of fulfillment of their security needs, and thus are more likely to suffer from anxiety disorders.

From its introduction, regulatory focus theory has explicitly adopted a hierarchical perspective (Higgins, 1997). Promotion and prevention are conceptualized as general motivational orientations that are served by eager versus vigilant strategies. Eager strategies are those means that promote advancement and ensure all opportunities for gains are pursued (i.e., seeking matches between one's current state and some desired end state). Vigilant strategies are those means that

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promote security and ensure all opportunities to protect against losses are pursued (i.e., seeking mismatches between one's current state and some undesired end state). Although early theorizing tended to assume a one-to-one correspondence between one's regulatory orientation and the strategies one adopts (Higgins, 1997), later treatments of regulatory focus theory proposed more independence and have stressed the implications of matching versus mismatching orientations and strategies (Higgins, 2000). Congruence between the strategy that one adopts and one's overarching regulatory orientation, for example, produces a perception of fluency or resonance, referred to as "regulatory fit" (Higgins, 2000, 2006). Pursuing nurturance (i.e., promotion) concerns with eagerness versus pursuing security (i.e., prevention) concerns with vigilance produces a fit. A mismatch between the one's regulatory orientation and strategic inclination produces a nonfit. States of regulatory fit versus nonfit can be misattributed by people as reflecting value, which can influence people's enjoyment and tenacity during goal pursuit (Freitas & Higgins, 2002; Spiegel, Grant-Pillow, & Higgins, 2004; see also Higgins, 2000, 2006). For example, research has demonstrated that people report greater enjoyment and willingness to repeat a task when the framing of the task as involving nurturance versus security matched participants' own promotion versus prevention orientations (Freitas & Higgins, 2002).

Regulatory focus theorists have more recently proposed a third level of this regulatory hierarchy, namely, the tactical level (Scholer & Higgins, 2008). These theorists have noted that whether a particular behavior or tactic is representative of an eager means (ensuring gains) versus a vigilant means (ensuring against losses) may be context dependent. For example, in most cases, a risky bias, as evidenced by a willingness to make errors of commission over errors of omission, represents a strategic means to ensure gains (Crowe & Higgins, 1997). Similarly, in most cases, a conservative bias, as evidenced by a willingness to make errors of omission over commission, represents a strategic means to ensure against losses. In states of loss or threat, however, people who are concerned about security, and are thus prevention oriented, may display a greater willingness to take risks to ensure safety (Scholer, et al., 2008; see also Scholer, Zou, Fujita, Stroessner, & Higgins, 2010). Thus the same tactic, namely a risky bias, may characterize either eager or vigilant strategic inclinations and ultimately serve promotion or prevention orientations.

It should be noted that more contemporary models of approach versus avoidance, in particular those that adopt a hierarchical perspective (Elliot, 1999, 2006), are more similar to regulatory focus than different (see also Scholar & Higgins, 2008). Many of the distinctions highlighted above between approach versus avoidance and regulatory focus become less relevant when one models the operation of approach versus avoidance at multiple levels of goal pursuit. For example, an orientation to additions to versus subtractions from one's status quo (gains vs. losses) may constitute one level of approach versus avoidance. At another level, however, one might express this broader orientation by approaching gains versus nonlosses, or by avoiding nongains versus losses. Thus, rather than represent independent constructs, approach versus avoidance and regulatory focus may describe motivational dynamics occurring at different levels of a hierarchical system (Elliot, 1999, 2006; Scholer & Higgins, 2008). Although theoretical treatments that incorporate

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the notion of hierarchical goal pursuit within the approach versus avoidance framework allow for fuller integration with regulatory focus theory, it is still too early to tell to what extent these models have been adopted by the broader research community. It may very well soon be the case where the distinctions between approach versus avoidance and promotion versus prevention that we have delineated above are rendered obsolete. Still, we note these distinctions as they highlight the heterogeneity with which the terms approach versus avoidance have been used historically and reveal the complexities involved in attempting to integrate the various theoretical approaches.

INTRINSIC VERSUS EXTRINSIC MOTIVATION

Decades of social psychological research have been devoted to understanding the concepts of intrinsic and extrinsic motivation. The vast and varied set of investigations comprising this literature has established the intrinsic versus extrinsic distinction as one of great import for personal satisfaction and productivity (Deci, 1971; Deci & Ryan, 1985; Kasser & Ryan, 1993). Researchers have generally defined intrinsic motivation as a drive to perform an activity for its own sake, such that the activity serves as an end in itself. This conceptualization is contrasted with that of extrinsic motivation, which is characterized as a desire to perform an activity in order to serve a larger goal, such that the activity acts as a means to some outcome that is removed from the activity itself (Calder & Staw, 1975; Kruglanski et al., 1975; Ryan & Deci, 2000).

In general, research suggests that, relative to extrinsic motivation, being intrinsically motivated maximizes personal enjoyment of a task and improves task persistence (Deci, 1971; Kruglanski et al., 1975; Kruglanski, Friedman, & Zeevi, 1971). General well-being has also been positively associated with intrinsic motivation (Kasser & Ryan, 1993, 1996). For instance, creativity, vitality, self-esteem, and self-actualization have all been positively associated with intrinsic motivation, whereas depression, psychopathology, social conflict, as well as smoking and drinking behavior have all been inversely related to this construct (Kasser & Ryan, 1993, 1996; Kruglanski et al., 1971; Sheldon, Ryan, Rawsthorne, & Ilardi, 1997; Williams, Cox, Hedberg, & Deci, 2000). The goal that motivates much of the research in this area is thus to understand the factors that promote intrinsic over extrinsic motivation.

Several early studies examining intrinsic versus extrinsic motivation revealed an unexpected finding, namely, that providing an external reward can undermine intrinsic motivation for a task (Deci, 1971, 1972a, 1972b; Kruglanski et al., 1971; Lepper, Greene, & Nisbett, 1973). These investigations have demonstrated that intrinsic motivation is reduced when a task, initially viewed as an end in itself (intrinsically motivated), comes to be associated with the expectation of an external reward. When first reported, this result was surprising because additional incentives were, at the time, believed to enhance motivation for an activity (Porter & Lawler, 1968; Thorndike, 1935; Vroom, 1964). Thus, researchers were left with the task of explaining this unexpected effect, a burden that has proven highly generative. Attempts to elucidate this effect have led to the emergence

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of two distinct perspectives, both of which have developed into successful programs of research.

Attributional Perspective

The first of these two perspectives provides an attributional explanation for the finding that external rewards reduce intrinsic motivation, which proponents have labeled the "overjustification effect." Based on Bem's (1967) self-perception theory, the main thrust of this argument lies in the understanding that people can look to environmental cues to determine the causes of their own behavior, just as they do to determine what motivates others. Using this model, intrinsic motivation is thought to increase when individuals perceive the cause of their engagement in an activity as lying within the activity itself, whereas extrinsic motivation is thought to increase when individuals perceive their actions as being caused by something outside of the activity. Therefore, intrinsic and extrinsic motivation is understood to be a product of the types of attributions individuals make while performing a task. This perspective suggests the overjustification effect occurs because the expected reward provides a reasonable cause for behavior, thereby reducing the perceived plausibility of an intrinsic rationale. In contrast, intrinsic motivation is likely to be deduced when a task is performed in the absence of a reasonable extrinsic motivator. In essence, the presence of an external explanation discounts the perceived existence of intrinsic motivation for a task, and the absence of an external motivator augments the perceived possibility that the action was intrinsically motivated.

The attributional perspective is attractive in its simplicity, and a great deal of research has sought to test its theoretical assertions. There is evidence, for example, that people do in fact make more external attributions for their behavior when that behavior has been rewarded (Brockner & Vasta, 1981; Phillips & Lord, 1980). Kruglanski et al. (1975) further demonstrated that when rewards are perceived as inherent to a task, they do not undermine intrinsic motivation. Since these rewards are not viewed as "external causes" for the behavior, intrinsic motivation is perceived as a valid explanation and is not discounted. Fazio (1981) provided additional evidence in support of this perspective by demonstrating that rewards do not undermine intrinsic motivation when people are reminded of having previously completed the task for no reward. Thus, by increasing the salience of one's intrinsic motivation for a task, the discounting effect of the reward is reduced. However, perhaps the most direct support for this perspective comes from Pittman, Cooper, and Smith (1977) who have shown that merely altering participants' perceptions of their motivation (via false physiological feedback) can affect the degree to which rewards reduce intrinsic motivation. Specifically, compared to those informed that their arousal levels suggested extrinsic motivation, participants led to believe they were intrinsically motivated to perform a task showed very little reward-induced decrement in intrinsic motivation. By revealing that simply convincing people they are motivated intrinsically can reduce the overjustification effect, these results provide strong support for the attributional perspective.

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Needs-Based Perspective

Other researchers propose a different account for the overjustification effect, which is alternatively referred to as the "undermining effect" (Deci & Ryan, 1985). These theorists start with the premise that people have basic psychological needs for competence and autonomy. These needs press for satisfaction, and they can be supported or squashed by the environment. Specifically, to the extent that the individual's needs for competence and autonomy are supported during pursuit of an initially intrinsically interesting activity, intrinsic motivation increases. Tasks or surrounding circumstances that do not satisfy these basic needs are said to diminish intrinsic motivation and increase extrinsic motivation.

Competence is conceptualized as a psychological need to demonstrate and expand one's capability to interact effectively with the environment (Deci & Ryan, 1985; White, 1959). This need is thought to be sustained by tasks that are perceived as pushing the boundaries of one's abilities just enough to provide a challenge without being too difficult. Perceived competence by itself, however, is not theorized to be enough to promote intrinsic motivation; autonomy is also necessary (Deci & Ryan, 1985).

Autonomy can be understood as the need to freely choose one's activities, such that one's behavior is a reflection of his or her authentic values and beliefs (DeCharms, 1968; Deci & Ryan, 1985; Ryan & Deci, 2000). This need is supported by situations in which individuals perceive their ability to decide on a course of action as unencumbered by outside factors. Such situations can be contrasted with those in which an activity is perceived as being controlled or coerced either by external or internal pressures and thus does not reflect a true choice. This conceptualization of control places internal forces, such as compulsions or negative emotions (e.g., guilt, shame), in the same category as external forces, such as rewards and evaluation. The model suggests that any perceived limitation on one's ability to choose how to act will reduce intrinsic motivation, regardless of whether that limitation is intrapsychic or situational.

Support for the needs-based approach comes, in part, from research documenting the factors that seem to moderate the overjustification effect. Research has shown that rewards must be expected, tangible, and task contingent to undermine intrinsic motivation (Ryan & Deci, 2000). Rewards that are unexpected, intangible, or dissociated from the task do not seem to have the same detrimental effect on intrinsic motivation and may even enhance it. Theorists for the needs-based approach have argued that such results are consistent with the assertion that sustaining a person's perceived sense of autonomy helps to maintain intrinsic motivation.

Needs-based theorists also cite research examining the effects of performance-contingent rewards on intrinsic and extrinsic motivation as support for their approach (Deci & Ryan, 2000; Ryan, Mims, & Koestner, 1983). Performance-contingent rewards serve two possible functions. These rewards can serve an informational role by providing valuable performance feedback, thus supporting a need for competence. These same rewards, however, can also be used to control behavior and thus can undermine a need for autonomy. As a result, the effect of performance-contingent rewards is expected to depend on which aspect

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is more salient. Indeed, research in this domain has revealed that when controlling aspects are made salient, intrinsic motivation suffers in comparison to situations that emphasize informational components (Pittman, Davey, Alafat, Wetherill, & Kramer 1980; Ryan, 1982).

Note that many of the findings described above can be used to support both the needs-based and attributional approaches to understanding intrinsic versus extrinsic motivation. Needs-based theorists, however, question the attributional account, claiming that it fails to capture the true nature of intrinsic motivation (Deci & Ryan, 1985). First, they argue that motivation need not be inferred from behavior, but instead can be known directly. Just as people know when they are hungry or thirsty, they can know whether they feel incompetent or lacking in autonomy, and thus whether or not they are motivated intrinsically to perform a task. Second, the needs-based approach suggests that simply shifting people's perceptions of the cause for their behavior is insufficient for a change in motivation. To have true changes in intrinsic versus extrinsic motivation, people need to experience a satisfaction versus deprivation of their basic needs. The needs-based approach thus suggests that although changes in attribution and perception may be important factors, they are not sufficient to cause changes in motivation.

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Subtypes of Intrinsic and Extrinsic Motivation

Needs-based theorists argue that intrinsic motivation is an evolved, natural response that must come from within the individual (Ryan & Deci, 2000). Therefore, intrinsic motivation cannot be created where none exists. However, not all activities are initially perceived as intrinsically interesting. To be able to account for instances in which intrinsic motivation seems to be promoted in initially extrinsically motivated activities, needs-based theorists have proposed multiple classes of extrinsic motivation (Deci & Ryan, 1985; Ryan & Deci, 2000; see also Sheldon & Elliot, 1999). These researchers propose a continuum of autonomous behavior, which ranges from intrinsic motivation, as the most prototypical autonomous motivation, to four distinct forms of increasingly controlled extrinsic motivation. This approach posits that whereas intrinsic motivation is autonomous by definition, extrinsic motivation can be either autonomous or controlled. The least autonomous (most controlled) type of extrinsic motivation is labeled *externally regulated*, which is behavior performed in compliance to external demands. *Introjected regulation* is the second most controlled point on the continuum and is a form of internal control in which behaviors are undertaken to maintain a sense of worth or to manage emotions such as guilt or pride. A third, more autonomous form of extrinsic motivation is termed *identified regulation*, in which an action is viewed as personally important but has not been fully internalized. Finally, the most autonomous type of extrinsic motivation is *integrated regulation*, whereby identified regulation becomes fully incorporated into the self and included as part of one's core values and beliefs. Integrated regulation shares many commonalities with intrinsic motivation, including perceived autonomy, an internal perceived locus of causality, task persistence, and task enjoyment (Deci & Ryan, 1985, 2008; Ryan & Deci, 2000; Sheldon & Elliot, 1999). Nonetheless, by definition, the original source of motivation for integrated

regulation is external. This factor accounts for its distinction from intrinsic motivation, which is always performed for the enjoyment inherent in the task itself.

Note that integrated regulation is difficult to distinguish from intrinsic motivation, as modeled by the attributional account described earlier. From the individual's perspective, both types of activity would be identified as intrinsic, as each would be perceived as motivated by the activity itself. Indeed, without assessing the motivational time course, it is difficult to imagine distinguishing these two types of motivation in practice, as they look the same in all behavioral measures, and the individuals themselves would experience no reportable difference. Perhaps, in part for these reasons, needs-based theorists have increasingly emphasized the autonomous versus controlled distinction (which does not differentiate between intrinsic and integrated regulation), as opposed to the traditional intrinsic versus extrinsic distinction (Deci & Ryan, 2008; Ryan & Deci, 2000; Ryan, Deci, Grolnick, & LaGuardia, 2006; Sheldon & Elliot, 1999).

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Activity Engagement

Research on intrinsic versus extrinsic motivation is not limited to understanding the "overjustification" or "undermining" effect, whereby intrinsic motivation is reduced by the promise of external rewards. Research supporting activity engagement theory (Higgins & Trope, 1990; Higgins, Trope, & Kwon, 1999) describes another set of circumstances through which intrinsic motivation can be undermined. Specifically, if an individual freely chooses to switch between two enjoyable tasks, intrinsic motivation for each task will be reduced. These theorists argue that this occurs because one assumes, by default, that a liked activity will be approached, but in making a choice between two liked activities, one must necessarily decide not to approach one of them (by approaching the other). Because approach is the expected result for a liked activity, the "failure to approach" is particularly salient and diagnostic. By repeatedly switching between liked activities, one is deciding *not* to approach each activity in turn, which promotes the inference that the activities are not well liked. This type of situation, where people freely alternate between two liked activities, has been shown to undermine intrinsic motivation (Higgins, Lee, Kwon, & Trope, 1995). However, this theory also proposes the possibility of *enhancing* intrinsic motivation when task switching occurs between *disliked* activities. As avoidance is the default orientation toward disliked activities, any decision not to avoid a task or activity is more diagnostic than a decision to avoid these tasks. As a result, when two disliked activities are freely alternated between, the choice to engage in one task is coded as a decision *not* to avoid that task. Repeatedly switching between disliked activities forces one to decide not to avoid each in turn, which leads one to infer that the tasks are not so bad after all. This type of task switching has been shown to enhance intrinsic motivation for the relevant activities (Higgins et al., 1999). Because nothing about the tasks themselves and only participants' perceptions of task motivation are changing in these studies, this theory relies on and supports an attributional explanation for the intrinsic versus extrinsic distinction. It is less clear how these findings can be understood from a needs-based perspective as no needs are

obviously satisfied. In particular, that intrinsic motivation increases in response to task switching among disliked activities would be difficult to explain by current needs-based approaches. Perhaps these theorists would argue that, because the decision to switch tasks is freely made, autonomy increases each time one changes tasks, and motivation becomes more "integrated" over time. Such an explanation, however, cannot simultaneously explain why switching between liked activities reduces intrinsic motivation. An explanation of these findings from an intrinsic needs perspective is thus still wanting.

Alternate Approaches to Intrinsic Versus Extrinsic Motivation

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The dominant theoretical models of intrinsic versus extrinsic motivation generally assume that the two motives are hydraulic, or even mutually exclusive, such that a high level of one necessitates a low level of the other (Deci & Ryan, 1985, 1987; Kruglanski et al., 1975). Furthermore, despite their differences, proponents of both the attributional and needs-based approaches at least seem to imply a preference for intrinsic (or autonomous) over extrinsic motivation (due to the link with positive outcomes such as interest, enjoyment, and well-being). Nonetheless, there is general agreement that extrinsic motivation can be very useful when a task is not intrinsically interesting (Lepper et al., 1973; Ryan & Deci, 2000). Thus, if one accepts that not all worthwhile endeavors are enjoyable, one must also recognize that in some instances extrinsic motivation is likely to be a functional option. Wiersma (1992) conducted a meta-analysis revealing that, across several studies, the addition of extrinsic motivation led to improved task performance relative to intrinsic motivation alone. These results indicate that extrinsic motivation can be beneficial, especially when superior performance is the desired outcome.

To maximize the benefits of both motivations (i.e., performance and interest), it would seem constructive for people to possess *both* types of motivation. This raises the question of whether people can be simultaneously motivated by both intrinsic and extrinsic concerns to perform a task, a possibility suggested by several researchers (Amabile, Hill, Hennessey, & Tighe, 1994; Harter, 1981; Lepper, Sethi, Dialdin, & Drake, 1997). Lepper et al. (1997), for example, demonstrated that intrinsic and extrinsic motivations were only weakly negatively correlated, which undermines the argument that they are mutually exclusive. Amabile et al. (1994), moreover, developed inventories that measure intrinsic and extrinsic motivation independently and have demonstrated that people can simultaneously report high intrinsic and high extrinsic motivation for the same task. This, again, provides support for the notion that intrinsic and extrinsic motivation can be understood as independent constructs.

Further insight might be gained by adoption of a hierarchical perspective, such that one type of motive might sometimes serve the other. For example, as Lepper and Henderlong (2000) propose, some activities may become intrinsically interesting only after basic skills have been mastered (e.g., reading, playing an instrument), such that an initial extrinsic motivation might sometimes help to promote intrinsic motivation in the long run. Furthermore, many intrinsically interesting tasks may have uninteresting components (e.g., taking organic chemistry to become a doctor)

or may lose their appeal once learning or ability has developed to the point that repetitive practice is required to reach the highest level of performance (Lepper & Henderlong, 2000). In situations like these, well-placed extrinsic rewards may help people to pursue their intrinsic interests maximally. Thus, although little research has addressed this issue, it seems plausible that intrinsic and extrinsic motivation might be hierarchically related; in some cases, one motive might be necessary to advance the other.

MASTERY VERSUS PERFORMANCE GOALS

In the achievement motivation literature, one of the most studied conceptual distinctions is that of mastery versus performance goals (Ames & Archer, 1988; Dweck, 1999; Dweck & Leggett, 1988; Nicholls, 1984). Achievement can be understood either as a learning process, in which one increases competence through mastery of skills and abilities, or as a performance process, in which one strives to gain favorable judgments of competence by others. Whereas the former promotes what are referred to as mastery (or learning) goals with respect to achievement, the latter promotes what are referred to as performance goals. These goals can either result as a function of situational cues or emerge as chronic individual differences. The primary assertion of achievement goal research is that how one pursues achievement, whether oriented by mastery or performance goals, fundamentally affects one's success and failure, performance, and a host of other achievement-relevant outcomes.

Performance goals focus people on demonstrating competence through successful task outcomes. In general, when attempting to demonstrate competence through performance, what constitutes a success or failure on a particular task is externally and normatively determined (i.e., by the performance standards of others). Performance goals prompt a focus on achievement as a means to demonstrate competence as defined by external rather than internal standards. This orientation is thus structured to undermine intrinsic motivation. Moreover, attributions following task success or failure emphasize a person's level of competence. Whether one succeeds or fails is indicative of possessing high versus low abilities, respectively. Although attributing success to dispositional characteristics such as ability may promote positive outcomes, attributing failure to those same stable dispositional characteristics promotes learned helplessness, withdrawal, and disengagement (Dweck & Leggett, 1988).

Mastery goals, in contrast, focus people on increasing competence through learning new skills. People engage in various tasks not in an effort to demonstrate competence, but rather to learn the skills involved in the task itself. This orientation to tasks as ends unto themselves should promote intrinsic motivation. Task success or failure serves as feedback on one's current progress toward that learning goal. Success is indicative of high effort and progress, whereas failure is indicative of insufficient effort and progress. Attributing success to high effort validates and encourages continuation of one's goal striving, whereas attributing failure to insufficient effort promotes reengagement and greater subsequent effort (Dweck & Leggett, 1988).

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Achievement goal theorists argue that a person's early experiences shape the development of mastery versus performance goals. For example, parental feedback and classroom settings influence whether children adopt mastery or performance goals with respect to academics (Ames & Archer, 1987, 1988). Children whose parents or teachers stress the role of effort versus ability in success and failure are more likely to develop mastery over performance goals. Dweck and her colleagues (Dweck, 1999, 2006; Dweck & Leggett, 1988) have gone one step further, arguing that the adoption of mastery or performance goals hinges on the endorsement of the belief that an ability is fixed or incremental. Those who believe that abilities are innate and immutable are more likely to adopt performance goals, whereas those who believe that abilities are changeable and can be improved upon are more likely to adopt mastery goals. These beliefs about abilities can be domain specific or more general and can reflect situational factors or stable individual differences. Critically, the adoption of a mastery goal may require first a belief that the ability to be learned and improved is actually mutable.

Highlighting the importance of understanding the distinction between mastery and performance goals is empirical evidence that students who are oriented by mastery versus performance goals choose more challenging tasks, are more engaged and active in the learning process, and display an attributional style that fosters persistence rather than withdrawal in the face of obstacles (Ames & Archer, 1988; Elliott & Dweck, 1988; Meece, Blumenthal, & Hoyle, 1988; Pintrich & De Groot, 1990). Although performance goals can lead to positive outcomes when successfully attained, they have detrimental effects on motivation and well-being when such expectations are unmet (Elliott & Dweck, 1988). Findings such as these have led many researchers to advocate promoting mastery rather than performance goals in domains such as schools in which promoting achievement is desired (Ames, 1992; Dweck, 1999, 2006; Dweck & Leggett, 1988). These researchers argue that mastery goals appear to have only positive outcomes, with few of the potential costs associated with performance goals.

The claim that mastery goals promote beneficial outcomes and performance goals promote detrimental outcomes, however, is not without controversy. Empirical evidence has not consistently supported the notion that performance goals lead to negative outcomes, such as reduced persistence and poorer performance (for reviews, see Elliot, 1999; Harackiewicz, Barron, & Elliot, 1998). Research has also questioned the assertion that mastery goals predict enhanced performance. For example, although mastery goals predict intrinsic interest in a given task, there is evidence that it is actually performance goals that predict superior performance (Barron & Harackiewicz, 2001; Harackiewicz, Barron, Carter, Lehto, & Elliot, 1997; Harackiewicz, Barron, Tauer, & Elliot, 2002; Harackiewicz & Elliot, 1993).

To explain these apparent empirical discrepancies, alternate theoretical models to the original mastery versus performance goals distinction have been proposed. One such approach, the multiple goals model, argues that people can adopt either mastery or performance goals or both (Harackiewicz et al., 1998). This model suggests it is important to understand how the two types of goals interact and produce outcomes not predicted by a theoretical approach focused solely on the adoption of mastery versus performance goals. For example, both types of goals may lead to

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beneficial outcomes, but these outcomes may be evident at different times. That is, whereas mastery goals may be more critical to promote initial intrinsic interest in a novel activity, performance goals may be more important in sustained superior performance over time (Barron & Harackiewicz, 2001; Harackiewicz et al., 1997, 2002). The two goals combined may also promote hypermotivation through an additive or interactive effect, boosting performance optimally when both goals are adopted simultaneously (see Barron & Harackiewicz, 2001, for more extensive discussion on various ways goals might interact to influence performance). The best predictors of optimal performance in the long term then may be the adoption of *both* types of goals, rather than one over the other.

A second approach integrates research on approach versus avoidance with mastery versus performance goals (Elliot, 1999, 2006; Elliot & Harackiewicz, 1996). Elliot and colleagues (Cury, Elliot, Da Fonseca, & Moller, 2006; Elliot, 1999, 2006; Elliot & McGregor, 2001) have proposed that there are actually two types of mastery goals: mastery-approach and mastery-avoidance. Mastery-approach goals focus on attaining competence, whereas mastery-avoidance goals focus on avoiding incompetence at some task. Similarly, they posit two types of performance goals: performance-approach versus performance-avoidance. Performance-approach goals focus on attaining successful outcomes, whereas performance-avoidance goals focus on avoiding unsuccessful outcomes relative to some normative standard. They argue that researchers have too often compared the effects of mastery-approach goals against performance-avoidance goals, while ignoring the other two types of goals (mastery-avoidance and performance-approach). Supporting these distinctions is empirical research indicating that whereas performance-avoidance goals lead to poorer performance, performance-approach goals lead to enhanced performance (Elliot & Church, 1997; Elliot & Harackiewicz, 1996; Elliot & McGregor, 2001). Further research has demonstrated that mastery-avoidance goals can lead to detrimental outcomes, such as poor mental health indicators and performance, relative to mastery-approach goals (Cury et al., 2006; Elliot & McGregor, 2001). Results such as these have led Elliot and his colleagues (Elliot, 1999, 2006; Elliot & Church, 1997; Elliot & Harackiewicz, 1996) to suggest that findings documenting the benefits of mastery versus performance goals may have overlooked the critical distinction between approach versus avoidance goals (cf., Grant & Dweck, 2003).

Some resolution to the issue of whether mastery or performance goals promote beneficial outcomes may also be found by adopting a hierarchical approach (Elliot & Dweck, 1988; Harackiewicz & Elliot, 1993). Research suggests, for example, an important determinant of intrinsic motivation is a match between the abstract versus concrete goals a person is pursuing (Harackiewicz & Elliot, 1998). Intrinsic motivation is enhanced when people pursue abstract mastery goals (e.g., "I want to be smarter") with more concrete mastery subgoals (e.g., "I want to learn the skills for task"), and when they pursue abstract performance goals (e.g., "I want to show how smart I am") with more concrete performance subgoals (e.g., "I want to outperform others on this task"). Mismatches between mastery and performance across levels, on the other hand, cause reductions in intrinsic motivation. Research has yet to examine performance. It may be that, like intrinsic

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motivation, matching goals across levels promotes optimal performance. It is also possible, however, that mismatches may promote performance. For example, perhaps pursuing abstract performance goals with concrete mastery subgoals allows people to have the proverbial "best of both worlds"—the concrete mastery goal might promote intrinsic interest long enough to master the specific skills that allow a person then to outperform others more generally.

SUMMARY

In this chapter, we have described several basic distinctions that researchers have proposed about the nature of goals. This review is meant not as an exhaustive survey of the literature, but rather as a starting place and foundation for further intellectual inquiry. Indeed, many of the topics briefly described in this chapter are discussed at further length in other chapters of the present volume, as noted above. Still other chapters describe and elaborate on goal distinctions not covered in this chapter, particularly those that relate to the operations and dynamics involved in goal pursuit, such as the differences between goal setting versus goal striving (Gollwitzer, Barry, & Oettingen, Chapter 4, this volume) and goal balancing versus goal highlighting (Fishbach & Finkelstein, Chapter 7, this volume).

What should be clear to the reader is that although these distinctions have been critical to understanding differences between various types of goals and goal pursuit, there is still a great deal of work to be done. One question that is evident across many of these goal distinctions is whether they reflect binary categories or a continuum. For example, can a goal be somewhat approach or somewhat avoidance but not entirely? Similarly, can a goal be partially mastery or partially performance but not completely? With some goal distinctions, the answer to these questions has been made explicit. For example, prevention and promotion are conceptualized and measured as continuous rather than binary categorical variables (Higgins et al., 2001; Lockwood, Jordan, & Kunda, 2002). In contrast, it is less clear whether intrinsic versus extrinsic motivation should be viewed as categorical or continuous constructs. This particular distinction has been discussed and operationalized in both ways (Deci & Ryan, 1985; Ryan & Deci, 2000). The distinction between abstract versus concrete has apparent categorical and continuous properties: The distinction is inherently relative and comparative (and is thus often discussed as if they represent binary categories), but the distinction itself is conceptualized as a more general continuum.

A second question that one can pose with many of these goal distinctions is whether they reflect mutually exclusive constructs (i.e., you are motivated by mastery or performance, but not both) or independent constructs (i.e., you can be motivated by neither mastery nor performance, by one or the other, or by both simultaneously). Some researchers studying intrinsic motivation, for example, have suggested that one either is or is not intrinsically motivated—one cannot be simultaneously intrinsically and extrinsically motivated (Deci & Ryan, 1985; Ryan & Deci, 2000). Others have argued that intrinsic and extrinsic motivation are independent, such that people can be highly motivated by both at the same time

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(Amabile et al., 1994; Harter, 1981; Lepper et al., 1997). Similar issues have been raised about the distinction between mastery versus performance goals (Baron & Harackiewicz, 2001; Dweck & Leggett, 1988). Further conceptual and empirical work is clearly needed to resolve this issue across a number of the goal distinctions described in this chapter.

Finally, more work is needed to integrate these varied goal distinctions more fully. This chapter has described, where appropriate, research that combines the various research distinctions, for example, integrating approach versus avoidance with abstract versus concrete (Elliot, 1999, 2006), and combining approach versus avoidance with mastery versus performance (Cury et al., 2006; Elliot & McGregor, 2001). However, full integration of these distinctions, and a comprehensive examination of the consequences these unique combinations have for thought, feelings, and behavior, are yet to be achieved.

These questions are likely to occupy researchers well into the future. To study these questions, however, one needs to understand the nuanced differences between the various approaches that we have discussed in this chapter. In discussing these important differences, we have also attempted to highlight several areas that hold promise for future research. As such, given the richness of future research opportunities available, we eagerly anticipate new and exciting developments in our understanding of these central goal distinctions.

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REFERENCES

Amabile, T. M., Hill, K. G., Hennessey, B. A., & Tighe, E. M. (1994). The work preference inventory: Assessing intrinsic and extrinsic motivational orientations. *Journal of Personality and Social Psychology, 66*(5), 950–967.

Ames, C. (1992). Classrooms: Goals, structures, and student motivation. *Journal of Educational Psychology, 84*, 261–271.

Ames, C., & Archer, J. (1987). Mothers' beliefs about the role of effort and ability in school learning. *Journal of Educational Psychology, 79*, 409–414.

Ames, C., & Archer, J. (1988). Achievement goals in the classroom: Students' learning strategies and motivational processes. *Journal of Educational Psychology, 80*, 260–267.

Atkinson, J. W. (1957). Motivational determinants of risk-taking behavior. *Psychological Review, 64*(6), 359–372.

Bar-Anan, Y., Liberman, N., & Trope, Y. (2006). The association between psychological distance and construal level: Evidence from an implicit association test. *Journal of Experimental Psychology: General, 135*(4), 609–622.

Bargh, J. A. (1990). Auto-motives: Preconscious determinants of social interaction. In E. T. Higgins & R. M. Sorrentino (Eds.), *Handbook of motivation and cognition: Foundations of social behavior* (Vol. 2, pp. 93–130). New York: Guilford.

Barron, K. E., & Harackiewicz, J. M. (2001). Achievement goals and optimal motivation: Testing multiple goal models. *Journal of Personality and Social Psychology, 80*, 706–722.

Bem, D. J. (1967). Self-perception: An alternative interpretation of cognitive dissonance phenomena. *Psychological Review,74*, 183–200.

Berglas, S., & Jones, E. (1978). Drug choice as a self-handicapping strategy in response to noncontingent success. *Journal of Personality and Social psychology, 36*, 405–417.

Brockner, J., & Vasta, R. (1981). Do causal attributions mediate the effects of extrinsic rewards on intrinsic interest? *Journal of Research in Personality, 159*, 201–209.

Cacioppo, J. T., & Berntson, G. G. (1994). Relationship between attitudes and evaluative space: A critical review with emphasis on the separability of positive and negative substrates. *Psychological Bulletin, 115*, 401–423.

Cacioppo, J. T., & Berntson, G. G. (1999). The affect system: Architecture and operating characteristics. *Current Directions in Psychological Science, 8*, 133–137.

Calder, B. J., & Staw, B. M. (1975). Self-perception of intrinsic and extrinsic motivation. *Journal of Personality and Social Psychology, 31*, 599–605.

Carver, C. S., & Harmon-Jones, E. (2009). Anger is an approach-related affect: Evidence and implications. *Psychological Bulletin, 135*(2), 183–204.

Carver, C. S., & Scheier, M. F. (1982). Control theory: A useful conceptual framework for personality–social, clinical, and health psychology. *Psychological Bulletin, 92*(1), 111–135.

Carver, C. S., & Scheier, M. F. (1990). Origins and functions of positive and negative affect: A control-process view. *Psychological Review, 97*(1), 19–35.

Carver, C., & White, T. (1994). Behavioural inhibition, behavioural activation, and affective responses to impending reward and punishment: The BIS/BAS scales. *Journal of Personality and Social Psychology, 67*, 319–333.

Coats, E., Janoff-Bulman, R., & Alpert, N. (1996). Approach versus avoidance goals: Differences in self-evaluation and well-being. *Personality and Social Psychology Bulletin, 22*, 1057–1067.

Crowe, E., & Higgins, E. T. (1997). Regulatory focus and strategic inclinations: Promotion and prevention in decision-making. *Organizational Behavior and Human Decision Processes, 69*, 117–132.

Cury, F., Elliot, A. J., Da Fonseca, D., & Moller, A. C. (2006). The social-cognitive model of achievement motivation and the 2 × 2 achievement goal framework. *Journal of Personality and Social Psychology, 90*(4), 666–679.

DeCharms, R. (1968). *Personal causation*. New York: Academic Press.

Deci, E. L. (1971). Effects of externally mediated rewards on intrinsic motivation. *Journal of Personality and Social Psychology, 18*, 105–115.

Deci, E. L. (1972a). Intrinsic motivation, extrinsic reinforcement, and inequity. *Journal of Personality and Social Psychology, 22*, 113–120.

Deci, E. L. (1972b). The effects of contingent and non-contingent rewards and controls on intrinsic motivation. *Organizational Behavior and Human Performance, 8*, 217–229.

Deci, E. L., & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behavior*. New York: Plenum.

Deci, E. L., & Ryan, R. M. (1987). The support of autonomy and the control of behavior. *Journal of Personality and Social Psychology, 53*, 1024–1037.

Deci E. L., & Ryan, R. M. (2000). When rewards compete with nature: The undermining of intrinsic motivation and self-regulation. In C. Sansone & J. M. Harackiewicz (Eds.), *Intrinsic and extrinsic motivation: The search for optimal motivation and performance* (pp. 257–307). San Diego: Academic Press.

Deci, E. L., & Ryan, R. M. (2008). Facilitating optimal motivation and psychological well-being across life's domains. *Canadian Psychology, 49*, 14–23.

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Dweck, C. S. (1999). *Self-theories: Their role in motivation, personality and development*. Philadelphia: Psychology Press.

Dweck, C. S. (2006). *Mindset: The new psychology of success*. New York: Random House.

Dweck, C. S., & Leggett, E. L. (1988). A social-cognitive approach to motivation and personality. *Psychological Review, 95*(2), 256–273.

Elliot, A. J. (1999). Approach and avoidance motivation and goals. *Educational Psychologist, 34*, 169–189.

Elliot, A. J. (2006). The hierarchical model of approach-avoidance motivation. *Motivation and Emotion, 30*(2), 111–116.

Elliot, A. J., & Church, M. A. (1997). A hierarchical model of approach and avoidance achievement motivation. *Journal of Personality and Social Psychology, 72*, 218–232.

Elliot, A. J., Gable, S. L., & Mapes, R. R. (2006). Approach and avoidance motivation in the social domain. *Personality and Social Psychology Bulletin, 32*, 378–391.

Elliot, A. J., & Harackiewicz, J. M. (1996). Approach and avoidance achievement goals and intrinsic motivation: A mediational analysis. *Journal of Personality and Social Psychology, 70*, 461–475.

Elliot, A. J., & McGregor, H. (2001). A 2 × 2 achievement goal framework. *Journal of Personality and Social Psychology, 80*, 501–519.

Elliot, A. J., & Sheldon, K. (1997). Avoidance achievement motivation: A personal goals analysis. *Journal of Personality and Social Psychology, 73*, 171–185.

Elliot, A. J., & Sheldon, K. (1998). Avoidance personal goals and the personality-illness relationship. *Journal of Personality and Social Psychology, 75*, 1282–1299.

Elliot, A. J., & Thrash, T. M. (2002). Approach-avoidance motivation in personality: Approach and avoidance temperaments and goals. *Journal of Personality and Social Psychology, 82*, 804–818.

Elliott, E. S., & Dweck, C. S. (1988). Goals: An approach to motivation and achievement. *Journal of Personality and Social Psychology, 54*, 5–12.

Fazio, R. H. (1981). On the self-perception explanation of the overjustification effect: The role of salience of initial attitude. *Journal of Experimental Social Psychology, 17*, 417–426.

Fishbach, A., & Ferguson, M. J. (2007). The goal construct in social psychology. *Social psychology: Handbook of basic principles* (2nd ed., pp. 490–515). New York: Guilford.

Fishbach, A., Friedman, R. S., & Kruglanski, A. W. (2003). Leading us not into temptation: Momentary allurements elicit overriding goals activation. *Journal of Personality and Social Psychology, 84*, 296–309.

Förster, J., Higgins, E. T., & Bianco, A. T. (2003). Speed/accuracy decisions in task performance: Built-in trade-off or separate strategic concerns? *Organizational Behavior and Human Decision Processes, 90*, 148–164.

Fowles, D. (1993). Biological variables in psychopathology: A psychobiological perspective. In P. B. Sutker & H. E. Adams (Eds.), *Comprehensive handbook of psychopathology* (2nd ed., pp. 57–82). New York: Plenum.

Freitas, A. L., & Higgins, E. T. (2002). Enjoying goal-directed action: The role of regulatory fit. *Psychological Science, 13*, 1–6.

Fujita, K. (2008). Seeing the forest beyond the trees: A construal-level approach to self-control. *Social and Personality Psychology Compass, 2*(3), 1475–1496.

Fujita, K., Trope, Y., & Liberman, N. (2006). The role of mental construal in self-control. In D. DeCremer, M. Zeelenberg, & J. K. Murnighan (Eds.), *Social psychology and economics* (pp. 193–211). New York: Sage.

Fujita, K., Trope, Y., & Liberman, N. (2010). Seeing the big picture: A construal level analysis of self-control. In R. R. Hassin, K. N. Ochsner, & Y. Trope (Eds.), *Self-control in society, mind, and brain* (pp. 408–427). New York: Oxford University Press.

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Fujita, K., Trope, Y., Liberman, N., & Levin-Sagi, M. (2006). Construal levels and self-control. *Journal of Personality and Social Psychology, 90*, 351–367.

Gable, S. L. (2006). Approach and avoidance social motives and goals. *Journal of Personality, 71*, 175–222.

Gollwitzer, P. M. (1999). Implementation intentions: Strong effects of simple plans. *American Psychologist, 54*(7), 493–503.

Grant, H., & Dweck, C. S. (2003). Clarifying achievement goals and their impact. *Journal of Personality and Social Psychology, 85*, 541–553.

Gray, J. A. (1971). *The psychology of fear and stress.* New York: McGraw-Hill.

Gray, J. A. (1990). Brain systems that mediate both emotion and cognition. In J. Gray (Ed.), *Psychobiological aspects of relationships between emotion and cognition* (pp. 239–288). Hillsdale, NJ: Erlbaum.

Harackiewicz, J. M., Barron, K. E., Carter, S. M., Lehto, A. T., & Elliot, A. J. (1997). Predictors and consequences of achievement goals in the college classroom: Maintaining interest and making the grade. *Journal of Personality and Social Psychology, 73*, 1284–1295.

Harackiewicz, J. M., Barron, K. E., & Elliot, A. J. (1998). Rethinking achievement goals: When are they adaptive for college students and why? *Educational Psychologist, 33*, 1–21.

Harackiewicz, J. M., Barron, K. E., Tauer, J. M., & Elliot, A. J. (2002). Predicting success in college: A longitudinal study of achievement goals and ability measures as predictors of interest and performance from freshman year through graduation. *Journal of Educational Psychology, 94*, 562–575.

Harackiewicz, J. M., & Elliot, A. J. (1993). Achievement goals and intrinsic motivation. *Journal of Personality and Social Psychology, 65*, 904–915.

Harmon-Jones, E. (2003). Clarifying the emotive functions of asymmetrical frontal cortical activity. *Psychophysiology, 40*, 838–848.

Harmon-Jones, E., & Allen, J. J. B. (1997). Behavioral activation sensitivity and resting frontal EEG asymmetry: Covariation of putative indicators related to risk for mood disorders. *Journal of Abnormal Psychology, 106*, 159–163.

Harmon-Jones, E., & Allen, J. J. B. (1998). Anger and prefrontal brain activity: EEG asymmetry consistent with approach motivation despite negative affective valence. *Journal of Personality and Social Psychology, 74*, 1310–1316.

Harter, S. (1981). A new self-report scale of intrinsic versus extrinsic orientation in the classroom: Motivational and informational components. *Developmental Psychology, 17*(3), 300–312.

Heath, C., Larrick, R. P., & Wu, G. (1999). Goals as reference points. *Cognitive Psychology, 38*, 79–109.

Higgins, E. T. (1997). Beyond pleasure and pain. *American Psychologist, 52*(12), 1280–1300

Higgins, E. T. (2000). Beyond pleasure and pain. In E. T. Higgins & A. W. Kruglanski (Eds.), *Motivational science: Social and personality perspectives. Key reading in social psychology* (pp. 231–255). Philadelphia, PA: Psychology Press/Taylor & Francis.

Higgins, E. T. (2006). Value from hedonic experience and engagement. *Psychological Review*, *113*, 439–460.

Higgins, E. T., Bond, R. N., Klein, R., & Strauman, T. (1986). Self-discrepancies and emotional vulnerability: How magnitude, accessibility, and type of discrepancy influence affect. *Journal of Personality and Social Psychology, 51*, 5–15.

Higgins, E. T., Friedman, R. S., Harlow, R. E., Idson, L. C., Ayduk, O. N., & Taylor, A. (2001). Achievement orientations from subjective histories of success: Promotion pride versus prevention pride. *European Journal of Social Psychology, 31*, 3–23.

Higgins, E. T., Lee, J., Kwon, J., & Trope, Y. (1995). When combining intrinsic motivations undermines interest: A test of activity engagement theory. *Journal of Personality and Social Psychology, 68*, 749–767.

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Higgins, E. T., Shah, J., & Friedman, R. (1997). Emotional responses to goal attainment: Strength of regulatory focus as moderator. *Journal of Personality and Social Psychology, 72*, 515–525.

Higgins, E. T., & Trope, Y. (1990). Activity engagement theory: Implications of multiply identifiable input for intrinsic motivation. In E. T. Higgins & R. M. Sorrentino (Eds.), *Handbook of motivation and cognition: Foundations of social behavior* (Vol. 2, pp. 229–264). New York: Guilford.

Higgins, E. T., Trope, Y., & Kwon, J. (1999). Augmentation and undermining from combining activities: The role of choice in activity engagement theory. *Journal of Experimental Social Psychology, 35*, 285–307.

Hull, C. L. (1938). The goal-gradient hypothesis applied to some "field-force" problems in the behavior of young children. *Psychological Review, 45*(4), 271–299.

Hull, C. (1943). *Principles of behavior.* New York: Appleton-Century-Crofts.

Impett, E. A., Gable, S. L., & Peplau, L. A. (2005). Giving up and giving in: The costs and benefits of daily sacrifice in intimate relationships. *Journal of Personality and Social Psychology, 89*, 327–344.

Impett, E., Strachman, A., Finkel, E. J., & Gable, S. L. (2008). Maintaining sexual desire in intimate relationships: The importance of approach goals. *Journal of Personality and Social Psychology, 94*, 808–823.

Jones, E. E., & Berglas, S. (1978). Control of attributions about the self through self-handicapping strategies: The appeal of alcohol and the role of underachievement. *Personality and Social Psychology Bulletin, 4*, 200–206.

Johnson, S. L., Turner, R. J., & Iwata, N. (2003). BIS/BAS levels and psychiatric disorder: an epidemiological study. *Journal of Psychopathology and Behavioral Assessment, 25*, 25–36.

Kahneman, D., & Tversky, A. (1979). Prospect theory: An analysis of decision under risk. *Econometrica, 47*, 263–291.

Kasser, T., & Ryan, R. M. (1993). A dark side of the American dream: Correlates of financial success as a central life aspiration. *Journal of Personality and Social Psychology, 65*, 410–422.

Kasser, T., & Ryan, R. M. (1996). Further examining the American dream: Differential correlates of intrinsic and extrinsic goals. *Personality and Social Psychology Bulletin, 22*, 280–287.

Kruglanski, A. W., Friedman, I., & Zeevi, G. (1971). The effects of extrinsic incentive on some qualitative aspects of task performance. *Journal of Personality, 39*(4), 606–617.

Kruglanski, A. W., Riter, A., Arazi, D., Agassi, R., Monteqio, J., Peri, I., & Peretz, M. (1975). Effect of task-intrinsic rewards upon extrinsic and intrinsic motivation. *Journal of Personality and Social Psychology, 31*(4), 699–705.

Kruglanski, A. W., Shah, J. Y., Fishbach, A., Friedman, R., Chun, W. Y., & Sleeth-Keppler, D. (2002). A theory of goal systems. In M. P. Zanna (Ed.), *Advances in experimental social psychology* (Vol. 34, pp. 331–378). San Diego, CA: Academic Press.

Lepper, M. R., Greene, D., & Nisbett, R. E. (1973). Undermining children's intrinsic interest with extrinsic reward: A test of the "overjustification" hypothesis. *Journal of Personality and Social Psychology, 28*(1), 129–137.

Lepper, M. R., & Henderlong, J. (2000). Turning "play" into "work" and "work" into "play": 25 years of research on intrinsic versus extrinsic motivation. In C. Sansone & J. M. Harackiewicz (Eds.), *Intrinsic and extrinsic motivation: The search for optimal motivation and performance* (pp. 257–307). San Diego, CA: Academic Press.

Lepper, M. R., Sethi, S., Dialdin, D., & Drake, M. (1997). Intrinsic and extrinsic motivation: A developmental perspective. *Developmental psychopathology: Perspectives on adjustment, risk, and disorder* (pp. 23–50). New York: Cambridge University Press.

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Lewin, K. (1935). *A dynamic theory of personality.* New York: McGraw-Hill.
Liberman, N., Trope, Y., McCrea, S. M., & Sherman, S. J. (2007). The effect of level of construal on the temporal distance of activity enactment. *Journal of Experimental Social Psychology, 43*(1), 143–149.
Liberman, N., Trope, Y., & Stephan, E. (2007). Psychological distance. In E. T. Higgins & A. W. Kruglanski (Eds.), *Social psychology: Handbook of basic principles* (Vol. 2, pp. 353–381). New York: Guilford.
Locke, E. A., & Latham, G. P. (1990). *A theory of goal setting & task performance*. Englewood Cliffs, NJ: Prentice-Hall.
Lockwood, P., Jordan, C. H., & Kunda, Z. (2002). Motivation by positive or negative role models: Regulatory focus determines who will best inspire us. *Journal of Personality and Social Psychology, 83*, 854–864.
Mann, T., & Ward, A. (2004). To eat or not to eat: Implications of the attentional myopia model for restrained eaters. *Journal of Abnormal Psychology, 113*(1), 90–98.
McClelland, D. C., Koestner, R., & Weinberger, J. (1989). How do self-attributed and implicit motives differ? *Psychological Review, 96*, 690–702.
Meece, J. L., Blumenfeld, P. C., & Hoyle, R. H. (1988). Students' goal orientations and cognitive engagement in classroom activities. *Journal of Educational Psychology, 80*, 514–523.
Metcalfe, J., & Mischel, W. (1999). A hot/cool system analysis of delay of gratification: Dynamics of willpower. *Psychological Review, 106*, 3–19.
Miller, N. (1944). Experimental studies of conflict. In J. Hunt (Ed.), *Personality and the behavioral disorders* (Vol. 1, pp. 431–465). New York: Ronald Press.
Mischel, W., Shoda, Y., & Rodriguez, M. L. (1989). Delay of gratification in children. *Science, 244*, 933–938.
Nicholls, J. G. (1984). Achievement motivation: Conceptions of ability, subjective experience, task choice, and performance. *Psychological Review, 91*, 328–346.
Oleson, K. C., Poehlmann, K. M., Yost, J. H., Lynch, M. E., & Arkin, R. M. (2000). Subjective overachievement: Individual differences in self-doubt and concern with performance. *Journal of Personality, 68*, 491–524.
Papies, E. K., Stroebe, W., & Aarts, H. (2008). Healthy cognition: Processes of self-regulatory success in restrained eating. *Personality and Social Psychology Bulletin, 44*, 1290–1300.
Phillips, J. S., & Lord, R. G. (1980). Determinants of intrinsic motivation: Locus of control and competence information as components of Deci's cognitive evaluation theory. *Journal of Applied Psychology, 65*, 211–218.
Pintrich, P. R., & De Groot, E. (1990). Motivational and self-regulated learning components of classroom academic performance. *Journal of Educational Psychology, 82*(1), 33–50.
Pittman, T. S., Cooper, E. E., & Smith, T. W. (1977). Attribution of causality and the overjustification effect. *Personality and Social Psychology Bulletin, 3*(2), 280–283.
Pittman, T. S., Davey, M. E., Alafat, K. A., Wetherill, K. V., & Kramer, N. A. (1980). Informational versus controlling verbal rewards. *Personality and Social Psychology Bulletin, 6*, 228–233.
Porter, L. W., & Lawler, E. E. (1968). *Managerial attitude and performance*. Homewood, IL: Irwin-Dorsey.
Rachlin, H. (1995). Self-control: Beyond commitment. *Behavioral and Brain Sciences, 18*(1), 109–159.
Ryan, R. M. (1982). Control and information in the intrapersonal sphere: An extension of cognitive evaluation theory. *Journal of Personality and Social Psychology, 43*, 450–461.
Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist, 55*, 68–78.

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Ryan, R. M., Deci, E. L., Grolnick, W. S., & La Guardia, J. G. (2006). The significance of autonomy and autonomy support in psychological development and psychopathology. In D. Cicchetti & D. J. Cohen (Eds.), *Developmental psychopathology: Theory and method* (2nd ed., pp. 795–849). New York: Wiley.

Ryan, R. M., Mims, V., & Koestner, R. (1983). Relation of reward contingency and interpersonal context to intrinsic motivation: A review and test using cognitive evaluation theory. *Journal of Personality and Social Psychology, 45*, 736–750.

Scholer, A. A., & Higgins, E. T. (2008). Distinguishing levels of approach and avoidance: An analysis using regulatory focus theory. In A. J. Elliot (Ed.), *Handbook of approach and avoidance motivation* (pp. 489–504). New York: Psychology Press.

Scholer, A. A., Stroessner, S. J., & Higgins, E. T. (2008). Responding to negativity: How a risky tactic can serve a vigilant strategy. *Journal of Experimental Social Psychology, 44*, 767–774.

Scholer, A. A., Zou, X., Fujita, K., Stroessner, S. J., & Higgins, E. T. (2010). When risk-seeking becomes a motivational necessity. *Journal of Personality and Social Psychology, 99*, 215–231.

Schultheiss, O. C., & Brunstein, J. C. (2010). *Implicit motives*. New York: Oxford University Press.

Sheldon, K. M., & Elliot, A. J. (1999). Goal striving, need-satisfaction, and longitudinal well-being: The self-concordance model. *Journal of Personality and Social Psychology, 76*, 482–497.

Sheldon, K. M., Ryan, R. M., Rawsthorne, L., & Ilardi, B. (1997). Trait self and true self: Cross-role variation in the Big Five traits and its relations with authenticity and subjective well-being. *Journal of Personality and Social Psychology, 73*, 1380–1393.

Spiegel, S., Grant-Pillow, H., & Higgins, E. T. (2004). How regulatory fit enhances motivational strength during goal pursuit. *European Journal of Social Psychology, 34*, 39–54.

Strauman, T. J., & Higgins, E. T. (1987). Automatic activation of self-discrepancies and emotional syndromes: When cognitive structures influence affect. *Journal of Personality and Social Psychology, 53*, 1004–1014.

Strauman, T. J., & Higgins, E. T. (1988). Self-discrepancies as predictors of vulnerability to distinct syndromes of chronic emotional distress. *Journal of Personality, 56*, 685–707.

Stroebe, W. (2008). *Dieting, overweight, and obesity: Self-regulation in a food-rich environment*. Washington, DC: American Psychological Association.

Thorndike, E. L. (1935). *The psychology, of wants, interests, and attitudes.* New York: Appleton-Century-Crofts.

Trope, Y., & Liberman, N. (2003). Temporal construal. *Psychological Review, 110*, 403–421.

Turner, S. M., Beidel, D. C., & Wolff, P. L. (1996). Is behavioral inhibition related to the anxiety disorders? *Clinical Psychology Review, 16*(2), 157–172.

Vallacher, R. R., & Wegner, D. M. (1985). *A theory of action identification.* Hillsdale, NJ: Erlbaum.

Vallacher, R. R., & Wegner, D. M. (1987). What do people think they're doing? Action identification and human behavior. *Psychological Review, 94*(1), 3–15.

Vallacher, R. R., Wegner, D. M., & Somoza, M. P. (1989). That's easy for you to say: Action identification and speech fluency. *Journal of Personality and Social Psychology, 56*(2), 199–208.

Vroom, V. H. (1964). *Work and motivation*. New York: Wiley.

Wegner, D. M., Vallacher, R. R., Macomber, G., Wood R., & Arps, K. (1984). The emergence of action. *Journal of Personality and Social Psychology, 46*(2), 269–279.

White, R. W. (1959). Motivation reconsidered: The concept of competence. *Psychological Review, 66*, 297–333.

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Wicklund, R. A., & Gollwitzer, P. M. (1982). *Symbolic self-completion.* Hillsdale, NJ: Erlbaum.

Wiersma, U. J. (1992). The effects of extrinsic rewards in intrinsic motivation: A meta-analysis. *Journal of Occupational and Organizational Psychology, 65*(2), 101–114.

Williams, G. C., Cox, E. M., Hedbert, V., & Deci, E. L. (2000). Extrinsic life goals and health risk behaviors in adolescents. *Journal of Applied Social Psychology, 30*, 1756–1771.

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4

Needs and Incentives as Sources of Goals

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To clarify what researchers may have in mind when referring to needs (motives), incentives, and goals, let us start with a historical overview of how these terms have been used in research on motivation. Based on learning theory advanced by early animal psychologists (Hull, 1943, 1952; Spence, 1956), the strength of the tendency to make a response, and thus an organism's *motivation* to show this response, was considered to be a function of an organism's skills (or habit strength), its needs, and the incentive value of the outcome. For example, how quickly an animal runs toward a box containing food was said to depend on its habit strength, its hunger (need), and the quality and quantity of food. However, with the advance of the cognitive revolution in psychology, these determinants of motivation as well as the concept of motivation itself have become ever more elaborated.

The neo-behaviorist Tolman (1932, 1952) postulated various mental processes "which intermediate in the causal equation between environmental stimuli and … overt behavior" (Tolman, 1932, p. 2). These intermediate processes entailed concepts of purpose (ends and means) as well as expectations (e.g., means expectations, end expectations, and means-end expectations). The social psychologists

Festinger (1942) and Atkinson (1957) drew on that work in their research on what motivates humans to select and perform tasks of varying difficulty. They suggested that people weight the incentive value of the desired outcome with the expectancy that it would actually occur.

Social cognitive learning theorists (e.g., Bandura, 1982) went a step further, factoring in whether one could successfully perform the necessary behavior required to arrive at a desired outcome (efficacy or control beliefs). These theorists also alluded to further relevant expectancies, such as whether the situation by itself would produce the desired outcome (Heckhausen, 1977), whether performing a given behavior would lead to the desired outcome (Bandura, 1977, 1982), whether achieving the desired outcome would be instrumental to accruing further positive consequences (Vroom, 1964), whether a specified future outcome can be attained (Oettingen & Mayer, 2002), and whether the future in general would be bright (Abramson, Seligman, & Teasdale, 1978; Scheier & Carver, 1987).

Adding these expectancy-related variables helped to explicate in more detail what Hull and Spence tried to capture with the concept of habit strength, that is, the can-do aspect (or feasibility aspect) of the motivation to make a certain response: Can the desired outcome be brought about? But the cognitive revolution also helped to explicate the want aspect (or desirability aspect) of the motivation to make a certain response: Do I really want the desired outcome? This desirability issue was originally captured by Hull and Spence with the concepts of need and incentive. Whereas terms like habit strength refer to the way learning and experience shape behavior, needs and incentives refer to the influence of internal states and the subjective characteristics of particular stimuli, respectively. Needs were initially understood to result from deprivation, and they stimulated behavior that would correct the deprivation. Originally, Hull (1943) defined the tendency to make a particular response as a multiplicative function of habit strength and drive; drive reflected the force of a need in terms of the number of hours of deprivation. Incentive value was later added to this model (multiplicatively by Hull, but additively by Spence as he wanted to suggest that incentive can affect behavioral readiness even when the need level is zero) to account for the fact that, for example, rats in a maze ran faster for more or tastier food.

With respect to need, the cognitively inspired psychology of motivation ventured into the concept of motives (for a summary see McClelland, 1985a), defined as the class of incentives that are intuitively attractive to the person (e.g., achievement, power, affiliation, intimacy). More importantly, McClelland (1985b) discovered that depending on whether this preference for certain classes of incentives was measured implicitly (as assessed by the Thematic Apperception Test; TAT) or explicitly (as assessed by attitude questionnaires), it predicts the execution of different types of motive-related responses. It was also found that whether an incentive is hoped for versus feared matters greatly. For instance, a person with a strong achievement motive, longing for the pride associated with success, will choose to pursue a task of medium difficulty; this level of difficulty provides the most information about achievement level. However, a person who abhors the shame associated with failure (Atkinson, 1958, 1964) will choose either a very easy or a very difficult task, which is an effective strategy to avoid

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shame (as very easy tasks are likely to be solved, and failure on too-difficult tasks can easily be explained). Finally, researchers have differentiated among types of incentives as well (Heckhausen, 1977). For instance, in the realm of achievement, anticipation of positive self-evaluations (e.g., "I did really well!"), positive evaluations by others (e.g., praise by the teacher), higher order positive consequences (e.g., successful professional career), and consequences that go beyond achievement (e.g., having a good time with co-workers) can motivate people to do well on given tasks.

Given these conceptual developments regarding the concept of needs and incentives, one wonders why the psychology of motivation needs the concept of goals? In our opinion, the concept of goals was helpful for predicting whether one response tendency is selected over another, and whether the chosen one is engaged in with strong or weak determination. Most importantly in this regard, Ajzen and Fishbein (1969) suggested that a person's readiness to enact a response tendency can be assessed in terms of the strength of a person's intention to make the response. Mischel (1973) went a step further and argued that such intentions can be conceived of as self-imposed goals that imply standards that the person intends to meet (with respect to quality and quantity criteria). It is important to note here that this conceptualization of the term goal is quite different from how the same term had been used by the animal psychologists of motivation. In their behavioristic approach (e.g., Bindra, 1959; Skinner, 1953), a goal was nothing but a powerful incentive, defined as objects and events that affect an organism's behavior radically and reliably (e.g., food, sexual stimulation, a sudden loud noise). Whether an object or event was treated as a goal, however, depended solely on the investigator's perspective on the organism's behavior. If the investigator selected a certain incentive as a reference point for the description of respective behavior, this incentive became a goal. For example, Skinner (1953) referred to the food that is provided as incentive to explore a maze as the animal's goal (or reason) to run through the maze. In the behaviorist tradition, the reference point for goal-directed behavior is thus not the goal set by the organisms themselves. Behaviorists did not want to analyze internal goals or the processes leading to goal setting and subsequent goal implementation. Skinner phrased this most cogently when he referred to goal directedness as an effective and easy-to-use term for the description of persistent, appropriate, and searching behavior toward an incentive that results from some kind of learning.

Very much to the contrary, cognitive social learning theorists (e.g., Bandura, 1989; Mischel, 1973) considered goals as internal and subjective processes and states, and this had tremendous transformative consequences for the study of motivation: If one conceptualizes goal-directed responses in relation to subjective goals held by the individual (e.g., to get to know an attractive person), then one begins to ask new questions such as how people set themselves such goals and how they strive to achieve them. Present-day researchers (see, e.g., the action phases model of Gollwitzer, 1990; and Heckhausen & Gollwitzer, 1987) therefore highlight the distinction between goal setting and goal striving as suggested early on by Kurt Lewin (Lewin, Dembo, Festinger, & Sears, 1944). Today research on

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goals explicitly targets either the determinants and processes of goal setting or the determinants and processes of goal striving and successful goal attainment.

Conceptualizing goals as internal and subjective has the additional advantage of differentiating the content of the goal from the responses that are performed in its service. This distinction has led to research on how goals are framed and how their framing facilitates different responses. For example, it matters whether an achievement goal is framed as a learning goal or a performance goal (e.g., "I want to learn from performing the task" vs. "I want to demonstrate my abilities"; Dweck, 1996). Also, conceptualizing goals as subjective internal states allows for raising the question of whether the mental representation of a goal can be activated outside a person's awareness (as suggested in the auto-motive model; Bargh, 1990), and given that goals are internal mental representations, one can ask how such mental representations relate to the representations of other goals, subgoals, and means of attainment (Kruglanski, 1996).

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MOTIVES AND NEEDS AS PERSONAL DETERMINANTS OF GOAL DESIRABILITY

As suggested above, needs, motives, and incentives speak to the desirability of a goal. If one assumes that people set themselves goals they find attractive (Ajzen & Fishbein, 1969; Gollwitzer, 1990), they should select those goals for themselves that target outcomes that satisfy their needs or motives; moreover, when these outcomes have features that suggest a strong incentive value, this should further increase perceived desirability of the intended outcome and thus further strengthen a person's readiness to commit to the goal in question. There are numerous lines of research that support this assumption.

As broader internal states, needs are often distinguished as belonging to various categories. On the one hand, research finds that for humans, psychological needs, such as the achievement motive, have effects similar to those of physiological needs, such as hunger (McClelland, Atkinson, & Clark, 1949). Developmental models of needs have argued that it is important to differentiate various types of needs in order to understand which needs a person is likely to serve at a given time. For example, Maslow (1943) organized needs as a hierarchy or pyramid, with physiological (breathing, food, water) at the base, followed by safety (employment, morality), love or belonging (friendship, family), esteem (confidence, achievement), and finally self-actualization (creativity, spontaneity) at the top. Only when lower-order needs were satisfied could people progress to a higher level. Maslow applied his conceptualization to a person's lifetime, as he considered progressing through the need hierarchy to be a developmental task. If a lower set of needs were no longer met, an individual would temporarily prioritize them, but would not permanently regress to the lower level of the hierarchy. More recent work has refined Maslow's hierarchy, such that need-related goal systems are considered to be overlapping rather than completely hierarchical. Once a goal system, such as those for addressing physiological, self-protection, or affiliation needs, has been developed, it is likely to be activated whenever relevant environmental cues are salient (Kenrick, Griskevicius, Neuberg, & Schaller,

2010). Also, in most modern conceptualizations needs are categorized as physiological (thirst, hunger, sex), psychological (autonomy, competence, relatedness), or social (achievement, intimacy, power). In this framework, psychological needs are those that are universal, inherent, and part of human nature, whereas social needs are shaped by individual experiences and thus vary considerably among people (Reeve, 2008).

Achievement, Power, and Affiliation

In McClelland's (1985b) analysis of motives, it is assumed that three central motives guide behavior by their unique anticipated goal states. The central motives McClelland distinguishes are achievement, power, and affiliation; each of them is linked to a typical desired goal state (i.e., meeting a high standard of excellence in a challenging task for the achievement motive) that is assumed to lead to a typical positive affect (i.e., pride for the achievement motive). The individual preference for one or the other type of goal state is defined as a person's motive disposition, which is assumed to be stable over time. A person with one or the other motive disposition learns over time which situations allow striving for the respective desired goal states and acquires a behavioral repertoire to do so successfully. The distinction between the three motives has found ample support in psychobiology (Schultheiss, 2007; Schultheiss, Campbell, & McClelland, 1999; Schultheiss, Dargel, & Rohde, 2003; Schultheiss, Pang, Torges, Wirth, & Treynor, 2005; Schultheiss & Rohde, 2002; Schultheiss & Wirth, 2008; Schultheiss, Wirth, & Stanton, 2004; Wirth, Welsh, & Schultheiss, 2006). For example, Stanton and Schultheiss (2009) reviewed results indicating that sympathetic catecholamines, testosterone, cortisol, and estradiol were all correlated with implicit power needs, and they synthesized these findings with animal research on the physiology of dominance behavior in order to propose a biological model whereby the dispositional need for power is intertwined with dominance physiology.

It is assumed that people possess the named motives to a different degree, which affects how many situations a person perceives as relevant for motive satisfaction and how strong the anticipated affect is for respective goal attainments. The strength of the individual motive disposition is commonly assessed by the TAT (see Schultheiss & Pang, 2007, for recent versions of this test). The TAT presents pictures containing scenes that relate to the three motives but are ambiguous enough to allow for different interpretations. Test takers are encouraged to freely associate to these pictures, arriving at a story that answers questions such as: What is happening here? What led up this situation? What will happen next? The story is then content analyzed using a differentiated coding scheme that allows assigning scores to people for each of the three motives. People with high scores on the achievement motive, for instance, have been found to set themselves more challenging goals and to pursue these goals with more persistence. When it comes to more general measures of successful achievement, for example, success in one's professional career, it pays to consider the constellation of the three motives. For instance, it has been found that the constellation of a high need for power and a low need for affiliation predicts the success of business managers; an additional

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high need for achievement is beneficial to low level managers who still need to make individual contributions, whereas high level managers who can extensively delegate things to others benefit from an additional low need for achievement (McClelland & Boyatzis, 1982).

To circumvent the intricate content analysis of TAT stories, researchers have also developed questionnaires to assess the three motives. As it turned out, however, only very moderate correlations are typically observed between TAT scores and respective questionnaire scores. This made McClelland, Koestner, and Weinberger (1989) distinguish between two types of motives: implicit versus explicit. Implicit versus explicit motives are assumed to originate in different ways (acquired through affective experiences vs. verbal communication with others), are linked to different incentives (activity-related excitement vs. social-evaluative feedback), and instigate distinct behaviors (spontaneous intuitive action vs. action that is based on extensive deliberation). Implicit motives, in contrast to explicit motives, are not easily accessed by conscious thought and thus cannot be assessed by self-report questionnaires.

The distinction between these two types of motives spawned a large body of subsequent research. First, it appears that the statistical independence of implicit versus explicit motives is indeed valid and not merely an artifact of their being measured in different ways. Schultheiss, Yankova, Dirilikvo, and Schad (2009) measured implicit and explicit motives using cue- and response-matched versions of the picture story exercise (PSE; McClelland et al., 1989) and still found little overlap between the two motives (see also Thrash, Elliot, & Schultheiss, 2007).

Second, as the two motive systems are assumed to be independent, research has ventured into studying the consequences of different degrees of overlap between the two. It was found that a discrepancy between the two systems qualifies as a chronic internal stressor (Baumann, Kaschel, & Kuhl, 2005), as subjective well-being and general goal attainment rates are negatively affected (Brunstein, 2008), and the negative health behavior patterns observed with people suffering from chronic stress are observed as well (Job, Oertig, Allemand, & Brandstätter, 2010).

Third, empirical studies largely support the contention of McClelland et al. (1989) that implicit and explicit motives differ in their ways of guiding behavior. For example, in a study where effort-related task engagement was measured via speed of responding and choice-related task engagement via the choice to continue working on the test task, the implicit motive to achieve predicted the former and the explicit motive to achieve predicted the latter (Brunstein & Maier, 2005). Further, each motive type was found to be responsive to a different type of feedback: Implicit motives interacted with feedback that referred to the participant's own previous level of achievement, whereas explicit motives interacted with feedback that referred to the achievement of a social reference group. Although implicit and explicit motives thus appear to "represent two orthogonal psychological needs that respond to specific standards of excellence and predict different types of behavior" (Brunstein & Maier, 2005, p. 219), they may work in combination as well. Specifically, Brunstein and Maier suggest that because solving difficult tasks serves as a strong incentive, this might stimulate the implicit

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need for achievement. Thus, an implicit need for achievement would mediate the effect of an explicit achievement need geared toward outperforming others on the task at hand.

Further Relevant Needs and Motives

According to ***self-determination theory*** (SDT), the needs for competence, relatedness, and autonomy are essential for constructive human development (Ryan & Deci, 2000). People can promote well-being by pursuing and attaining goals that satisfy the needs for competence, relatedness, and autonomy; the pursuit of other goals (e.g., materialistic goals) does not contribute to and may even detract from well-being (Ryan, Sheldon, Kasser, & Deci, 1996). Research in the SDT framework has largely concentrated on how these needs can be thwarted or satisfied, and how their satisfaction allows people to flourish, rather than on how these needs shape goal choice and pursuit. However, SDT points to intrinsic motivational orientation as a consequence of possessing self-determination needs; this orientation in turn is seen as a key determinant of the human "tendency to seek out novelty and challenges, to extend and exercise one's capacities, to explore, and to learn" (Ryan & Deci, 2000, p. 70). As the pursuit of novelty, exploration, and learning should inform one's goals, investigating the determinants of a low or high intrinsic orientation helps to elucidate goal choice.

Intrinsic motivation is diminished by extrinsic rewards (Deci, Koestner, & Ryan, 1999), threats, deadlines, directives, pressured evaluations, and imposed goals because these factors promote an external locus of causality; intrinsic motivation can, however, be enhanced by choice, acknowledgment of feelings, opportunities for self-direction, and autonomy-supportive teachers and caregivers, that is, by factors that engender personal feelings of autonomy. Intrinsic motivation is also enhanced when relatedness (Anderson, Manoogian, & Reznick, 1976; Ryan & Grolnick, 1986) and competence (Deci, 1975; Vallerand & Reid, 1984) needs are met. In sum then, SDT suggests that people will choose and strive for goals that allow them to satisfy the needs for autonomy, relatedness, and competence.

Need for cognition is defined as a relatively stable tendency to engage in and enjoy effortful cognitive endeavors (Cacioppo & Petty, 1982; Cacioppo, Petty, Feinstein, & Jarvis, 1996). It is typically indexed via self-report measures like the Need for Cognition Scale (NCS; Cacioppo, Petty, & Kao, 1984). Rather than being a stable tendency that people are born with, need for cognition is argued to be "the consequence of developing a sense of competence and self-satisfaction from repeated or prolonged episodes of effortful problem solving" (Cacioppo et al., 1996, p. 199). Although many investigations have explored the role of need for cognition in information processing, attitude formation, attitude change, persuasion, and decision making, relatively few have addressed the need for cognition as a source of goals.

However, researchers assume that a stronger need for cognition results in less concern with conserving cognitive resources and leads people to instead seek, acquire, and consider information in order to make sense of stimuli, relationships, and events in their world. Accordingly, individuals high in need for

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cognition should be more likely to pursue tasks and goals that require reasoning or problem solving (e.g., reading, comprehensive exams), whereas individuals low in need for cognition should be more likely to pursue tasks and goals that enable them to conserve cognitive resources (reviewed by Cacioppo et al., 1996). Need for cognition has also been shown to promote the acquisition of novel, complex skills via higher levels of self-efficacy and an orientation toward learning (Day, Espejo, Kowollik, Boatman, & McEntire, 2007). Correlational data indicate that individuals high in need for cognition obtain more years of education (Davis, Severy, Kraus, & Whitaker, 1993), procrastinate less (Ferrari, 1992), seek out activities or information without concern for extrinsic reward contingencies (Amabile, Hill, Hennessey, & Tighe, 1994; Olson, Camp, & Fuller, 1984), and pursue and enjoy activities associated with high levels of sensation (Crowley & Hoyer, 1989; Olson et al., 1984) more so than individuals low in need for cognition.

These findings suggest that need for cognition may shape goal choice by influencing the activities that individuals find attractive, that is, by affecting the incentive value of these activities. Further, higher need for cognition gives rise to a stronger correspondence between attitudes and behavior (Cacioppo, Petty, Kao, & Rodriguez, 1986). Accordingly, a higher need for cognition might engender a stronger link between one's attitudes and goals, resulting in goal choices that more strongly correspond to attitudes.

A strong need for cognition may also affect goal setting by moderating the effect of goal priming. A high need for cognition means that constructs are generally easier to activate, that people engage in more thinking, providing more opportunity for priming to bias judgment, and that judgments are based more on thinking, so biased thoughts should have a greater impact on judgment (Petty & Jarvis, 1996). Indeed, when primes are subtle (e.g., presented subliminally or via word-completion tasks with a low ratio of prime-to-filler words), priming has a stronger effect on behavior and judgment the higher the participants' need for cognition (Petty, DeMarree, Briñol, Horcajo, & Strathman, 2008). However, need for cognition also increases the person's willingness to engage in effortful processes of cognitive correction when one's judgments are suspected to be biased (D'Agostino & Fincher-Kiefer, 1992), and in line with this, blatant priming (e.g., via word-completion tasks with a high ratio of prime-to-filler words) is found to have a weaker effect the stronger the participants' need for cognition (Petty et al., 2008).

Need for cognitive closure refers to the desire for a firm answer to a question, accompanied by an aversion toward ambiguity (Webster & Kruglanski, 1994). Need for closure may fluctuate in response to contextual variables such as time pressure or perceived costs of further information processing, but it is also assumed to be a relative stable individual tendency. Kruglanski and Webster (1996) argue that the need for cognitive closure guides activities aimed at attaining closure, as well as biasing choices toward constrained rather than open-ended pursuits. Research has largely examined the effects of need for closure on decision making and information processing rather than goal choice per se. As does need for cognition, need for closure can moderate priming effects; high need for

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closure predicts stronger assimilation of judgments to primes (Ford & Kruglanski, 1995; Thompson, Roman, Moscowitz, Chaiken, & Bargh, 1994). Need for closure, manipulated as well as measured, also shapes the preference for working with a persuasive versus easily persuadable partner and leads participants who have received enough information to form an opinion to argue longer when forced to reach a consensus (Kruglanski, Webster, & Klem, 1993). Recent findings indicate that the need for closure is associated with valuing security, conformity, and tradition rather than stimulation and self-direction (Calogero, Bardi, & Sutton, 2009), so it should influence goal selection by pointing people toward goals that satisfy these values.

One area of research on needs explicitly addresses the issue of goals; this research refers to the domain of achievement. Achievement goals are believed to stem from the ***need for achievement***, the ***need to avoid failure***, and perceptions of personal competence (Elliot & Church, 1997). Recognizing that competence can be defined as an absolute standard (i.e., mastery) or relative to a normative standard (i.e., performance) and may be framed in terms of a positive possibility to approach (i.e., success) or a negative possibility to avoid (i.e., failure), Elliot and his colleagues used this 2 × 2 framework to distinguish four types of achievement goals: *mastery-approach* (focused on attaining task-based or intrapersonal competence), *performance-approach* (focused on attaining normative competence), *mastery-avoidance* (focused on avoiding task-based or intrapersonal incompetence), and *performance-avoidance* (focused on avoiding normative incompetence; Elliot & McGregor, 2001; Elliot & Murayama, 2008). Specifically, a strong achievement motive and positive competence perceptions lead people to adopt mastery goals; a strong achievement motive, positive competence perceptions, and high fear of failure lead people to adopt performance-approach goals; negative competence perceptions and high fear of failure lead people to adopt performance-avoidance goals (Elliot & Church, 1997). People benefit from adopting goals that are a fit to their needs and competence perceptions: in one study, striving for approach goals (both mastery and performance) predicted experiences of positive affect and well-being only for people who had a strong achievement motive (Job, Langens, & Brandstätter, 2009).

The different types of achievement goals are not only adopted to fit different needs, they also have different consequences. Holding performance-approach goals predicts high performance, whereas holding mastery-approach goals predicts feelings of motivation (Elliot & Sheldon, 1997). On the other hand, avoidance goals appear to be detrimental for academic achievement, even if these goals are a good "fit" to a person's regulatory style. For example, avoidance goals predicted lower exam scores whether participants chronically focused on accomplishing their hopes and aspirations (i.e., promotion focus) or on trying not to fail at duties and obligations (prevention focus; Sullivan, Worth, Baldwin, & Rothman, 2006). One line of research proposes that the link between achievement goals and performance is explained by emotions in the achievement context: Mastery goals yield enjoyment, low boredom, and low anger; performance-approach goals yield hope and pride; and performance-avoidance goals yield anxiety, shame, and hopelessness, feelings that in turn affect achievement (Pekrun, Elliot, & Maier, 2009). A further

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reason that performance-approach goals may particularly enhance performance is that they lead people to be more exploitative in obtaining and using information that can promote goal achievement, compared to mastery or no goals (Poortvliet, Janssen, Van Yperen, & Van de Vliert, 2007).

Elliot and McGregor's (2001; Elliot, 2008) distinction of ***approach versus avoidance motives*** has been applied within but also outside the domain of academic achievement. It is assumed that approach motives favor the selection of approach goals, whereas avoidance motives favor the selection of avoidance goals. For example, with regard to social achievement (Horst, Finney, & Barron, 2007), friendship goals (Elliot, Gable, & Mapes, 2006; Gable, 2006), relationship sacrifices and satisfaction (Impett, Gable, & Peplau, 2005), sports performance (Thomassen & Halvari, 2007), eating behavior (Otis & Pelletier, 2008), and moderation of stereotype threat effects (Brodish & Devine, 2009), approach goals were generally found to result in superior achievement. However, avoidance goals can also be beneficial, such as when people attempt to quit smoking (Worth, Sullivan, Hertel, Rothman, & Jeffery, 2005). Furthermore, people may shift from general approach to avoidance orientations in response to situational cues. For example, participants who were made to feel threatened in their romantic relationships (by writing about "secret selves," which could negatively impact their relationship) became quicker to identify avoidance words than approach words, whereas this difference was not observed in participants who were not made to feel a relationship threat (Cavallo, Fitzsimons, & Holmes, 2010). In a second study, threatened participants performed better on an avoidance-framed task than control participants, suggesting that the shift from approach to avoidance orientation following a relationship threat had consequences outside the relationship domain (Cavallo et al., 2010).

How Do Needs and Motives Affect Goal Choice?

Research on the perceptual and attentional correlates of needs provides insight into why and how these dispositional tendencies might guide goal selection. Needs are found to lead to a readiness to perceive stimuli that could address the need (i.e., incentives). Participants who were made thirsty were faster to recognize drinking-related words (e.g., cup, water) in a lexical decision task than participants who were not thirsty (Aarts, Dijksterhuis, & De Vries, 2001, Study 1). In a second experiment, thirsty participants also remembered more drinking-related objects (e.g., a glass, a bottle) that they had seen in a room (Aarts et al., 2001).

Needs are also found to predict people's speed and precision in identifying stimuli that are relevant in ways other than potentially offering need satisfaction. One representative investigation found that people with a strong power motive oriented attention toward faces signaling low dominance and away from faces signaling high dominance; people with a strong affiliation motive were better at detecting faces signaling low affiliation (i.e., rejection) and also tended to orient attention toward faces signaling high affiliation (i.e., acceptance; Schultheiss & Hale, 2007). Likewise, being high on the fear of failure-based achievement motive predicts higher arousal when viewing unpleasant images and a bias

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to spend more time viewing failure images (Duley, Conroy, Morris, Wiley, & Janelle, 2005).

Interestingly, the effects of needs on perception can be altered by behavior. Compared to nonthirsty people, thirsty people perceived water bottles and water glasses as larger (Veling & Aarts, 2009; Veltkamp, Aarts, & Custers, 2008). However, this effect is reversed when participants are made to hold back from pursuing water by completing a go/no-go task in which water was paired with refraining from acting. Thirsty participants who had water paired with no-go cues perceived the water bottle and glass as smaller than did nonthirsty participants, suggesting that the reward value of an object is decreased when it is paired with cues that put behavior on hold.

Importantly, the motive-related differences in perception and attention have consequences for learning. On an implicit learning task, power-motivated individuals had enhanced performance for sequences paired with low-dominance facial expressions and impaired performance for sequences paired with high-dominance expressions, whereas affiliation-motivated individuals had impaired performance for sequences paired with hostile faces (Schultheiss, Pang, et al., 2005). In sum, the perception and attention research as well as psychophysiology research reported above suggests that needs guide the content of goals in part by making need-related stimuli (i.e., incentives) particularly compelling and arousing.

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Can Motives Affect Nonconscious Goal Activation?

The goal-priming literature (for a review, see Dijksterhuis, Chartrand, & Aarts, 2007) has shown that a goal can be activated without the individual knowing about or intending it, either through subliminal presentation of goal-relevant stimuli or through subtle and unobtrusive supraliminal presentation. A wide variety of environmental triggers have been demonstrated—not only verbal stimuli semantically related to the goal (as in many studies), but also material objects such as backpacks and briefcases (Kay, Wheeler, Bargh, & Ross, 2004), scents such as cleaning fluids (Holland, Hendriks, & Aarts, 2005), power-related features of a situation such as a professor's desk chair (Chen, Lee-Chai, & Bargh, 2001), and the names of one's significant others (Fitzsimons & Bargh, 2003; Shah, 2003). Moreover, a wide variety of goals have been shown capable of unconscious operation: information-processing goals such as impression formation (Chartrand & Bargh, 1996; McCulloch, Ferguson, Kawada, & Bargh, 2008), achievement and task performance goals (Bargh, Gollwitzer, Lee-Chai, Barndollar, & Trötschel, 2001), as well as interpersonal goals such as helping and cooperation (Bargh et al., 2001; Fitzsimons & Bargh, 2003). It has further been observed that once activated outside the person's knowledge, these goals operate autonomously, without any conscious guidance, to direct cognition and behavior toward the desired end state (see reviews in Bargh, 2005; Bargh & Ferguson, 2000; Chartrand & Bargh, 2002; Dijksterhuis et al., 2007; Ferguson, Hassin, & Bargh, 2008; Fitzsimons & Bargh, 2004).

Importantly, unconscious goals seem to produce similar outcomes as conscious goals, and they seem to do so by employing similar processes; even the

phenomenal qualities of goal striving, such as persistence in the face of obstacles and resumption of interrupted goal striving, appear to be the same. The affective (mood) and motivational consequences of conscious and unconscious goal striving are also the same. The consequences of conscious goal striving for affective experience (mood) and the future strength of that goal after goal attainment or failure to reach the goal have long been established (Bandura, 1977; Heckhausen, 1991). Success produces positive mood and increased tendencies to pursue that goal in the future; failure produces the opposite consequences. Research on unconscious goal pursuit has shown that the same consequences accrue for goal striving even if the individual is not aware of engaging in it. Finally, Kawada, Oettingen, Gollwitzer, and Bargh (2004) observed that unconscious goals, when active, are also projected on to (i.e., attributed to) other people, as is true for consciously held goals.

Given these similarities, one wonders whether a person's motives affect the activation (priming) of unconscious goals, given that the selection of conscious goals is known to be influenced by a person's motives. This issue has not attracted much research interest so far, but there is a relevant early goal priming study reported by Bargh and Gollwitzer (1994). Participants' chronic achievement and affiliation motives were measured, and they were then primed with either achievement, affiliation, or neutral words. Finally, they had to work as a team with another participant who was actually a confederate on a series of five word-search puzzles. The confederate performed poorly by design, showing frustration and embarrassment. By finding a lot of words, the participant could thus fulfill the achievement goal but would make the confederate feel even worse; by "dumbing down," on the other hand, the participant could sacrifice the achievement goal and serve the affiliation goal of preventing the confederate from feeling too bad. Results showed that the goal priming interacted with participants' chronic motives: An initial priming effect (achievement-primed participants outperformed affiliation-primed participants) was eventually overtaken by a significant chronic motive effect. Namely, on the final trial, participants with chronically high achievement and low affiliation motives outperformed those with chronically low achievement and high affiliation motives, regardless of priming. It is thus not only the conscious selection of goals that respects a person's motives; the nonconscious activation of goals seems to do so as well.

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INCENTIVES AS ANTICIPATED POSITIVE CONSEQUENCES OF GOAL PURSUIT

The perceived desirability of a potential goal also depends on one's evaluation (attitude toward) of the anticipated consequences of goal attainment. In theory, it is the sum total of the possible positive and negative consequences associated with the attainment of the potential goal, with each of these consequences weighted by its perceived likelihood of occurrence (Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975). In practice, of course, people may not go through such a comprehensive reasoning process to develop each attitude before committing to the goal.

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Limits to a Comprehensive Analysis of Potential Consequences

First, holding ***naïve theories*** on how behavioral outcomes originate from a given goal pursuit limits the kind of consequences that are anticipated. For instance, Dweck and her colleagues (Dweck, 1999; Dweck & Leggett, 1988; Hong, Chiu, Dweck, Lin, & Wan, 1999; Molden & Dweck, 2006) have focused on implicit theories about the malleability of human attributes, such as intelligence, personality, and moral character. When individuals view an attribute like intelligence as fixed (*entity theory*), they want to evaluate how much of the attribute they possess. When individuals view attributes as malleable (*incremental theory*), they want to cultivate the attribute in themselves. Thus, entity theorists should anticipate consequences of goal attainment that speak to the possession of capabilities; incremental theorists, on the other hand, should anticipate consequences that speak to how one can further develop one's capabilities. In this way, implicit theories shape the goals that people choose to pursue: learning goals in the case of incremental theorists and performance goals in the case of entity theorists.

Just as the research of Deci and Ryan points out that external reward can dampen implicit motivation (Deci et al., 1999), Dweck and her colleagues have identified a way that external rewards, in the form of praise, can shape goal choice. In the latter case, the important variable is the topic of the praise. Implicit theories develop partially as a result of the feedback children are given. Praise that conveys person or trait judgments (e.g., "You're a good girl," "You're really good at this") results in less constructive responses to subsequent setbacks than praise that addresses a process (e.g., "You must have tried really hard," "You found a good way to do it, can you think of other ways that may also work?"; Kamins & Dweck, 1999). Person praise, also referred to as generic praise because it suggests a general tendency, implies that there is a stable ability that underlies performance, which seems to lead children to construe ability as inherent and fixed (Cimpian, Arce, Markman, & Dweck, 2007). Likewise, praise for intelligence leads children to consider intelligence more as a fixed trait than praise for hard work. Thus, praise for intelligence leads children to care more about performance goals relative to learning goals than praise for effort (Mueller & Dweck, 1998).

Although some researchers have argued that mastery goals (i.e., learning goals) are roundly superior to performance goals, findings suggest that both have beneficial consequences (Barron & Harackiewicz, 2001). For example, mastery goals are associated with higher subsequent interest and predict behavior like enrollment in additional courses on the same topic; performance goals, on the other hand, predict higher grades in the short term as well as long term (Harackiewicz, Barron, Tauer, Carter, & Elliot, 2000). Moreover, performance goals only seem to undercut interest when pursued within evaluative contexts by people low in achievement orientation (Senko & Harackiewicz, 2002). Mastery goals may actually undermine academic achievement by leading students to preferentially allocate study time to material they find appealing (Senko & Miles, 2008). Interestingly, recent research suggests that when students adopt mastery goals as a strategy for succeeding and not as a strategy for being viewed in a

socially desirable way, then mastery goal endorsement does predict higher grades (Dompnier, Darnon, & Butera, 2009).

Within a given context, people are relatively stable in their endorsement of particular achievement goals (Senko & Harackiewicz, 2005). However, achievement goals also fluctuate, particularly after receiving feedback in the early stages of a new pursuit; gaining experience leads to adjusting goals to situational constraints and personal limitations. People high in fear of failure, by being particularly sensitive to competence evaluation, are especially likely to change their relative endorsement of various achievement goals over time (Fryer & Elliot, 2007).

A second limitation of the comprehensive analysis of the potential consequences of attaining a potential goal rests in the fact that people may not be motivated to reflect on the desirability of a given goal choice. Different variables are known to affect the ***motivation to deliberate on the desirability of a potential goal***. For instance, Cioffi and Garner (1996) found that requiring active choices of a goal (i.e., answering affirmative items to do volunteer work) led to thinking of more reasons why such a decision could be more attractive than requiring only a passive choice to be made (i.e., skipping items that affirmed the opposite choice). Liberman and Trope (1998) reported that reflecting on a potential goal that is psychologically distant (e.g., acting on the goal is required in the distant future rather than near future) makes people focus on the goal's desirability, whereas a goal that is psychologically near (e.g., acting on the goal is required in the near future) triggers feasibility concerns. But considering a potential goal that is psychologically distant may not only turn the person's mind to the desirability of this goal but actually increase its perceived desirability. Specifically, when Vasquez and Buehler (2007) varied near versus far psychological distance by having people imagine the performance of a future task from a first- or third-person perspective, they observed that the importance of doing well (i.e., high desirability of goal attainment) increased by taking a third-person perspective. The latter perspective produced higher desirability, which in turn led to a stronger goal to do well on the task at hand. So it appears that psychologically close versus distant construals of a goal not only affect the extent to which desirability or feasibility is considered, but psychologically distant construals may also make a goal seem more desirable.

Another mode of thought that affects a person's readiness to reflect on the desirability of a goal is counterfactual thinking (Epstude & Roese, 2008; McCrea, 2008). Failing to reach a set goal (e.g., not doing well in a midterm exam where one set out to receive an A) often triggers thoughts such as: "If only I had studied harder, I would have done better on the midterm exam!" Such counterfactual thought in turn triggers thoughts about the desirability of studying harder for the class, potentially leading to the goal to study harder for this class in the future. But when it comes to adjusting one's goals to internal and external demands, counterfactual thinking is not the only form of thinking attentively, repetitively, or frequently about one's self and one's world. A summary article by Watkins (2008) points out that there are many others: for instance, rumination (or brooding on negative stimuli), worrying, mind wandering, chronic self-consciousness, and

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mental simulation. Each of these forms of thinking may produce a differential readiness to consider desirability of potential goals.

It is not only mode of thought that influences desirability considerations and assessments; emotional states also play a role. Traditional analyses of emotion (e.g., Frijda, 1986; Russell, 2003) emphasize the potential of emotions to elicit behavior directly. For example, fear produces fight or flight, or disgust leads to rejection. Recently, Baumeister, Vohs, DeWall, and Zhang (2007) have argued that behaviors can produce emotional outcomes. For example, stealing may lead to feelings of guilt. By cognitively anticipating such outcome emotions, people can learn about the desirability of performing the respective behavior (e.g., pride may signal high desirability). As a consequence, when people deliberate whether to perform a certain behavior, they may anticipate relevant outcome emotions. These anticipated emotions in turn may provide valuable feedback on whether or not to set the goal to perform the behavior.

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Different Ways of Reflecting on the Desirability of a Potential Goal

Thinking about the positive consequences of having attained a potential goal can be done in different ways, and these different ways may be differentially effective in turning anticipated positive consequences into commitments to actually reach this potential goal. The ***theory of fantasy realization*** specifies three relevant ways of thinking (Oettingen, 2000): mental contrasting, indulging, and dwelling. In mental contrasting, people first imagine the fulfillment of a potential goal (e.g., the positive consequences of giving a good presentation at a conference) and then reflect on the present reality that stands in the way of attaining the desired future (e.g., evaluation anxiety). Mental contrasting is a problem-solving strategy that allows people to recognize that they have not yet fulfilled their wish and that they need to take action in order to achieve the desired future. As a consequence, expectations of attaining the desired future become activated and determine a person's goal commitment and subsequent striving to attain the desired future. When perceived expectations of success are high, people will actively commit to realizing the desired future; when expectations of success are low, people will refrain from doing so, and thus they will venture on alternative potential goals (i.e., desired futures). In this way, mental contrasting helps people discriminate between feasible and unfeasible goals and promotes motivationally smart goal setting (i.e., people invest in attractive goals that they can attain; see the summary by Oettingen & Stephens, 2009).

The theory of fantasy realization specifies two further ways of thinking about potential goals. People may engage in either indulging (envisioning only the positive consequences of goal attainment) or dwelling (reflecting only on the present negative reality). Neither indulging nor dwelling directs the individual's attention to the discrepancy between future and reality, and thus the individual fails to recognize that actions (making responses) are necessary to achieve the desired future. Therefore, expectations of success do not become activated, and goal setting does not reflect the perceived likelihood of reaching the desired future. Individuals who indulge and dwell show a medium level of goal commitment, even though

the resource-efficient strategy to follow would be no engagement in the case of low expectations of success and full engagement in the case of high expectations of success. For example, when it comes to the goal of giving a good presentation at a conference, both indulging and dwelling will lead to moderate preparation, regardless of whether a successful performance is perceived as within one's reach or as hardly possible.

Various experiments support these claims (e.g., Oettingen, 2000; Oettingen, Hönig, & Gollwitzer, 2000; Oettingen, Mayer, Sevincer, Pak, & Hagenah, 2009; Oettingen, Mayer, Thorpe, Janetzke, & Lorenz, 2005; Oettingen, Pak, & Schnetter, 2001; Oettingen, Stephens, Mayer, & Brinkmann, 2010). In one study (Oettingen et al., 2001, Study 4), first-year students enrolled in a vocational school for computer programming indicated their expectations of excelling in mathematics and were assigned to mentally contrast, indulge, or dwell about doing so. As dependant variables, participants indicated how energized they felt with respect to excelling in math, and 2 weeks later participants' teachers reported how much effort each student had invested over the interim and provided each student with a grade for that time period. As predicted, only in the mental contrasting condition did the students feel energized, exert effort, and earn grades based on their expectations of success. Those with high expectations of success felt the most energized, invested the most effort, and received the highest course grades; those with low expectations of success felt the least energized, invested the least effort, and received the lowest course grades. To the contrary, participants in both the indulging and dwelling conditions showed moderate goal commitment, independent of their expectations of success.

A variety of studies pertaining to different life domains replicated this pattern of results, for example, in experiments on studying abroad, acquiring a second language, getting to know an attractive stranger, finding a balance between work and family life, self-improvement, and idiosyncratic interpersonal wishes of great importance. Furthermore, strength of goal commitment was assessed by cognitive (e.g., making plans), affective (e.g., feelings of frustration), motivational (e.g., feelings of energization), and behavioral (e.g., amount of invested effort) indicators. These indicators were measured via self-report or observations, either directly after the experiment or weeks later. All of these studies evidenced the same patterns of results: Given high expectations of success, participants in the mental contrasting group showed the strongest goal commitment; given low expectations, mental contrasting participants showed the weakest goal commitment. Participants who indulged in positive images about the future or dwelled on negative images of reality showed medium commitment no matter whether expectations of success were high or low. It is important to note that the outcomes of mental contrasting do not occur as a result of changes in the level of expectations (feasibility) or incentive valence (desirability).

The mediating processes of mental contrasting pertain to energization (Oettingen, Mayer, Sevincer et al., 2009). Specifically, mentally contrasting a desired future with obstacles of present reality leads to energization, which in turn creates goal commitments strong enough to lead to effective goal striving and successful goal attainment. Mediating effects of energization on goal commitment are

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shown with physiological indicators of energization (i.e., systolic blood pressure) as well as with experiential indicators (self-reports of feeling energized). Mental contrasting also spurs planning, a known cognitive mediator between expectations of success and goal commitment (Oettingen & Stephens, 2009). Moreover, the effects of mental contrasting result in changes of implicit cognition. A series of studies show that when expectations of success are high, mental contrasting establishes strong mental associations between the desired future and the present reality, which is now perceived as an obstacle to attain the future reality; when expectations are low, mental contrasting leads to weak mental associations. Relevant control groups produce mental associations of moderate strength that are independent of expectations. Importantly, in the mental contrasting group, the strength of associations mediates the link between expectations and goal commitment (Kappes & Oettingen, 2011).

Mental contrasting, because it is a problem-solving strategy, necessitates heightened cognitive activity. A recent experiment attesting to this idea used continuous magnetoencephalography, a brain-imaging technique measuring magnetic fields produced by electrical activity in the brain (Achtziger, Fehr, Oettingen, Gollwitzer, & Rockstroh, 2009). Mental contrasting, contrary to indulging or simply resting, produced heightened brain activity in areas associated with working memory, episodic memory, intention maintenance, action preparation, and vivid visualization. That is, mental contrasting implies vividly imagining a desired future, anticipating hindrances to realizing this future, and making plans on how to overcome these obstacles. The brain activity associated with indulging, on the other hand, did not differ from resting.

These findings are in line with observational studies showing that sheer positive fantasies about the future predict low effort and success (Oettingen & Mayer, 2002; Oettingen & Wadden, 1991). For example, spontaneously indulging in positive fantasies about future weight loss predicted low success in actual weight loss (after 4 months and 1 year; Oettingen & Wadden, 1991). Moreover, indulging in positive fantasies (measured by valence and frequency) predicted weak goal commitments (as assessed by efforts to strive for the goal) in areas of academic achievement (e.g., achieving a good grade in a psychology class), professional achievement (e.g., finding a job after graduation), interpersonal relations (e.g., finding a romantic partner), and health (e.g., recovering from hip surgery). Importantly, the findings prevailed regardless of whether the spontaneously produced positive fantasies pertained to the desired outcome or to the process of achieving that outcome. Also, goal commitment in these studies was assessed at a range of 2 weeks to 2 years after the assessment of the spontaneously produced positive future fantasies.

At first sight, the reported findings seem to be in contrast to research observing facilitating effects of positive affect on performance in executive function tasks (Dreisbach & Goschke, 2004; Gable & Harmon-Jones, 2008; Kazen & Kuhl, 2005). However, these facilitating effects are evident in individuals who perform these tasks while being in a positive affective state. Note that the studies reported in the previous paragraph assessed performance long after the potential hype produced by the positive affective state had vanished. Therefore, performance was

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a function of goal commitment, and a binding goal commitment cannot emerge when people indulge in their wishes and fantasies about the future.

A further strategy of reflecting about the desirability of a potential goal is suggested by the ***mindset theory of action phases*** (Gollwitzer, 1990, 2011; Heckhausen & Gollwitzer, 1987). This theory maintains that setting goals means selecting one of one's many wishes and deciding to realize it. The theory posits that there are multiple stages of goal pursuit, called action phases, which people need to successfully navigate to attain a goal: the predecision, the preaction, the action, and the postaction phases. Each phase is characterized by a distinct task that must be accomplished, and the degree of involvement with each of these tasks produces a typical mindset that facilitates task completion (e.g., a deliberative mindset when the pros and cons of choosing a goal at hand are weighed; an implemental mindset when the individual steps of goal striving are planned according to when, where, and how they are to be executed). In the mindset theory of action phases, setting oneself a goal is conceived of as the end product of navigating the predecisional phase.

Assuming that people generally entertain more wishes than they have time or means to realize, they face the task of having to decide between the wishes in order to accomplish at least some of them. The deliberation of desirability (weighing the pros and cons of goal attainment) and feasibility (estimating the likelihood of goal attainment), in this order, guides this decision. The theory assumes that whenever people start to deliberate their wishes, cognitive procedures become activated that allow for open-minded processing of available information (Fujita, Gollwitzer, & Oettingen, 2007), turning people toward processing information related to the desirability and feasibility of their wishes (Gollwitzer, Heckhausen, & Steller, 1990), and they allow for even-handed (impartial analysis of pros and cons) and objective (realistic analysis of likelihoods) analysis of this information (Armor & Taylor, 2003; Bayer & Gollwitzer, 2005; Gagné & Lydon, 2001a, 2001b; Gollwitzer & Kinney, 1989; Taylor & Gollwitzer, 1995).

Mindset theory assumes that the transition from the predecisional phase to the preaction phase takes the form of a resolution that leads to a determination to act. Through this resolution the desired end state, specified by the wish and explicated by deliberation of positive and negative consequences of wish fulfillment, becomes a goal that the individual feels committed to achieve. According to mindset theory, the desirability and feasibility of a wish needs to be fully and completely deliberated before one can move from indecisiveness to decisiveness. As a consequence, when people feel that they have deliberated enough, they should be able to justify to themselves that they can now make such a move (i.e., "cross the Rubicon"). To test this hypothesis, Gollwitzer, Heckhausen, and Ratajczak (1989) had as-yet-undecided people intensively deliberate the possible pros and cons of an unresolved personal problem. Even though immediately thereafter these participants were still observed to be very undecided; when these participants were contacted again after 1 week had passed, their readiness to make a decision had significantly increased.

But what if ***incentives are activated outside of awareness***? Can this also promote the selection of goals? Recent research by Aarts and colleagues (for a

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review, see Veltkamp, Aarts, & Custers, 2009) suggests that this should be the case. In their research, they studied nonconscious goal activation rather than conscious goal selection and observed that both the goal of high performance (exertion) and the incentive attached to that goal could be manipulated nonconsciously. Importantly, participants subliminally primed with the goal of exertion outperformed a control group in a hand-grip squeezing task, but those primed simultaneously with both the exertion goal and positive stimuli performed the best of all (Aarts, Custers, & Marien, 2008). Moreover, experimental work by Custers and Aarts (2005, 2007) observed that conditioning a positive affective response to the name of a particular goal increases the chances the individual will pursue that goal when primed outside of awareness. All of these studies provide support for the assumption that the nonconscious activation of a goal is not only facilitated when a person is high on the respective chronic motive (as reported above); goal priming also receives a boost when the goal is linked to positive incentives, even if the individual is not aware of these links.

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THE ROLE OF MOTIVES AND INCENTIVES DURING GOAL STRIVING

So far we have analyzed the role of motives and incentives with respect to selecting goals. But what is the role of motives and incentives when it comes to striving successfully for chosen goals? As the strength of a person's motive should affect the commitment to a respective goal, strong motives can be assumed to facilitate goal attainment via strengthening respective goal commitments. The same can be assumed for powerful as compared to weak incentives. Again, the former should help to come up with strong goal commitments, which in turn facilitate goal attainment. A more interesting question pertains to the impact of deliberation of a goal's desirability after one has chosen a goal. Will such renewed deliberation enhance or hinder goal striving?

Deliberation of Desirability for Chosen as Compared to Nonchosen Goals

Deliberation of desirability has in the past been conceptually attached to the predecision action phase (for a review, see Gollwitzer & Bayer, 1999; Gollwitzer, 2011). However, from a pragmatic point of view people can also be asked to deliberate on a goal's desirability once a goal decision has been made. What are the consequences of engaging in pre- versus postdecisional deliberation? Recent research has addressed this issue by asking whether predecisional versus postdecisional deliberation differentially affects people's commitment to the goal at hand (Nenkov & Gollwitzer, 2010).

As reported above, past research has provided some insights into the effects of predecisional deliberation on goal commitment. Gollwitzer, Heckhausen, and Ratajczak (1990) found that asking undecided participants to deliberate on potential change goals (e.g., to switch one's major) has the immediate effect of making participants even more hesitant to commit to making the change decision in

question. These findings suggest that deliberation might lower goal commitment for people who are still in the predecisional phase, that is, who have not yet decided to strive for the goal at hand.

Note that in this Gollwitzer et al. (1990) study, the assigned deliberation matched the predecisional action phase in which participants were still located. Gagné and Lydon (2001a), on the other hand, looked into the effects of a mismatching deliberation on goal commitment (i.e., postdecisional individuals were asked to engage in deliberation). Their results revealed that asking people to deliberate on goals related to a relationship that they were already committed to made them bolster their relationship illusions. Gagné and Lydon explained this finding by suggesting that the doubt and uncertainty associated with deliberation may pose a threat to individuals who are already committed to a relationship, which prompts them to defend against such threat by exaggerating their partner's superiority and bolstering their positive illusions. Because relationship illusions are indicative of increased commitment to the relationship (Gagné & Lydon, 2001b), these findings suggest that postdecisional deliberation may have a strengthening effect on goal commitment.

Nenkov and Gollwitzer (2010) therefore proposed that a person's being pre- or postdecisional with respect to a given goal might be a potential moderator of the deliberation–goal commitment relationship. Deliberating on the pros and cons of pursuing or not pursuing a goal should lower goal commitment when people are still predecisional (i.e., are undecided about pursuing the goal) but strengthen goal commitment when people have already decided to pursue the goal. This hypothesis is also in line with the mindset theory of action phases (Gollwitzer, 1990, 2011), as predecisional individuals can be assumed to show a predilection for a deliberative mindset characterized by open-mindedness and impartiality, whereas postdecisional individuals should be characterized by a predilection for an implemental mindset characterized by closed-mindedness and partiality. Accordingly, predecisional people should become even more open-minded and impartial and thus more hesitant to commit to the goal in question, whereas postdecisional people should become even more closed-minded and partial in favor of the goal at hand and thus very determined to reach the goal. Current conceptions of goal commitment define this concept as the extent to which personal goals are associated with a strong sense of determination, with the willingness to invest effort, and with impatient striving for goal implementation (Hollenbeck, Willias, & Klein, 1989; Kruglanski et al., 2002; Oettingen, Pak, & Schnetter, 2001). Using different measures of goal commitment, Nenkov and Gollwitzer (2010) observed that postdecisional deliberation that was requested by the experimenter led to an increase in goal commitment, whereas predecisional deliberation produced a decrease.

Deliberation of Desirability: Effects on Plan Formation and Plan Enactment

Gollwitzer (1999) has argued that people can enhance goal attainment by furnishing their goals with implementation intentions. In implementation intentions,

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people plan the when, where, and how of striving for a goal in an "If I encounter situation Y, then I will perform goal-directed response Z!" format. By predeciding how to act in response to a specific situation, implementation intentions delegate the control over the initiation of goal-directed responses to critical situational cues. Implementation intentions have been observed to facilitate coping with the typical problems of goal striving, such as failing to get started, getting derailed, not calling a halt to futile striving, and overextending oneself (Gollwitzer & Sheeran, 2006). For instance, with respect to staying on track (not getting derailed), the implementation intention "If I hear or see commercials, then I will ignore them!" improved test-anxious students' performance on a math exam that they completed as televised distractions appeared in a separate window on the same computer screen (Parks-Stamm, Gollwitzer, & Oettingen, 2010).

Mediators of the implementation intention effects pertain to the if component and the then component of an implementation intention. Making if-then plans (i.e., forming implementation intentions) heightens the state of activation of the mental representation of the specified cue in the if component, which ensures easy cognitive accessibility of this cue (Aarts, Dijksterhuis, & Midden, 1999; Achtziger, Bayer, & Gollwitzer, 2010; Webb & Sheeran, 2008). Second, implementation intentions forge a strong link between the anticipated situational cue specified in the if component and the intended response in the then component (Webb & Sheeran, 2008), leading to the automation of response initiation. This automation is indicated by uncontrolled attention to the specified cues (Wieber & Sassenberg, 2006), immediate and efficient initiation of the goal-directed response (Aarts & Dijksterhuis, 2000; Brandstätter, Lengfelder, & Gollwitzer, 2001, Studies 3 and 4; Gollwitzer & Brandstätter, 1997, Study 3), and the redundancy of conscious intent at the moment of response initiation (Bayer, Achtziger, Gollwitzer, & Moskowitz, 2009).

Recent research raised the question of whether reflecting on the positive consequences of the respective superordinate goal might help or undermine the formation and enactment of implementation intentions (Wieber, Gollwitzer, Gawrilow, & Oettingen, 2011; Wieber, Gollwitzer, & Sezer, 2011). With respect to implementation intention formation, the authors argue that when forming implementation intentions, people have to select situations that qualify as critical cues for action and instrumental goal-directed responses, which they then link together by a conscious act of will in an if-then format. Consciously forging the specific if-then plan is thus the critical act by which action control is delegated to critical situational cues. Deliberating on the positive consequences of one's goal while a respective implementation intention is formed directs attention away from encoding the if-then link, which should result in an impaired automation of action control by the implementation intention.

In line with this reasoning, research on prospective memory found that encoding prospective memory tasks suffers from resource-demanding tasks that direct attention away (Einstein, Smith, McDaniel, & Shaw, 1997; McDaniel, Robinson-Riegler, & Einstein, 1998). For example, participants were less likely to respond to selected targets (events, points in time) when they were engaged in an attention-demanding digit-monitoring task during the encoding of the prospective memory

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instructions (Einstein et al., 1997). Similarly, a reduced efficiency of encoding, as observed in participants of older age, has been shown to result in higher amounts of missed prospective memory responses (Einstein et al., 1997; Zöllig, Martin, & Kliegel, 2010).

Indeed, when Wieber, Gollwitzer, Gawrilow, and Oettingen (2011) asked participants to extend the if-then format of their implementation intentions by a why component (resulting in the deliberation of positive consequences of goal attainment), the attainment of the respective goal was reduced. This was true for the goal to reduce one's body weight in a longitudinal field study on dieting. Even though goal attainment was enhanced (as compared to a mere goal intention control group) by common if-then implementation intentions, if-then-why implementation intentions failed to do so.

In two further studies, Wieber, Gollwitzer, and Sezer (2011) analyzed whether the enactment of implementation intentions is also affected by reflecting on goal desirability. The authors argue that deliberation on the why of a goal can be expected to establish a reflective information processing mode (deliberative mindset, see above) and that such a mindset may hamper the smooth running off of automatic processes. As implementation intentions achieve their effects on automatic processes, implementation intention enactment should suffer. Evidence that deliberation can impair automated action control is provided by various lines of research, as for instance in research on the "choking under pressure" phenomenon, where decrements in performance relative to one's level of skill occur under circumstances that increase the perceived importance of good performance (Baumeister & Showers, 1986; Beilock, Bertenthal, Hoerger, & Carr, 2008; Hill, Hanton, Matthews, & Fleming, 2010; Lewis & Linder, 1997). To give an example, participants who had proceduralized their golf-putting skill under conditions of low performance pressure underperformed under high performance pressure as operationalized by videotaping them (Beilock & Carr, 2001). According to explicit monitoring theories, choking under pressure results from consciously monitoring the execution of well-learned sensorimotor skills, as it disrupts the smooth execution of skills that do not require conscious step-by-step control (Baumeister, 1984). More specifically, conscious monitoring is assumed to break down an integrated control structure into a sequence of smaller, independent units that must be activated and run separately (Masters, 1992). This process results in slowed performance and increased error rates. Further evidence that deliberation impairs the effectiveness of automatic processes is generated by research on the effects of analytic thought on decision making. Analyzing reasons for a decision was found to reduce postdecision satisfaction (Dijksterhuis & van Olden, 2006), consistency with one's attitudes (Wilson, Dunn, Bybee, Hyman, & Rotondo, 1984), and accuracy assessed by using objective criteria (Dijksterhuis, Bos, Nordgren, & van Baaren, 2006; McMackin & Slovic, 2000).

Together, the findings on the disruption of automatic processes by conscious reflective thinking as derived from quite different fields of research suggest that a deliberative mindset originating from reflecting on the desirability of a potential goal should disrupt automatic action control by implementation intentions. Wieber,

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Gollwitzer, and Sezer (2011) found support for this hypothesis in two studies that first created a deliberative mindset by reflecting on the desirability of a potential goal and then had participants strive for assigned task goals that were either furnished with implementation intentions or not (i.e., holding a handgrip closed as long as possible in one of the studies; performing a go/no-go task as quickly and accurately as possible in the other study). The authors observed that the created deliberative mindset completely abolished the commonly observed beneficial effects of implementation intentions on goal attainment. In other words, deliberative mindsets created by desirability reflections seem to disrupt the strategic automation of action control by implementation intentions.

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Striving for a Goal in the Presence of Positive and Negative Incentives

Assuming that the presence of positive and negative incentives affects a person's mood, research on the effects of affective states on goal striving are relevant to the understanding of how the presence of incentives affects ongoing goal striving. For instance, Tice, Bratislavsky, and Baumeister (2001) focused on negative affect and observed that feeling emotionally distraught (i.e., having been asked to imagine that one has caused a traffic accident that killed a child) makes it difficult to follow through with goals of not eating unhealthy food or delaying gratification to attain better long-term rewards. Moreover, this emotionally negative state also intensifies procrastination: for example, people did not use the time provided to study for an upcoming test. In all of these studies, it appeared that the reason people did not act on their goals was simple; they felt that inaction would alleviate their negative emotional states.

Positive affect, on the other hand, has been observed to facilitate goal striving. In early childhood (2 to 4 years of age), positive emotionality in children's interactions with their mothers facilitates the difficult self-regulation required for tasks such as slowing down, lowering one's voice, or delaying the unwrapping of a received gift. Research with adults has focused on how positive affect achieves this beneficial effect on task goal attainment. Kazen and Kuhl (2005; Kuhl & Kazen, 1999) argue that even though decreases in positive affect make it easier to maintain a goal intention in working memory, it takes an increase in positive affect to facilitate the successful behavioral implementation of difficult intentions (e.g., to do well on the Stroop task). Gable and Harmon-Jones (2008) observed that positive affect induced by imagining rewards (such as tasty desserts) reduced the breadth of the focus of attention, which facilitates emphasizing specific action tendencies and thus tenacious goal striving.

But positive affect may promote goal striving not only via certain cognitive processes, but it may also do so by causing changes in motivation. At least this is suggested by energization theory (Brehm & Self, 1989; Wright, 1996), which argues that people show a heightened willingness to exert reactive effort in the face of difficulties when the incentive value of task completion is high. Empirical tests of the theory have varied incentive value by offering high or low rewards for task completion, making high rewards more or less likely, or by describing

the task as diagnostic of an important scholastic skill or not (Gendolla & Richter, 2006). Effort mobilization is usually assessed by cardiovascular responses (i.e., heart rate and systolic blood pressure). In general, the presence of high incentives was found to make people exert additional effort to meet the goal at hand, even when task difficulty moved from medium to high. According to the theory, high incentives raise the level of potential motivation, so the amount of effort a person is willing to exert is expanded. Energization theory has been used to understand the differences between men and women in effort on gender-typed tasks and to explore the effects of private versus public performance conditions on effort (Wright, Murray, Storey, & Williams, 1997; Wright, Tunstall, Williams, Goodwin, & Harmon-Jones, 1995). The important message of these findings is that people can facilitate energization in the face of difficulties by adding incentives to task performance.

Given that positive affect was found to foster performance on some tasks (e.g., the Stroop) does not imply that positive affect is beneficial to goal striving in all kinds of tasks. Complex and ill-defined tasks require that people anticipate potential obstacles and hindrances. This is easier when people experience negative affect. Not surprisingly then, for complex and ill-defined tasks, positive affect was found to be a hindrance rather than a facilitator of using strategies to set and attain the goal (Kappes, Oettingen, Mayer, & Maglio, 2011) and actual goal attainment (Markman, Lindberg, Kray, & Galinsky, 2007; Oettingen & Mayer, 2002; Taylor, Pham, Rivkin, & Armor, 1998). And people are found to prefer to be in negative emotional states if those states better facilitate goal striving: soldiers entering battle or football players during a game prefer an angry, aggressive (negative) mood rather than a relaxed, positive mood (Tamir, 2009).

Finally, the most striking demonstration that the presence of positive and negative incentives matters when it comes to successful goal striving comes from research where incentives are presented subliminally while the research participant works on an assigned task goal. The task goals studied relate to performing well on various executive function tasks (e.g., the Stroop, the stop signal task, the arrow flanker task, or exerted effort). As it turned out in various recent studies, subliminally presented incentives (e.g., coins) managed to affect performance on these tasks (Pessiglione et al., 2007; Schmidt, Palmintieri, Lafaruge, & Pessiglione, 2010). It seems safe to assume that executive functions (such as response inhibition, task switching, focusing attention, conflict resolution, effort expenditure) are crucial for the success of our daily goal strivings, and it will be an important objective for future research to learn which of these functions are positively affected by subliminally presented incentives and which are hampered (e.g., Bijleveld, Custers, & Aarts, 2010), and analogously, which of them benefit from incentives that are presented supraliminally (i.e., can be consciously processed) and which are handicapped.

CONCLUSIONS

This chapter explicates the concepts of needs (motives), incentives, and goals by turning to the history of the psychology of motivation. It then analyzes whether

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needs qualify as determinants of goal choice. It is observed that various lines of research attest to a guiding function of needs when it comes to the selection of goals; needs are thought to determine the type (content) of goals that are selected. Most interestingly, needs may even affect the activation of goals outside of awareness in the sense that need-congruent goal activation is more stable (i.e., the heightened activation level is more stable over time). Similarly, incentives defined as the anticipated consequences of goal attainment are also assumed to have a guiding function in goal selection. However, recent research shows that the way in which incentives are thought about makes a crucial difference; this not only applies to the comprehensiveness of a person's thinking about incentives, it also pertains to the mode of thought by which incentives are addressed (e.g., indulging vs. mental contrasting). Again, recent research shows that subliminally presented incentives also manage to affect goal choice.

Finally, we suggest that needs and incentives play an important role when it comes to implementing chosen goals, simply because strong needs and powerful incentives lead to strong commitments to the chosen goal. Most interestingly, recent research has also analyzed how goal implementation is affected by the presence of positive and negative incentives when actual goal striving is taking place. It is still an open question what kind of (task) goals benefit from the presence of positive or negative incentives, and whether this depends on the person's awareness or unawareness of their presence.

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REFERENCES

Aarts, H., Custers, R., & Marien, H. (2008). Preparing and motivating behavior outside of awareness. *Science, 319*, 1639.

Aarts, H., & Dijksterhuis, A. (2000). Habits as knowledge structures: Automaticity in goal-directed behavior. *Journal of Personality and Social Psychology, 78*, 53–63.

Aarts, H., Dijksterhuis, A., & De Vries, P. (2001). On the psychology of drinking: Being thirsty and perceptually ready. *British Journal of Psychology, 92*, 631–642.

Aarts, H., Dijksterhuis, A. P., & Midden, C. (1999). To plan or not to plan? Goal achievement or interrupting the performance of mundane behaviors. *European Journal of Social Psychology, 29*, 971–979.

Abramson, L. Y., Seligman, M. E. P., & Teasdale, J. D. (1978). Learned helplessness in humans: Critique and reformulation. *Journal of Abnormal Psychology, 87*, 49–74.

Achtziger, A., Bayer, U. C., & Gollwitzer, P. M. (2010). *Committing to implementation intentions: Attention and memory effects for selected situational cues.* Manuscript submitted for publication.

Achtziger, A., Fehr, T., Oettingen, G., Gollwitzer, P. M., & Rockstroh, B. (2009). Strategies of intention formation are reflected in continuous MEG activity. *Social Neuroscience, 4*, 11–27.

Ajzen, I., & Fishbein, M. (1969). The prediction of behavioral intentions in a choice situation. *Journal of Experimental Social Psychology, 5*, 400–416.

Ajzen, I., & Fishbein, M. (1980). *Understanding attitudes and predicting social behavior.* Englewood Cliffs, NJ: Prentice-Hall.

Amabile, T. M., Hill, K. G., Hennessey, B. A., & Tighe, E. M. (1994). The work preference inventory: Assessing intrinsic and extrinsic motivational orientations. *Journal of Personality and Social Psychology, 66*, 950–967.

Anderson, R., Manoogian, S. T., & Reznick, J. S. (1976). The undermining and enhancing of intrinsic motivation in preschool children. *Journal of Personality and Social Psychology, 34*, 915–922.

Armor, D. A., & Taylor, S. E. (2003). The effects of mindset on behavior: Self-regulation in deliberative and implemental frames of mind. *Personality and Social Psychology Bulletin, 29*, 86–95.

Atkinson, J. W. (1957). Motivational determinants of risk-taking behavior. *Psychological Review, 64*, 359–372.

Atkinson, J. W. (1958). Towards experimental analysis of human motivation in terms of motives, expectancies and incentives. In J. W. Atkinson (Ed.), *Motives in fantasy, action, and society* (pp. 288–305). Princeton, NJ: Van Nostrand.

Atkinson, J. W. (1964). *An introduction to motivation*. Princeton, NJ: Van Nostrand.

Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review, 84*, 191–215.

Bandura, A. (1982). Self-efficacy mechanisms in human agency. *American Psychologist, 37*, 122–147.

Bandura, A. (1989). Human agency in social cognitive theory. *American Psychologist, 44*, 1175–1184.

Bargh, J. A. (1990). Auto-motives: Preconscious determinants of social interaction. In E. T. Higgins & R. M. Sorrentino (Eds.), *Handbook of motivation and cognition* (Vol. 2, pp. 93–130). New York: Guilford.

Bargh, J. A. (2005). Bypassing the will: Toward demystifying the nonconscious control of social behavior. In R. R. Hassin, J. S. Uleman, & J. A. Bargh (Eds.), *The new unconscious*. (pp. 37–58). New York: Oxford University Press.

Bargh, J. A., & Ferguson, M. J. (2000). Beyond behaviorism: The automaticity of higher mental processes. *Psychological Bulletin, 126*, 925–945.

Bargh, J. A., & Gollwitzer, P. M. (1994). Environmental control of goal-directed behavior. In W. Spaulding (Ed.), *Nebraska symposium on motivation* (Vol. 41, pp. 71–124). Lincoln: University of Nebraska Press.

Bargh, J. A., Gollwitzer, P. M., Lee-Chai, A., Barndollar, K., & Trötschel, R. (2001). The automated will: Unconscious activation and pursuit of behavioral goals. *Journal of Personality and Social Psychology, 81*, 1004–1027.

Barron, K. E., & Harackiewicz, J. M. (2001). Achievement goals and optimal motivation: Testing multiple goal models. *Journal of Personality and Social Psychology, 80*, 706–722.

Baumann, N., Kaschel, R., & Kuhl, J. (2005). Striving for unwanted goals: Stress-dependent discrepancies between explicit and implicit achievement motives reduce subjective well-being and increase psychosomatic symptoms. *Journal of Personality and Social Psychology, 89*, 781–799.

Baumeister, R. F. (1984). Choking under pressure: Self-consciousness and paradoxical effects of incentives on skillful performance. *Journal of Personality and Social Psychology, 46*, 610–620.

Baumeister, R. F., & Showers, C. J. (1986). A review of paradoxical performance effects: Choking under pressure in sports and mental tests. *European Journal of Social Psychology, 16*, 361–383.

Baumeister, R. F., Vohs, K. D., DeWall, C. N., & Zhang, L. (2007). How emotion shapes behavior: feedback, anticipation, and reflection, rather than direct causation. *Personality and Social Psychology Bulletin, 11*, 167–203.

Bayer, U. C., Achtziger, A., Gollwitzer, P. M., & Moskowitz, G. B. (2009). Responding to subliminal cues: Do if-then plans cause action preparation and initiation without conscious intent? *Social Cognition, 27*, 183–201.

Bayer, U. C., & Gollwitzer, P. M. (2005). Mindset effects on information search in self-evaluation. *European Journal of Social Psychology, 35*, 313–327.

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Beilock, S. L., Bertenthal, B. I., Hoerger, M., & Carr, T. H. (2008). When does haste make waste? Speed-accuracy tradeoff, skill level, and the tools of the trade. *Journal of Experimental Psychology: Applied, 14*, 340–352.

Beilock, S. L., & Carr, T. H. (2001). On the fragility of skilled performance: What governs choking under pressure? *Journal of Experimental Psychology: General, 130*, 701–725.

Bijleveld, E., Custers, R., & Aarts, H. (2010). Unconscious reward cues increase invested effort, but do not change speed-accuracy tradeoffs. *Cognition, 115*, 330–335.

Bindra, D. (1959). *Motivation: A systematic reinterpretation*. New York: Ronald Press.

Brandstätter, V., Lengfelder, A., & Gollwitzer, P. M. (2001). Implementation intentions and efficient action initiation. *Journal of Personality and Social Psychology, 81*, 946–960.

Brehm, J. W., & Self, E. (1989). The intensity of motivation. *Annual Review of Psychology, 40*, 109–131.

Brodish, A. B., & Devine, P. G. (2009). The role of performance-avoidance goals and worry in mediating the relationship between stereotype threat and performance. *Journal of Experimental Social Psychology, 45*, 180–185.

Brunstein, J. C. (2008). Implicit and explicit motives. In J. Heckhausen & H. Heckhausen (Eds.), *Motivation and action* (pp. 227–246). New York: Cambridge University Press.

Brunstein, J. C., & Maier, G. W. (2005). Implicit and self-attributed motives to achieve: Two separate but interacting needs. *Journal of Personality and Social Psychology*, 89, 205–222

Cacioppo, J. T., & Petty, R. E. (1982). The need for cognition. *Journal of Personality and Social Psychology, 42*, 116–131.

Cacioppo, J. T., Petty, R. E., Feinstein, J. A., & Jarvis, W. B. G. (1996). Dispositional differences in cognitive motivation: The life and times of individuals varying in need for cognition. *Psychological Bulletin, 119*, 197–253.

Cacioppo, J. T., Petty, R. E., & Kao, C. F. (1984). The efficient assessment of need for cognition. *Journal of Personality Assessment, 48*, 306–307.

Cacioppo, J. T., Petty, R. E., Kao, C. F., & Rodriguez, R. (1986). Central and peripheral routes to persuasion: An individual difference perspective. *Journal of Personality and Social Psychology, 51*, 1032–1043.

Calogero, R. M., Bardi, A., & Sutton, R. M. (2009). A need basis for values: Associations between the need for cognitive closure and value priorities. *Personality and Individual Differences, 46*, 154–159.

Cavallo, J. V., Fitzsimons, G. M., & Holmes, J. G. (2010). When self-protection overreaches: Relationship-specific threat activates domain-general avoidance motivation. *Journal of Experimental Social Psychology, 46*, 1–8.

Chartrand, T. L., & Bargh, J. A. (1996). Automatic activation of social information processing goals: Unconscious priming reproduces effects of explicit conscious instructions. *Journal of Personality and Social Psychology, 71*, 464–478.

Chartrand, T. L., & Bargh, J. A. (2002). Unconscious motivations: Their activation, operation, and consequences. In A. Tesser, D. Stapel, & J. Wood (Eds.), *Self and motivation: Emerging psychological perspectives* (pp. 13–41). Washington, DC: American Psychological Association Press.

Chen, S., Lee-Chai, A. Y., & Bargh, J. A. (2001). Relationship orientation as a moderator of the effects of social power. *Journal of Personality and Social Psychology, 80*, 173–187.

Cimpian, A., Arce, H. C., Markman, E. M., & Dweck, C. S. (2007). Subtle linguistic cues affect children's motivation. *Psychological Science, 18*, 314–316.

Cioffi, D., & Garner, R. (1996). On doing the decision: Effects of active versus passive choice on commitment and self-perception. *Personality and Social Psychology Bulletin, 22*, 133–147.

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Crowley, A. E., & Hoyer, W. D. (1989). The relationship between need for cognition and other individual difference variables: A two-dimensional framework. *Advances in Consumer Research, 16*, 37–43.

Custers, R., & Aarts, H. (2005). Positive affect as implicit motivator: On the unconscious operation of behavioral goals. *Journal of Personality and Social Psychology, 89*, 129–142.

Custers, R., & Aarts, H. (2007). In search of the unconscious sources of goal pursuit: Accessibility and positive affective valence of the goal state. *Journal of Experimental and Social Psychology, 43*, 312–318.

D'Agostino, P. R., & Fincher-Kiefer, R. (1992). Need for cognition and the correspondence bias. *Social Cognition, 10*, 151–163.

Davis, T. L., Severy, L. J., Kraus, S. J., & Whitaker, J. M. (1993). Predictors of sentencing decisions: The beliefs, personality variables, and demographic factors of juvenile justice personnel. *Journal of Applied Social Psychology, 23*, 451–477.

Day, E. A., Espejo, J., Kowollik, V., Boatman, P. R., & McEntire, L. E. (2007). Modeling the links between need for cognition and the acquisition of a complex skill. *Personality and Individual Differences, 42*, 201–212.

Deci, E. L. (1975). *Intrinsic motivation*. New York: Plenum.

Deci, E. L., Koestner, R., & Ryan, R. M. (1999). A meta-analytic review of experiments examining the effects of extrinsic rewards on intrinsic motivation. *Psychological Bulletin, 125*, 627–668.

Dijksterhuis, A., Bos, M. W., Nordgren, L. F., & van Baaren, R. B. (2006). On making the right choice: The deliberation-without-attention effect. *Science, 311*(5763), 1005–1007.

Dijksterhuis, A., Chartrand, T. L., & Aarts, H. (2007). Effects of priming and perception on social behavior and goal pursuit. In J. A. Bargh (Ed.), *Social psychology and the unconscious: The automaticity of higher mental processes* (pp. 51–132). Philadelphia: Psychology Press.

Dijksterhuis, A., & van Olden, Z. (2006). On the benefits of thinking unconsciously: Unconscious thought can increase post-choice satisfaction. *Journal of Experimental Social Psychology, 42*(5), 627–631.

Dompnier, B., Darnon, C., & Butera, F. (2009). Faking the desire to learn: A clarification of the link between mastery goals and academic achievement. *Psychological Science, 20*, 939–943.

Dreisbach, G., & Goschke, T. (2004). How positive affect modulates cognitive control: reduced perseveration at the cost of increased distractibility. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 30*, 343–353.

Duley, A. R., Conroy, D. E., Morris, K., Wiley, J., & Janelle, C. M. (2005). Fear of failure biases affective and attentional responses to lexical and pictorial stimuli. *Motivation and Emotion, 29*, 1–17.

Dweck, C. S. (1996). Implicit theories as organizers of goals and behavior. In P. M. Gollwitzer & J. A. Bargh (Eds.), *The psychology of action: Linking cognition and motivation to behavior* (pp. 69–90). New York: Guilford.

Dweck, C. S. (1999). *Self-theories: Their role in motivation, personality, and development*. New York: Psychology Press.

Dweck, C. S., & Leggett, E. L. (1988). A social-cognitive approach to personality and motivation. *Psychological Review, 95*, 256–273.

Einstein, G. O., Smith, R. E., McDaniel, M. A., & Shaw, P. (1997). Aging and prospective memory: The influence of increased task demands at encoding and retrieval. *Psychology and Aging, 12*(3), 479–488.

Elliot, A. J. (2008). *Handbook of approach and avoidance motivation*. Mahwah, NJ: Erlbaum.

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Elliot, A. J., & Church, M. A. (1997). A hierarchical model of approach and avoidance achievement motivation. *Journal of Personality and Social Psychology, 72*, 218–232.
Elliot, A. J., Gable, S. L., & Mapes, R. R. (2006). Approach and avoidance motivation in the social domain. *Personality and Social Psychology Bulletin, 32*, 378–391.
Elliot, A. J., & McGregor, H. A. (2001). A 2 × 2 achievement goal framework. *Journal of Personality and Social Psychology, 80*, 501–519.
Elliot, A. J., & Murayama, K. (2008). On the measurement of achievement goals: Critique, illustration, and application. *Journal of Educational Psychology, 100*, 613–628.
Elliot, A. J., & Sheldon, K. M. (1997). Avoidance achievement motivation: A personal goals analysis. *Journal of Personality and Social Psychology, 73*, 171–185.
Epstude, K., & Roese, N. J. (2008). The functional theory of counterfactual thinking. *Personality and Social Psychology Review, 12*, 168–192.
Ferguson, M. J., Hassin, R., & Bargh, J. A. (2008). Implicit motivation: Past, present, and future. In J. Y. Shah & W. L. Gardner (Eds.), *Handbook of motivation science* (pp. 150–166). New York: Guilford Press.
Ferrari, J. R. (1992). Procrastinators and perfect behavior: An exploratory factor analysis of self-presentation, self-awareness, and self-handicapping components. *Journal of Research in Personality, 26*, 75–84.
Festinger, L. (1942). A theoretical interpretation of shifts in level of aspiration. *Psychological Review, 49*, 235–250.
Fishbein, M., & Ajzen, I. (1975). *Belief, attitude, intention, and behavior: An introduction to theory and research.* Reading, MA: Addison-Wesley.
Fitzsimons, G. M., & Bargh, J. A. (2003). Thinking of you: Unconscious pursuit of interpersonal goals associated with relationship partners. *Journal of Personality and Social Psychology, 84*, 148–164.
Fitzsimons, G. M., & Bargh, J. A. (2004). Automatic self-regulation. In R. F. Baumeister & K. D. Vohs (Eds.), *Handbook of self-regulation: Research, theory and applications* (pp. 151–170). New York: Guilford.
Ford, T. E., & Kruglanski, A. W. (1995). Effects of epistemic motivations on the use of accessible constructs in social judgment. *Personality and Social Psychology Bulletin, 21*, 950–962.
Frijda, N. H. (1986). *The emotions*. Cambridge, U.K.: Cambridge University Press.
Fryer, J. W., & Elliot, A. J. (2007). Stability and change in achievement goals. *Journal of Educational Psychology, 99*, 700–714.
Fujita, K., Gollwitzer, P. M., & Oettingen, G. (2007). Mindsets and preconscious open-mindedness to incidental information. *Journal of Experimental Social Psychology, 43*, 48–61.
Gable, P. A., & Harmon-Jones, E. (2008). Approach-motivated positive affect reduces breadth of attention. *Psychological Science, 19*, 476–482.
Gable, S. L. (2006). Approach and avoidance social motives and goals. *Journal of Personality, 74*, 175–222.
Gagné, F. M., & Lydon, J. E. (2001a). Mind-sets and close relationships: When bias leads to (in)accurate predictions. *Journal of Personality and Social Psychology, 81*, 85–96.
Gagné, F. M., & Lydon, J. E. (2001b). Mindset and relationship illusions: The moderating effects of domain specificity and relationship commitment. *Personality and Social Psychology Bulletin, 27*, 1144–1155.
Gendolla, G. H. E., & Richter, M. (2006). Cardiovascular reactivity during performance under social observation: The moderating role of task difficulty. *International Journal of Psychophysiology, 62*, 185–192.
Gollwitzer, P. M. (1990). Action phases and mind-sets. In E. T. Higgins & R. M. Sorrentino (Eds.), *Handbook of motivation and cognition: Foundations of social behavior* (Vol. 2, pp. 53–92). New York: Guilford.

Downloaded by [Karen Hudson] at 03:29 22 March 2015

Gollwitzer, P. M. (1999). Implementation intentions: Strong effects of simple plans. *American Psychologist*, *54*, 493–503.

Gollwitzer, P. M. (2011). Mindset theory of action phases. In P. Van Lange, A. W. Kruglanski, & E. T. Higgins (Eds.), *Handbook of theories of social psychology* (pp. 526–545). London: Sage.

Gollwitzer, P. M., & Bayer, U. C. (1999). Deliberative versus implemental mindsets in the control of action. In S. Chaiken & Y. Trope (Eds.), *Dual-process theories in social psychology* (pp. 403–422). New York: Guilford.

Gollwitzer, P. M., & Brandstätter, V. (1997). Implementation intentions and effective goal pursuit. *Journal of Personality and Social Psychology, 73*, 186–199.

Gollwitzer, P. M., Heckhausen, H., & Ratajczak, H. (1990). From weighing to willing: Approaching a change decision through pre- or postdecisional mentation. *Organizational Behavior and Human Decision Processes, 45*, 41–65.

Gollwitzer, P. M., Heckhausen, H., & Steller, B. (1990). Deliberative and implemental mind-sets: Cognitive tuning toward congruous thoughts and information. *Journal of Personality and Social Psychology, 59*, 1119–1127.

Gollwitzer, P. M., & Kinney, R. F. (1989). Effects of deliberative and implemental mind-sets on illusion of control. *Journal of Personality and Social Psychology, 56*, 531–542.

Gollwitzer, P. M., & Sheeran, P. (2006). Implementation intentions and goal achievement: A meta-analysis of effects and processes. *Advances in Experimental Social Psychology, 38*, 69–119.

Harackiewicz, J. M., Barron, K. E., Tauer, J. M., Carter, S. M., & Elliot, A. J. (2000). Short-term and long-term consequences of achievement goals: Predicting interest and performance over time. *Journal of Educational Psychology, 92*, 316–330.

Heckhausen, H. (1977). Achievement motivation and its constructs: A cognitive model. *Motivation and Emotion, 1*, 283–329.

Heckhausen, H. (1991). *Motivation and action.* New York: Springer.

Heckhausen, H., & Gollwitzer, P. M. (1987). Thought contents and cognitive functioning in motivational versus volitional states of mind. *Motivation and Emotion, 11*, 101–120.

Hill, D. M., Hanton, S., Matthews, N., & Fleming, S. (2010). A qualitative exploration of choking in elite golf. *Journal of Clinical Sport Psychology, 4*, 221–240.

Holland, R. W., Hendriks, M., & Aarts, H. (2005). Smells like clean spirit: Unconscious effects of scent on cognition and behavior. *Psychological Science, 16*, 689–693.

Hollenbeck, J. R., Willias, C. R., & Klein, H. J. (1989). An empirical examination of the antecedents of commitment to difficult goals. *Journal of Applied Psychology, 74*, 18–23.

Hong, Y., Chiu, C., Dweck, C. S., Lin, D. M., & Wan, W. (1999). Implicit theories, attributions, and coping: A meaning system approach. *Journal of Personality and Social Psychology, 77*, 588–599.

Horst, S. J., Finney, S. J., & Barron, K. E. (2007). Moving beyond academic achievement goal measures: A study of social achievement goals. *Contemporary Educational Psychology, 32*, 667–698.

Hull, C. L. (1943). The problem of intervening variables in molar behavior theory. *Psychological Review, 50*, 273–291.

Hull, C. L. (1952). *A behavior system.* New Haven, CT: Yale University Press.

Impett, E. A., Gable, S. L., & Peplau, L. A. (2005). Giving up and giving in: The costs and benefits of daily sacrifice in intimate relationships. *Journal of Personality and Social Psychology, 89*, 327–344.

Job, V., Langens, T. A., & Brandstätter, V. (2009). Effects of achievement goal striving on well-being: The moderating role of the explicit achievement motive. *Personality and Social Psychology Bulletin, 35*, 983–996.

Job, V., Oertig, D., Allemand, M., & Brandstätter, V. (2010). Motive-discrepancies as antecedents of unhealthy eating behavior. *Journal of Personality, 78*, 1209–1238.

Downloaded by [Karen Hudson] at 03:29 22 March 2015

Kamins, M. L., & Dweck, C. S. (1999). Person versus process praise and criticism: Implications for contingent self-worth and coping. *Developmental Psychology, 35*, 835–847.

Kappes, A., & Oettingen, G. (2011). *The emergence of goal commitment: Mental contrasting connects future and reality*. Manuscript submitted for publication.

Kappes, H. B., Oettingen, G., Mayer, D., & Maglio, S. (2011). Sad mood promotes self-initiated mental contrasting of future and reality. *Emotion*. Advance online publication. doi:10.1037/a0023983

Kawada, C. L. K., Oettingen, G., Gollwitzer, P. M., & Bargh, J. A. (2004). The projection of implicit and explicit goals. *Journal of Personality and Social Psychology, 86*, 545–559.

Kay, A. C., Wheeler, S. C., Bargh, J. A., & Ross, L. (2004). Material priming: The influence of mundane physical objects on situational construal and competitive behavioral choice. *Organizational Behavior and Human Decision Processes, 95*, 83–96.

Kazen, M., & Kuhl, J. (2005). Intention memory and achievement motivation: Volitional facilitation and inhibition as a function of affective contents of need related stimuli. *Journal of Personality and Social Psychology, 89*, 426–448.

Kenrick, D. T., Griskevicius, V., Neuberg, S. L., & Schaller, M. (2010). Renovating the pyramid of needs: Contemporary extensions built upon ancient foundations. *Perspectives on Psychological Science*, 5, 292–314.

Kruglanski, A. W. (1996). Goals as knowledge structures. In P. M. Gollwitzer & J. A. Bargh (Eds.), *The psychology of action* (pp. 599–618). New York: Guilford.

Kruglanski, A. W., Shah, J. Y., Fishbach, A., Friedman, R., Chun, W. Y., & Sleeth-Keppler, D. (2002). A theory of goal systems. In M. P. Zanna (Ed.), *Advances in experimental social psychology* (pp. 331–378). San Diego, CA: Academic Press.

Kruglanski, A. W., & Webster, D. M. (1996). Motivated closing of the mind: "Seizing" and "freezing." *Psychological Review, 103*, 263–283.

Kruglanski, A. W., Webster, D. M., & Klem, A. (1993). Motivated resistance and openness to persuasion in the presence or absence of prior information. *Journal of Personality and Social Psychology, 65*, 861–876.

Kuhl, J., & Kazén, M. (1999). Volitional facilitation of difficult intentions: Joint activation of intention memory and positive affect removes Stroop interference. *Journal of Experimental Psychology: General, 128*, 382–399.

Lewin, K., Dembo, T., Festinger, L., & Sears, P. S. (1944). Level of aspiration. In J. McV. Hunt (Ed.), *Personality and the behaviour disorders* (Vol. 1, pp. 333–378). New York: Ronald Press.

Lewis, B. P., & Linder, D. E. (1997). Thinking about choking? Attentional processes and paradoxical performance. *Personality and Social Psychology Bulletin, 23*, 937–944.

Liberman, N., & Trope, Y. (1998). The role of feasibility and desirability considerations in near and distant future decisions: A test of temporal construal theory. *Journal of Personality and Social Psychology, 75*, 5–18.

Markman, K. D., Lindberg, M. J., Kray, L. J., & Galinsky, A. D. (2007). Implications of counterfactual structure for creativity and analytical problem solving. *Personality and Social Psychology Bulletin, 33*, 312–324.

Maslow, A. H. (1943). A theory of human motivation. *Psychological Review, 50*, 370–396.

Masters, R. S. W. (1992). Knowledge, knerves and know-how: The role of explicit versus implicit knowledge in the breakdown. *British Journal of Psychology, 83*, 343.

McClelland, D. C. (1985a). *Human motivation*. Glenview, IL: Scott, Foresman.

McClelland, D. C. (1985b). How motives, skills, and values determine what people do. *American Psychologist, 41*, 812–825.

McClelland, D. C., Atkinson, J. W., & Clark, R. A. (1949). The projective expression of needs: III. The effect of ego-involvement, success, and failure on perception. *Journal of Psychology: Interdisciplinary and Applied, 27*, 311–330.

Downloaded by [Karen Hudson] at 03:29 22 March 2015

McClelland, D. C., & Boyatzis, R. E. (1982). Leadership motive pattern and long-term success in management. *Journal of Applied Psychology, 67*, 737–743.

McClelland, D. C., Koestner, R., & Weinberger, J. (1989). How do self-attributed and implicit motives differ? *Psychological Review, 96*, 690–702.

McCrea, S. M. (2008). Self-handicapping, excuse-making, and counterfactual thinking: Consequences for self-esteem and future motivation. *Journal of Personality and Social Psychology, 95*, 274–292.

McCulloch, K. D., Ferguson, M. J., Kawada, C., & Bargh, J. A. (2008). Taking a closer look: On the operation of unconscious impression formation. *Journal of Experimental Social Psychology, 44*, 614–623.

McDaniel, M. A., Robinson-Riegler, B., & Einstein, G. O. (1998). Prospective remembering: Perceptually driven or conceptually driven processes? *Memory and Cognition, 26*(1), 121–134.

McMackin, J., & Slovic, P. (2000). When does explicit justification impair decision making? *Applied Cognitive Psychology, 14*(6), 527–541.

Mischel, W. (1973). Toward a cognitive social learning reconceptualization of personality. *Psychological Review, 80*, 252–283.

Molden, D. C., & Dweck, C. S. (2006). Finding "meaning" in psychology: A lay theories approach to self-regulation, social perception, and social development. *American Psychologist, 61*, 192–203.

Mueller, C. M., & Dweck, C. S. (1998). Praise for intelligence can undermine children's motivation and performance. *Journal of Personality and Social Psychology, 75*, 33–52.

Nenkov, G. Y., & Gollwitzer, P. M. (2010). *Pre- versus postdecisional deliberation of goal choices: Differential effects on commitment*. Manuscript submitted for publication.

Oettingen, G. (2000). Expectancy effects on behavior depend on self-regulatory thought. *Social Cognition, 18*, 101–129.

Oettingen, G., & Gollwitzer, P. M. (2001). Goal setting and goal striving. In A. Tesser & N. Schwarz (Eds.), *Intraindividual processes. Blackwell handbook in social psychology.* Editors-in-chief M. Hewstone & M. Brewer (Vol. 1, pp. 329–347). Oxford: Blackwell.

Oettingen, G., Hönig, G., & Gollwitzer, P. M. (2000). Effective self-regulation of goal attainment. *International Journal of Educational Research, 33*, 705–732.

Oettingen, G., & Mayer, D. (2002). The motivating function of thinking about the future: Expectations versus fantasies. *Journal of Personality and Social Psychology, 83*, 1198–1212.

Oettingen, G., Mayer, D., Sevincer, A. T., Stephens, E. J., Pak, H., & Hagenah, M. (2009). Mental contrasting and goal commitment: The mediating role of energization. *Personality and Social Psychology Bulletin, 35*, 608–622.

Oettingen, G., Mayer, D., Thorpe, J. S., Janetzke, H., & Lorenz, S. (2005). Turning fantasies about positive and negative futures into self-improvement goals. *Motivation and Emotion, 29*, 237–267.

Oettingen, G., Pak, H., & Schnetter, K. (2001). Self-regulation of goal-setting: Turning free fantasies about the future into binding goals. *Journal of Personality and Social Psychology, 80*, 736–753.

Oettingen, G., & Stephens, E. J. (2009). Fantasies and motivationally intelligent goal setting. In G. B. Moskowitz & H. Grant (Eds.), *The psychology of goals* (pp. 153–178). New York: Guilford.

Oettingen, G., Stephens, E. J., Mayer, D., & Brinkmann, B. (2010). Mental contrasting and the self-regulation of helping relations. *Social Cognition, 28*, 490–509.

Oettingen, G., & Wadden, T. A. (1991). Expectation, fantasy, and weight loss: Is the impact of positive thinking always positive? *Cognitive Therapy and Research, 15*, 167–175.

Olson, K. R., Camp, C. J., & Fuller, D. (1984). Curiosity and need for cognition. *Psychological Reports, 54*, 71–74.

Downloaded by [Karen Hudson] at 03:29 22 March 2015

Otis, N., & Pelletier, L. G. (2008). Women's regulation styles for eating behaviors and outcomes: The mediating role of approach and avoidance food planning. *Motivation and Emotion, 32*, 55–67.

Parks-Stamm, E. J., Gollwitzer, P. M., & Oettingen, G. (2010). Implementation intentions and test anxiety: Shielding academic performance from distraction. *Learning and Individual Differences, 20*, 30–33.

Pekrun, R., Elliot, A. J., & Maier, M. A. (2009). Achievement goals and achievement emotions: Testing a model of their joint relations with academic performance. *Journal of Educational Psychology, 101*, 115–135.

Pessiglione, M., Schmidt, L., Draganski, B., Kalisch, R., Lau, H., Dolan, R. J., & Frith, C. D. (2007). How the brain translates money into force: A neuroimaging study of subliminal motivation. *Science, 316*, 904–906.

Petty, R. E., DeMarree, K. G., Briñol, P., Horcajo, J., & Strathman, A. J. (2008). Need for cognition can magnify or attenuate priming effects in social judgment. *Personality and Social Psychology Bulletin, 34*, 900–912.

Petty, R. E., & Jarvis, W. B. G. (1996). An individual differences perspective on assessing cognitive processes. In N. Schwarz & S. Sudman (Eds.), *Answering questions: Methodology for determining cognitive and communicative processes in survey research.* (pp. 221–257). San Francisco: Jossey-Bass.

Poortvliet, P. M., Janssen, O., Van Yperen, N. W., & Van de Vliert, E. (2007). Achievement goals and interpersonal behavior: How mastery and performance goals shape information exchange. *Personality and Social Psychology Bulletin, 33*, 1435–1447.

Reeve, J. (2008). *Understanding motivation and emotion*. Hoboken, NJ: Wiley.

Russell, J. A. (2003). Core affect and the psychological construction of emotion. *Psychological Review, 110*, 145–172.

Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist, 55*, 68–78.

Ryan, R. M., & Grolnick, W. S. (1986). Origins and pawns in the classroom: Self-report and projective assessments of individual differences in children's perceptions. *Journal of Personality and Social Psychology, 50*, 550–558.

Ryan, R. M., Sheldon, K. M., Kasser, T., & Deci, E. L. (1996). All goals are not created equal: An organismic perspective on the nature of goals and their regulation. In P. M. Gollwitzer & J. A. Bargh (Eds.), *The psychology of action: Linking cognition and motivation to behavior* (pp. 7–26). New York: Guilford.

Scheier, M. F., & Carver, C. S. (1987). Dispositional optimism and physical well-being: The influence of generalized outcome expectancies. *Journal of Personality, 55*, 169–210.

Schmidt, L., Palmintieri, S., Lafaruge, G., & Pessiglione, M. (2010). Splitting motivation: Unilateral effects of subliminal incentives. *Psychological Science*, *316*, 1–7.

Schultheiss, O. C. (2007). A biobehavioral model of implicit power motivation arousal, reward, and frustration. In E. Harmon-Jones & P. Winkielman (Eds.), *Social neuroscience: Integrating biological and psychological explanations of social behavior* (pp. 176–196). New York: Guilford.

Schultheiss, O. C., Campbell, K. L., & McClelland, D. C. (1999). Implicit power motivation moderates men's testosterone responses to imagined and real dominance success. *Hormones and Behavior, 36*, 234–241.

Schultheiss, O. C., Dargel, A., & Rohde, W. (2003). Implicit motives and gonadal steroid hormones: Effects of menstrual cycle phase, oral contraceptive use, and relationship status. *Hormones and Behavior, 43*, 293–301.

Schultheiss, O. C., & Hale, J. A. (2007). Implicit motives modulate attentional orienting to facial expressions of emotion. *Motivation and Emotion, 31*, 13–24.

Downloaded by [Karen Hudson] at 03:29 22 March 2015

Schultheiss, O. C., & Pang, J. S. (2007). Measuring implicit motives. In R. W. Robins, R. C. Fraley, & R. Krueger (Eds.), *Handbook of research methods in personality psychology* (pp. 322–344). New York: Guilford.

Schultheiss, O. C., Pang, J. S., Torges, C. M., Wirth, M. M., & Treynor, W. (2005). Perceived facial expressions of emotion as motivational incentives: Evidence from a differential implicit learning paradigm. *Emotion, 5*, 41–54.

Schultheiss, O. C., & Rohde, W. (2002). Implicit power motivation predicts men's testosterone changes and implicit learning in a contest situation. *Hormones and Behavior, 41*, 195–202.

Schultheiss, O. C., & Wirth, M. M. (2008). Biopsychological aspects of motivation. In J. Heckhausen & H. Heckhausen (Eds.), *Motivation and action* (3rd ed., pp. 247–271). New York: Cambridge University Press.

Schultheiss, O. C., Wirth, M. M., & Stanton, S. J. (2004). Effects of affiliation and power motivation arousal on salivary progesterone and testosterone. *Hormones and Behavior, 46*, 592–599.

Schultheiss, O. C., Yankova, D., Dirilikvo, B., & Schad, D. J. (2009). Are implicit and explicit motive measures statistically independent? A fair and balanced test using the picture story exercise and a cue- and response-matched questionnaire measure. *Journal of Personality Assessment, 91*, 72–81.

Senko, C., & Harackiewicz, J. M. (2002). Performance goals: The moderating roles of context and achievement orientation. *Journal of Experimental Social Psychology, 38*, 603–610.

Senko, C., & Harackiewicz, J. M. (2005). Regulation of achievement goals: The role of competence feedback. *Journal of Educational Psychology, 97*, 320–336.

Senko, C., & Miles, K. M. (2008). Pursuing their own learning agenda: How mastery-oriented students jeopardize their class performance. *Contemporary Educational Psychology, 33*, 561–583.

Shah, J. (2003). Automatic for the people: How representations of significant others implicitly affect goal pursuit. *Journal of Personality and Social Psychology, 84*, 661–681.

Skinner, B. F. (1953). *Science and human behavior*. New York: Macmillan.

Spence, K. W. (1956). *Behavior theory and conditioning*. New Haven, CT: Yale University Press.

Stanton, S. J., & Schultheiss, O. C. (2009). The hormonal correlates of implicit power motivation. *Journal of Research in Personality, 43*, 942–949.

Sullivan, H. W., Worth, K. A., Baldwin, A. S., & Rothman, A. J. (2006). The effect of approach and avoidance referents on academic outcomes: A test of competing predictions. [Special issue: Approach/Avoidance] *Motivation and Emotion, 30*, 157–164.

Tamir, M. (2009). What do people want to feel and why? Pleasure and utility in emotion regulation. *Current Directions in Psychological Science, 18*, 101–105.

Taylor, S. E., & Gollwitzer, P. M. (1995). Effects of mindset on positive illusions. *Journal of Personality and Social Psychology, 69*, 213–226.

Taylor, S. E., Pham, L. B., Rivkin, I. D., & Armor, D. A. (1998). Harnessing the imagination: Mental simulation, self-regulation, and coping. *American Psychologist, 53*, 429–439.

Thomassen, T. O., & Halvari, H. (2007). A hierarchical model of approach achievement motivation and effort regulation during a 90-min. soccer match. *Perceptual and Motor Skills, 105*, 609–635.

Thompson, E. P., Roman, R. J., Moskowitz, G. B., Chaiken, S., & Bargh, J. A. (1994). Accuracy motivation attenuates covert priming: The systematic processing of social information. *Journal of Personality and Social Psychology, 66*, 474–489.

Downloaded by [Karen Hudson] at 03:29 22 March 2015

Thrash, T. M., Elliot, A. J., & Schultheiss, O. C. (2007). Methodological and dispositional predictors of congruence between implicit and explicit need for achievement. *Personality and Social Psychology Bulletin, 33*, 961–974.

Tice, D. M., Bratslavsky, E., & Baumeister, R. F. (2001). Emotional distress regulation takes precedence over impulse control: If you feel bad, do it! *Journal of Personality and Social Psychology, 80*, 53–67.

Tolman, E. C. (1932). *Purposive behavior in animals and men*. New York: Appleton-Century.

Tolman, E. C. (1952). A cognition motivation model. *Psychological Review, 59*, 389–400.

Vallerand, R. J., & Reid, G. (1984). On the causal effects of perceived competence on intrinsic motivation: A test of cognitive evaluation theory. *Journal of Sport Psychology, 6*, 94–102.

Vasquez, N. A., & Buehler, R. (2007). Seeing future success: Does imagery perspective influence achievement motivation? *Personality and Social Psychology Bulletin, 33*, 1392–1405.

Veling, H., & Aarts, H. (2009). Putting behavior on hold decreases reward value of need-instrumental objects outside of awareness. *Journal of Experimental Social Psychology, 45*, 1020–1023.

Veltkamp, M., Aarts, H., & Custers, R. (2008). Perception in the service of goal pursuit: Motivation to attain goals enhances the perceived size of goal-instrumental objects. *Social Cognition, 26*, 720–736.

Veltkamp, M., Aarts, H., & Custers, R. (2009). Unravelling the motivational yarn: A framework for understanding the instigation of implicitly motivated behaviour resulting from deprivation and positive affect. *European Review of Social Psychology, 20*, 345–381.

Vroom, V. H. (1964). *Work and motivation*. New York: Wiley.

Watkins, E. R. (2008). Constructive and unconstructive repetitive thought. *Psychological Bulletin, 134*, 163–206.

Webb, T. L., & Sheeran, P. (2008). Mechanisms of implementation intention effects: The role of goal intentions, self-efficacy, and accessibility of plan components. *British Journal of Social Psychology, 47*, 373–395.

Webster, D. M., & Kruglanski, A. W. (1994). Individual differences in need for cognitive closure. *Journal of Personality and Social Psychology, 67*, 1049–1062.

Wieber, F., Gollwitzer, P. M., Gawrilow, C., & Oettingen, G. (2011). *Intending to lose weight: Benefits of why-reasoning and implementation intentions*. Manuscript submitted for publication.

Wieber, F., Gollwitzer, P. M., & Sezer, L. (2011). *Asking "why" helps action control by goals but not plans*. Manuscript submitted for publication.

Wieber, F., & Sassenberg, K. (2006). I can't take my eyes off of it—Attention attraction effects of implementation intentions. *Social Cognition, 24*, 723–752.

Wilson, T. D., Dunn, D. S., Bybee, J. A., Hyman, D. B., & Rotondo, J. A. (1984). Effects of analyzing reasons on attitude–behavior consistency. *Journal of Personality and Social Psychology, 47*, 5–16.

Wirth, M. M., Welsh, K. M., & Schultheiss, O. C. (2006). Salivary cortisol changes in humans after winning or losing a dominance contest depend on implicit power motivation. *Hormones and Behavior, 49*, 346–352.

Worth, K. A., Sullivan, H. W., Hertel, A. W., Rothman, A. J., & Jeffery, R. W. (2005). Avoidance goals can be beneficial: A look at smoking cessation. *Basic and Applied Social Psychology, 27*, 107–116.

Wright, R. A. (1996). Brehm's theory of motivation as a model of effort and cardiovascular response. In P. M. Gollwitzer & J. A. Bargh (Eds.), *The psychology of action: Linking cognition and motivation to behavior* (pp. 424–453). New York: Guilford.

Downloaded by [Karen Hudson] at 03:29 22 March 2015

Wright, R. A., Murray, J. B., Storey, P. L., & Williams, B. J. (1997). Ability analysis of gender relevance and sex differences in cardiovascular response to behavioral challenge. *Journal of Personality and Social Psychology, 73*, 405–417.

Wright, R. A., Tunstall, A. M., Williams, B. J., Goodwin, J. S., & Harmon-Jones, E. (1995). Social evaluation and cardiovascular response. *Journal of Personality and Social Psychology, 69*, 530–543.

Zöllig, J., Martin, M., & Kliegel, M. (2010). Forming intentions successfully: Differential compensational mechanisms of adolescents and old adults. *Cortex, 46*, 575–589.

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5

Goal Gradients, Expectancy, and Value

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Students study harder for an exam as it gets closer, rats pull harder the closer they get to the reinforcement, people are willing to pay more to avoid a painful and scary experience the closer they get to it, and runners mobilize all their resources when closer to the goal. In this chapter we offer a closer look at goal gradients, which is the tendency to increase effort closer to a goal. This chapter looks at the function of goal gradients and analyzes their causes. We then discuss the factors that may make goal gradients steeper versus shallower and the consequences of steeper versus shallower gradients for self-regulation.

WHAT ARE GOAL GRADIENTS?

Goal gradients mean that effort or motivation tends to increase closer to a goal. Clark Hull (1934) was probably the first to theorize on and systematically study goal gradients, establishing that rats in a maze run faster the closer they are to food (Figure 5.1). In a different classic study that demonstrated goal gradients, Brown (1948) trained one group of rats to run down a short alley to attain food when hungry. Each rat wore a little harness connected to a recording device such that the strength of its pull when stopped at a specific point in the alley could be measured in grams. Brown found that the animals that stopped nearer to

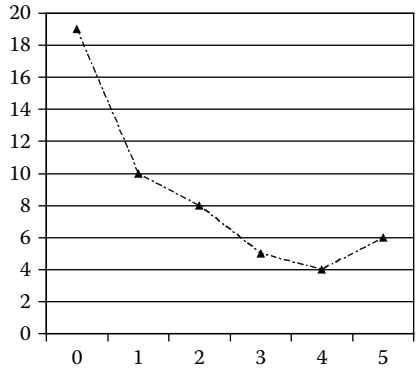


Figure 5.1 Length of time to traverse the several sections of a straight runway as a function of distance. The runway extended from the starting box at Segment 0, continued to the food, and finished some 21 inches beyond Segment 5. The several points on the curve represent means from approximately 160 measurements, the graph is a composite graph from 11 blind rats. (Typical finding from Hull's 1934 experiment; see Kivetz, Urminksy, & Zheng, 2006.)

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the food pulled harder than those who were stopped farther away. Supporting goal gradients, enhanced motivation closer to the goal has been observed with both animals and humans (Brown, 1948; Förster, Grant, Idson, & Higgins, 2001; Förster, Higgins, & Idson, 1998; Gjesme, 1974; Losco & Epstein, 1977; Miller & Kraeling, 1952; Miller & Murray, 1952; Murray & Berkun, 1955; Rigby, 1954; Smith, 1965). Recent studies also examined some of the cognitive underpinnings of goal gradients and showed that goal-related concepts become increasingly accessible closer to a goal (Denzler, Förster, & Liberman, 2009; Förster, Liberman, & Higgins, 2005). In these studies, participants in the goal condition searched through four subsequently presented series of pictures for a target combination of a picture of eyeglasses that is followed by a picture of scissors. The target combination was to appear only once, and upon finding it, participants had to report it to the experimenter. In the nongoal condition participants merely watched the series of pictures without having a certain goal. After watching each series, accessibility of eyeglasses-related words was measured with a lexical decision task, in which participants had to decide whether a word presented on the screen was a word or not. Word and nonwords appeared, and some of the words were related to the goal concept of eyeglasses (e.g., sun or reading) and some were not (e.g., fish or regarding). The target combination appeared in Series 3. Results reflected an increase in accessibility of goal-related words before the combination was found (from Series 1 to Series 2) for participants who had the goal to find the combination, compared to those who did not have that goal. One can conclude that goal gradients not only exist on the behavioral level are also reflected in the cognitive system.

What explains goal gradients? Goal gradients were postulated in Hull's (1943) classic theory of motivation and were described and more closely examined by Miller (1944, 1959). Hull defined motivation as a product of habit and

drive, where drive is equivalent to the extent of need (e.g., hunger, pain) and habit is the strength of association between action and outcome (e.g., habit, in this definition, increases with operant conditioning, as the desired outcome, such as getting food, gets more strongly associated with a specific action, such as running down the maze). Goal gradients, or changes in motivation over distance to the goal, were theorized to reflect changes over distance in habit, drive, or both. Lewin (1926, 1951) also assumed that motivation increases closer to a goal. He conceptualized desired and undesired end states as forces that operate on individuals and assumed that like physical forces (e.g., gravitation), psychological forces exerted by desired and avoided goals are inversely related to distance.

This chapter will take another classic theory of motivation, according to which motivation is a product of expectancy and value, and suggest that changes in motivation closer to a goal reflect changes in value, changes in expectancy, or both. We first examine this theory and then explain goal gradients by examining how distance to a goal changes value and expectancy. We then look at different types of goals in an attempt to predict the relative steepness of gradients they would produce. Our analysis will show that goal gradients, even though they exist, are not universal but rather change as a function of the type of goal in question or how a certain goal is construed.

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MOTIVATION AS A PRODUCT OF EXPECTANCY AND VALUE

Expected utility theory in economics and decision making (Edwards, 1951), the theory of achievement motivation (Atkinson, 1964), the theory of reasoned action (Fishbein & Ajzen, 1974), and the theory of motivation in organizational psychology (Mitchell, 1982; Vroom, 1964) all state that motivation increases as a product of the expectancy of reaching a goal and the goal's value. This means that motivation increases with increased goal value and with increased goal expectancy, and that the higher the expectancy (value) of reaching the goal, the higher the effect of value (expectancy) is. For example, the motivation to apply for a job increases with the job's attractiveness and with the likelihood of getting it. In addition, the expectancy of getting the job would play a larger role with more attractive jobs, and the job's attractiveness would play a larger role with jobs that are more attainable. Jobs that are not attractive at all would not be pursued, no matter how attainable (e.g., washing dishes in a nearby restaurant), and jobs that are almost impossible to get would not be pursued no matter how attractive (e.g., a leading role in a movie).

Expectancy and value also seem to enhance goal-related accessibility, which, as a result, may also exhibit goal gradients. In the aforementioned study by Förster et al. (2005), in which participants were instructed to search through a presented series of pictures for a target combination (eyeglasses followed by scissors), expectancy and value were also manipulated. More specifically, the authors manipulated the expectancy of achieving the goal by telling participants that the target

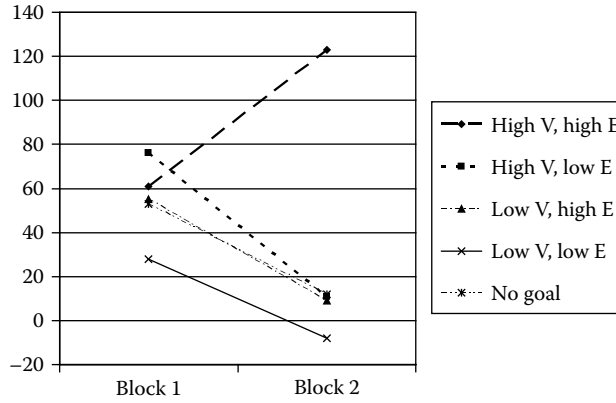


Figure 5.2 Relative accessibility (in milliseconds) of goal-related versus nongoal-related words. Results are as measured with a lexical decision task as a function of distance to the goal, value, and expectancy, plus a nongoal control group (as reported in Förster, Liberman, & Higgins, 2005).

combination was present in 90% of the cases versus only in 5% of the cases, and the value of the goal by telling participants that they would receive €1.00 versus only €0.05 for finding the combination. Note that the low expectancy and value conditions were extremely low, and it was expected that they would not motivate participants at all. The two factors were used orthogonally, and a no-goal control group was also included. As predicted, increased accessibility of goal-related words prior to fulfillment was only found when both value and expectancy were high (Figure 5.2). In other words, the effects of expectancy and value on goal-related accessibility were interactive (i.e., multiplicative) and similar to the effects of expectancy and value on motivation. It therefore appears that the $E \times V$ function also operates on the cognitive level.

But why does motivation increase with expectancy and value? That motivation varies as a function of goal value sounds almost trivial—more attractive goals motivate us more. For example, if a career as a hairdresser is not attractive for an A+ high school student, why should he ever consider it? The study by Förster et al. (2005) shows that the cognitive system does not render goal-related thoughts accessible if goal-value is low (in the experiment, a reward of €0.05). Thus, low value literally "turns off" memory supporting goal pursuit, an effect that does not seem to depend on a conscious decision.

The role of expectancy is theoretically more complicated, in part because of the different ways in which expectancy has been defined. There have been two major classes of definitions of expectancy: One definition, often assumed in theories of decision making under uncertainty (e.g., Edwards, 1951; Tversky & Kahneman, 1992), reflects uncontrollable probability. In these theories, the motivation to pursue an outcome is enhanced with more probable outcomes. Obviously, in these models, the dependency of motivation on expectancy serves to maximize outcomes. For example, pursuing the more likely of two equally attractive goals is bound to yield, on average, a higher return. The other definition of expectancy,

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which is assumed in many social psychological theories of motivation, views expectancy as the strength of the contingency between one's action and the desired outcome. According to this view, self-efficacy, ease, necessity of action, and sufficiency of action are all aspects of expectancy. For example, of two equally attractive goals, people would prefer the one that is easier to attain. Moreover, people generally prefer doing tasks they think they are more capable of doing. This strategy maximizes outcome because it helps distribute effort in the most effective way or, in other words, supports efficiency. For example, among goals of equal attractiveness, going for those that are easier to attain preserves effort for other goals. Similarly, engaging selectively in activities one has control over prevents unnecessarily wasting energy.

If (and when) the dependency of motivation on expectancy reflects a concern with optimizing effort, then removing these concerns would attenuate or even eliminate the dependency of motivation on expectancy. The goals in question are those that are experienced as duties and cannot be traded off with other goals. For example, one should seek to escape all life-threatening dangers, and escaping from one cannot be replaced with escaping another. As a result, the motivation to escape from a danger should not be contingent on the ease of escaping. Supporting this notion, Shah and Higgins (1997) showed that prevention goals (e.g., duties, responsibilities, obligations), which were perceived by actors as necessity, depended on expectancy less than the same goals when they were framed in terms of promotion goals (e.g., hopes and aspirations). To illustrate, in Higgins's (1997) study, participants' chronic tendency to perceive goals as duties (i.e., a prevention focus) or ideals (i.e., a promotion focus) was measured using a regulatory focus personality measurement. In the study, participants were asked to work on an anagram task, for which they had to find as many solutions as possible for 10 different anagrams. They were told they would received $4.00 but could win an additional $1.00 if they rated above the 90th percentile of all participants. The authors measured performance, subjective value of the incentive, and the expectancy whether they would be among the best. Results showed that the interaction between $E \times V$ predicted performance for promotion-focused people, whereas for prevention-focused people, for which high-value goals were perceived as necessities, only value predicted performance.

Importantly, the notion that motivation to pursue necessary goals does not depend on expectancy (e.g., when it is defined as contingency between effort and outcome) cannot be explained by the relative importance of these goals. This is because, as noted earlier, expectancy-value models of motivation suggest that motivation for more important goals should depend on expectancy more rather than less.

Returning to the main focus of this chapter, we now examine the predictions for goal gradients that follow from the expectancy-value theory of motivation. We propose that goal gradients in motivation reflect a change over distance in expectancy, in value, or in both. To that end, we examine how distance from a goal affects value and expectancy. The variables we discuss are summarized in Figure 5.3.

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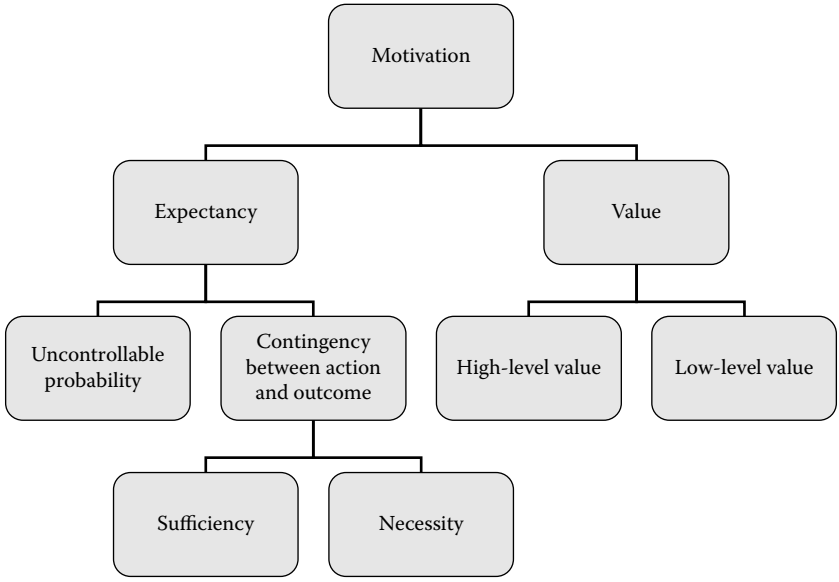


Figure 5.3 The various components of motivation. These components might increase or decrease closer to a goal, giving rise to steeper or shallower goal gradients.

HOW DOES DISTANCE TO A GOAL AFFECT GOAL VALUE?

The standard assumption in economics, psychology, political science, and education is that the value of outcomes is discounted or diminished as temporal distance from the outcomes increases (e.g., Ainslie, 1975; Ainslie & Haslam, 1992; Baumeister & Heatherton, 1996; Elster, 1979; Mischel, 1974; O'Donoghue & Rabin, 2002; Rachlin, 1995; Read, Loewenstein, & Kalyanaraman, 1999; Schelling, 1984). Research suggests that individuals often place higher value on a near future reward than on a distant future reward, even when the distant future reward is larger (e.g., Ainslie & Haslam, 1992; Fishbach & Trope, 2001; Loewenstein & Elster, 1992; Mischel, 1974; Read et al., 1999).

Some discounting of value over time is normative and justifiable in strictly economic terms. For example, monetary outcomes diminish in value over distance because of interest and inflation ($1,000 today is equivalent to $1,277 in 5 years, given an interest rate of 5%). A job a year from now is less attractive than a job now, if it means that one remains unemployed during that year. It is typically found, however, that people have much steeper discounting rates than is justified by rational economic considerations.

Contrary to the claim of overall time discounting, construal level theory (CLT) proposes that the effect of temporal distance on value depends on the level of construal with which value is associated (Liberman & Trope, 2008; Liberman, Trope, & Stephan, 2007; Trope & Liberman, 2003, 2010). CLT distinguishes between high-level construals, which are abstract representations of outcomes, and low-level

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construals, which are more concrete representations of the same outcomes. For example, representing a scientific conference by its scientific merit is a high-level construal. It refers to the abstract, superordinate goal of the conference. Contrary to this, representing the same conference in terms of "packing bags" and "staying in a hotel" constitutes a low-level representation. It refers to concrete, less central details.

According to CLT, people construe more distant stimuli on a higher level. Consequently, distance-related changes in the attractiveness of an option depend on the value associated with the high-level construal of the option (high-level value) and the value associated with the low-level construal of the option (low-level value). Specifically, distance increases the weight of high-level value and decreases the weight of low-level value. As a result, temporal distance shifts the overall attractiveness of an option closer to its high-level value than to its low-level value. When the low-level value of an option is more positive than its high-level value, the option should be more attractive in the near future (time discounting). For example, a mediocre conference in a very attractive hotel would seem more attractive at a closer temporal perspective. However, when the high-level value of an option is more positive, the option should be more attractive in the distant future (time augmentation). For example, an interesting conference in an inconvenient hotel would seem more attractive from a distal perspective than from a close perspective.

Research conducted within the framework of CLT has generally supported these predictions (for reviews, see Liberman & Trope, 2008; Liberman et al., 2007; Trope & Liberman, 2010). For example, a guest lecture on an interesting topic that was to take place in an inconvenient time (high level value more positive than low level value) seemed more attractive in the distant future than in the near future, but a guest lecture on an uninteresting topic that was to take place in a convenient time (high-level value more negative than low-level value) seemed less attractive in the distant future than in the near future (Liberman & Trope, 1998).

To sum up, we propose, in line with CLT, that how goal value changes with distance to the goal depends on its level of construal. Consequently, goal gradients that are a function of value should also be influenced by the level of construal. This notion runs contrary to prevalent views in many behavioral sciences, including economics and decision making, according to which value is discounted over distance. We think that this latter view is overgeneralized and that what is sometimes discounted over distance in the studies on time discounting is expectancy rather than value. As noted earlier, motivation reflects not only value but also expectancy, and it is expectancy, rather than value, that typically decreases over distance in studies on time discounting (see Liberman & Trope, 2003, for a more detailed discussion of this point in relation to extant theories of intertemporal discounting). We now turn to discuss this latter notion, namely, how goal expectancy changes over distance to the goal.

HOW DOES DISTANCE TO A GOAL AFFECT GOAL EXPECTANCY?

We noted earlier two major definitions of expectancy: as uncontrollable probability and as the extent of contingency between one's efforts and outcome. We will here

examine them separately with respect to the question of how they are affected by distance to the goal.

How Does Distance to a Goal Affect Goal Probability?

Generally, probability of predicted future outcomes decreases with temporal distance to these outcomes. This is because uncertainty typically increases with temporal distance (Keren & Roelofsma, 1995; see also Frederick, Loewenstein & O'Donoghue, 2003; Prelec & Loewenstein, 1991). For example, imagine a parent who promises to buy her child a new computer game either tomorrow, a month later, or a year later. Temporal distance to the promised game purchase diminishes its likelihood and also the motivating value of the promise from the child's perspective; as the promised game is more distant in time, it becomes more likely that it would be forgotten or that the game will be out of stock. Negative events, too, tend to decrease in likelihood with greater temporal distance. For example, a surgery that is not urgent and is scheduled for the next year might then not be necessary anymore (at least one may hope so), or the methods involved may have improved, causing less pain and problems. Similarly, an upcoming punishment would be less deterring with increasing temporal distance because the likelihood of its actual implementation would decrease.

It is important to note that probability and probability change over distance are not only objective but may also have subjective components. For example, dispositional optimism would probably enhance estimates of probability of positive events and diminish estimates of probabilities of negative events (see Carver & Scheier, 2009). Also, a person who perceives her environment as stable might experience less increase in uncertainty with increasing distance. For example, a child who perceives her parents as reliable would experience less decrease in expectancy of promises with increasing distance (and as a consequence, show shallower goal gradients with respect to those promises) compared to a child whose parents consistently fail to keep their promises. Consistent with this notion, Mischel (1974) found that children from an unstable family environment were less able to delay gratification, probably at least partly due to disbelief in promised delayed future benefits (see also Frederick et al., 2003, and Prelec & Loewenstein, 1991, for a discussion of the relation between temporal distance and uncertainty).

How Does Distance to the Goal Affect the Contingency Between Action and Outcome?

We would like to distinguish between two aspects of contingency: sufficiency and necessity. We discuss how each of these changes over distance to the goal.

Sufficiency of an action for an outcome refers to the probability of the outcome given the action. For example, the sufficiency of studying for doing well on an exam refers to the probability of doing well given studying. Controllability (the extent to which one's actions can produce the effect; Rotter, 1966) and self-efficacy (the extent to which one feels capable of bringing about the desired outcome; for

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a review, see Bandura, 1997) both reflect sufficiency and were proposed as important determinants of motivation. For example, it has been shown that increasing students' sense of academic self-efficacy increased their motivation to study (Bandura, 1989). Likewise, increasing sense of control over desirable outcomes increases motivation to act toward achieving these outcomes (Deci & Ryan, 2000; Weiner, Russell, & Lerman, 1979).

Proximity to the goal often enhances objective sufficiency. For example, closer to the goal (e.g., 2 miles away from the goal vs. 50 miles away), each mile reduces the distance to the goal by a larger proportion and is therefore more sufficient. Each mile closer one is to the goal carries more efficacy, in that it becomes increasingly more likely to bring about the desired outcome (Förster et al., 1998). In a similar vein, if one's goal is to read 500 pages for an exam, reading the last page is more sufficient and therefore also more motivating than reading the first page.

Whereas objective sufficiency often increases closer to a goal, subjective sufficiency may actually decrease, as outcomes may seem less controllable and more complicated at a closer perspective. For example, Gilovich, Kerr, and Medvec (1993) documented the "cold feet phenomenon," whereby participants were less motivated to perform different tasks as time of implementation approached because these tasks seemed to them more difficult at a closer perspective (see also Savitsky, Medvec, Charlton, & Gilovich, 1998; Sherman, 1980). For example, participants who had to recruit students on campus for an experiment felt more confident they would recruit many students when the task had to be performed in the more distant future. When implementation was proximal, they lost some of their confidence. This example demonstrates that contrary to the common effect of goal gradients, motivation can actually decrease closer to implementation.

There are many other ways in which distance may affect sufficiency. For example, it is possible that one would get more skilled (or more tired) with repeated performance of a task, and thus sufficiency would increase (or decrease) as one proceeds with the same action. Such effects are important to consider when examining goal gradients in specific situations, but it is very difficult to come up with a general rule on when skill or fatigue would or would not play an important role in goal gradients. Because these effects defeat generalizations, we will not discuss them further in this chapter.

Despite its importance for causality (Einhorn & Hogarth, 1986), necessity has not received much attention in the literature on motivation. *Necessity* of an action for a goal increases as the likelihood of achieving the goal without the action decreases. For example, the necessity of studying to do well on an exam increases as the probability of doing well without studying decreases. If one can do well without studying, then studying is not necessary to do well on the exam. An action may be sufficient but not necessary for a goal (if studying will ensure success, but there are also other ways to do well, without studying, for example, by cheating on the exam), necessary but not sufficient (if there is no way that one will do well without studying, but studying does not ensure success), or both necessary and sufficient (if studying ensures success and there is no other way to succeed but studying).

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Necessity is related to means substitutability, also termed *equifinality* in the goal system theory of Kruglanski et al. (2002). In this theory, Kruglanski et al. predict that the extent to which a goal activates a given means is inversely related to the number of means that are connected to that goal. Notably, equifinality may vary not only across goals but also for the same goal, across situations. For example, our diet may be more restricted when we are sick than when we are healthy, and the goal of "getting nutrition" may be satisfied with a smaller number of means. Each of the means is thus less necessary when one is healthy than when one is sick (Förster, Liberman, & Friedman, 2007). According to goal systems theory motivation increases when fewer means are available, or in other words, necessity due to lowered equifinality should increase motivation and also produce steeper gradients.

Temporal distance often reduces necessity. For example, a long time before the exam, failing to study may be compensated by more intense studying later, but a short time before the exam, when only a few hours remain, such possibility no longer exists, and studying becomes more necessary. Increase in objective necessity closer to a goal is characteristic of many situations, such as studying for an exam, finding your passport before going to a trip, and buying a birthday present. The last shopping day before the party, buying something becomes necessary. Notably, deadlines often add necessity to one's action. Compare, for example, a situation in which one is shopping for a suit with no particular deadline with a situation in which one is shopping for a suit for a job interview. Necessity, and therefore also expectancy and motivation, would increase over time in the latter case more than in the former case. Notably, not all gradients driven by necessity are straightforwardly linear. For example, when planning to lose weight before a holiday or when rehearsing lyrics for an upcoming concert, starting the last day before the event would not suffice; here, self-regulation affords to start some time earlier, in other words, the gradient's shape could have its "peak" farther away from the deadline in these cases.

In sum, the three aspects of expectancy—probability, sufficiency, and necessity—influence goal gradients. Whereas some types of expectancy (e.g., perceived control) increase with distance, others (e.g., sufficiency and necessity) decrease with distance. Because not all aspects of expectancy apply in every situation (e.g., necessity is less important in actions that do not have a deadline; necessity and sufficiency do not apply in chance-determined outcomes), it is important to examine the characteristics of each situation to predict how expectancy would change over distance in that situation. Recently, we collected some preliminary data in support of our analysis, which we will now summarize.

DISTANCE EFFECTS ON ASPECTS OF EXPECTANCY: AN EMPIRICAL DEMONSTRATION

A recent study (Liberman & Förster, 2008) examined the effect of distance from task conclusion (and finding out whether one achieved the goal) on motivation and on various aspects of expectancy. We manipulated goal distance in two ways. First, we measured motivation and expectancy at different points during progress

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toward the goal. Second, we introduced a between-subjects experimental manipulation of goal distance: We made participants in the near-goal condition believe that the task was short and made participants in the distant-goal condition believe that it was long. In that way, the goal was more distant for the latter group than for the former group. More specifically, while working on a set of anagrams with more than one possible solution, participants in the near-goal condition were told they would have four anagrams to solve, whereas participants in the distant-goal condition were told they would have eight anagrams to solve. All participants were stopped after four anagrams. In this way, although participants in both conditions performed the same task, participants in the distal condition believed that they were farther away from the goal than participants in the near-goal condition. In the distant-goal condition, participants were interrupted after four anagrams and were told they were being interrupted because the experimenter was running out of time and that their score would be computed based on the anagrams they had done so far. We looked at how motivation and various aspects of expectancy changed with distance. Starting after the first anagram, participants were asked the following questions about each of the remaining anagrams:

1. Motivation: "How motivated are you to solve the next anagram?" (We also used performance in the task as a behavioral measure of motivation.)
2. Difficulty: "How difficult would it be for you to solve the next anagram?"
3. Sufficiency: "If you solve the next anagram, how likely are you to attain the goal?"
4. Necessity (in two different ways): "If you do not solve the next anagram, how likely are you to attain the goal?" and "If you do not solve the next anagram, how easy would it be for you to compensate by performance at later anagrams?"

Questions 2 through 4 reflect different aspects of expectancy; in order to examine changes over time, we asked all of these questions after each single anagram.

Goal gradients should be exhibited in two ways: first, higher ratings in the near-goal condition compared to the distant-goal condition, and second, increase over the three measurement points. We predicted gradients in motivation (Question 1) and in performance. We did not, however, predict gradients for difficulty (Question 2) because in this task it is possible that participants gained practice as they solved more anagrams (and thus perceived the anagrams as increasingly easier) or, conversely, that participants became increasingly tired (and therefore, perhaps, experienced the anagrams as more and more difficult). We predicted gradients in sufficiency because the extent to which each anagram brings one closer to the goal of performing well in the entire task increases with goal proximity (Question 3). We predicted gradients for the two measures of necessity because compensation for bad performance becomes increasingly more difficult as less anagrams remain.

Generally, our predictions were supported by the data: In the near-goal condition, compared to the distant-goal condition, participants exhibited higher performance over time and higher estimated necessity and inability to compensate

for bad performance. Also as predicted, there were no gradients in estimated difficulty and no differences between the goal-distance conditions. Moreover, we found a goal gradient for sufficiency in the near-goal condition; however, contrary to predictions, sufficiency slightly decreased in the distant-goal condition. Self-reported motivation also differed between the two conditions, reflecting a steeper gradient for the near-goal compared to the distant-goal condition. Performance data showed a marginally significant trend in the right direction with more increasing performance in the near-goal condition compared to the distant-goal condition.

For performance, motivation, sufficiency, and necessity, we found steeper gradients in the near-goal condition. In fact, no gradients were obtained in the distant-goal condition, except for a marginal trend in the predicted direction for the compensation rating. Notably, in the present paradigm, motivation, performance, sufficiency, and necessity did not increase linearly with goal proximity, but rather increased at a higher rate closer to the goal. A similar pattern is widely assumed in the literature on intertemporal discounting of value, which often finds that value diminishes at a faster rate at a closer distance (Ainslie & Haslam, 1992). For example, the difference in subjective value between getting $100 in 30 days and $100 in 31 days is smaller than the difference between getting $100 today and $100 tomorrow (Thaler & Shefrin, 1981).

Obviously, this study is only the first step toward an empirical investigation of the various components of motivation gradients, a study of which, we believe, would have both practical and theoretical importance. In the rest of this chapter, we present a theoretical analysis of motivational gradients in a number of goal-pursuit situations.

GRADIENTS OF DIFFERENT GOALS: A THEORETICAL ANALYSIS

We propose to conceptualize motivation gradients as stemming from changes over distance in expectancy, in value, or in their interaction. Furthermore, we propose that looking at various types of expectancy (probability, difficulty, sufficiency, necessity) and value (high-level value, low-level value) may allow fine-grained predictions on the shape and steepness of motivation gradients. For example, if both sufficiency and necessity increase closer to the goal (e.g., studying for an exam feels increasingly more efficient, the exam cannot be postponed and thus studying becomes more necessary, as not studying becomes increasingly hard to compensate for), the gradients are expected to be steeper than if only one of these factors increases with goal proximity. As another example, if the value of the goal is more positive on the high level of construal than on the low level of construal (and therefore value is expected to be reduced closer to the goal) and there is no deadline (and thus necessity does not increase closer to the goal), then motivation may increase closer to the goal less than if the goal has a deadline.

This analysis suggests that to predict the shape and steepness of goal gradients one needs to examine in detail the goal in question. In particular, one has to seek an answer to the question of whether and how value and the various aspects of

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expectancy change over distance. We believe that inasmuch the answers to these questions vary between different goals (e.g., with some goals, people feel increasingly more tired as they approach the goal, with other goals self-efficacy improves with goal progress), goal gradients would vary in a corresponding manner. In addition to these case-to-case variations, our analysis suggests a few generalizations, many of which need an empirical investigation.

Removing considerations of effort optimization would reduce the steepness of goal gradients. We mentioned earlier that the dependency of motivation on difficulty, necessity, and sufficiency reflects optimization of effort. We also raised the hypothesis that if considerations of optimizing effort are removed, then motivation would be less dependent on these factors. It also follows from this logic that removing considerations of effort optimization would attenuate goal gradients, inasmuch as such gradients reflect gradients in difficulty, necessity, or sufficiency. For example, taking care of one's sick child does not depend on optimizing effort across other goals; typically, this goal would not be traded off with other goals. We predict shallower gradients for these types of goals over other, less obligatory goals.

Of course there are other examples of situations in which the need to optimize resources is attenuated, for example, when resources are abundant or when the resources can be used toward only one goal. To illustrate, younger people who have more energy compared to older people may invest high levels of energy from the beginning, showing shallower gradients. That is, younger people would start with high effort and maintain a high level of effort until goal completion, whereas the elderly would start with a low level of effort but increase it with goal proximity. It would be interesting to examine, in future research, the prediction that in such situations, too, goal gradients would be attenuated.

When goal value stems from its high-level construal (e.g., goals that are abstract and general), gradients would be shallower than *when goal value stems from its low-level construal* (e.g., goals that are concrete and specific). This prediction derives from CLT. Typically concrete goals are more motivating than global, abstract goals (Gollwitzer & Brandstätter, 1997; Locke & Latham, 1990). Including goal proximity into the equation, we could, for example, predict increased motivation to attend a political rally (i.e., steeper gradients) when one thinks of the goal of attending it in concrete terms (e.g., hanging around with friends, being immersed in a lively crowd) rather than in more abstract terms of moral values (e.g., political involvement is important). In the latter case, it is even possible to get a reversal in goal gradients, namely, a decrease in motivation closer to a goal, as documented in research in the CLT framework (e.g., Eyal, Liberman, & Trope, 2008).

Deadlines would generally increase the steepness of goal gradients. This is because action becomes more necessary when approaching a deadline. For example, if one has to submit a chapter by the end of the month, then motivation should increase closer to that deadline. If, however, one writes a chapter without a particular deadline, then no such increase is expected. Moreover, the same logic should predict steeper gradients with stricter deadlines. For example, studying for an exam that cannot be retaken should produce steeper gradients than studying for an exam that can, potentially, be taken again on another occasion.

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When sufficiency does not increase closer to a goal, then gradients would be shallower. We mentioned earlier that, typically, closer to a goal action becomes more sufficient (the last one step is sufficient to get one to the goal, but far away from the goal one step is much less sufficient). But this is not always the case, as the contingency between one's actions and the desired outcome is often not that clear. Imagine a job candidate going through a series of interviews and expecting to hear the decision of the employer only a month later. If the candidate does not have a sense of how much (and whether) each of these interviews makes the job offer more likely, then, from the candidate's perspective, the last interview is not more sufficient than the first one and hence no goal gradient is expected. Of course, the situation would change if necessity comes into play. In a case where the candidate thinks that in his last interview he can compensate for flawed performances, he would likely invest more effort in the last interview.

When practice increases closer to a goal, gradients would be steeper. This is because with practice self-efficacy increases and the task becomes easier. Ease, in turn, is a determinant of expectancy and therefore also of motivation. For example, other things being equal, expectancy-value models of motivation should predict steeper gradients for students in a math course who feel they mastered the material than for students who do not experience such improvement in their abilities.

Obviously, fatigue moderates gradients. Because fatigue increases action difficulty and reduces expectancy and motivation, one may predict that, other things being equal, a person who gets tired by the process of goal pursuit would exhibit shallower gradients than a more resilient person. Counteracting fatigue (e.g., by providing glucose supply, see Gailliot et al., 2007) should make gradients steeper.

When (perceived) control decreases closer to a goal, gradients would be shallower and might, in fact, get reversed. As we noted before, at times, people experience "cold feet" when they get closer to a goal, as a previously experienced sense of control may dissipate in a proximal perspective. For example, a worker may feel initially confident that she can get a raise from her boss, but may lose her confidence as the time of the interview approaches. As a result, motivation to go to the interview would not increase but may actually decrease in a proximal perspective.

In the rest of this chapter, we examine the question of whether avoidance gradients are steeper than approach gradients, as some theories assumed. We take a broader perspective on this question, examining it not only in view of the framework presented here, but also in view of regulatory focus theory (Higgins, 1997), which suggests a distinction between promotion and prevention goals, in addition to the traditional distinction between approach and avoidance.

GRADIENTS OF APPROACH VERSUS AVOIDANCE GOALS

Miller's (1944, 1959) conflict model conceptualized motivation as a product of drive and habit and postulated that avoidance gradients are steeper than approach

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gradients. Miller suggested that whereas drives that are related to positive incentives (e.g., hunger in the case of food) do not decrease over distance, drives that are related to negative incentives (e.g., fear of an electric shock) do decrease over distance. Habit, on the other hand, which is the strength of association between one's action and the outcome, always decreases over distance. This is because when an extended action (e.g., running a maze) is associated with a positive outcome (e.g., getting food), the latter stages of the action (running the last part of the maze) are more temporally proximal to the outcome and thus are more strongly associated with it. Because both drive and habit decrease over distance in avoidance, but only habit decreases in approach, discounting over distance is steeper in avoidance than in approach motivation.*

Empirically, however, the notion that avoidance gradients are steeper than approach gradients did not receive overwhelming support. For example, using skin conductance and heart rate as a measure of arousal, Losco and Epstein (1977) found an increase in people's arousal with proximity to desired or undesired end states. They asked participants to perform a tapping task in which trials were framed in terms of a possible loss or a possible success. The value of losses and successes were also manipulated, they were either $1.00 or 1 cent. Skin conductance and heart rate were measured at Trials 1, 6, and 8. The authors found increased heart rate and skin conductance as a function of value and distance to the goal. Interestingly, in their studies the difference in heart rate between avoidance and approach gradients was not significant, which led them to doubt the notion that the avoidance gradients are always steeper than the approach gradients (Brown, 1948; Miller & Kraeling, 1952; Miller & Murray, 1952). Miller revised this general notion in 1959 because of accumulating mixed evidence for the notion that avoidance gradients are steeper than approach gradients.

Going back to the model we presented here, we do not see why probability, difficulty, or sufficiency would be different between approach and avoidance, but there is a sense in which, in a goal's immediate presence, avoidance is more difficult to compensate for than approach, and thus its necessity increases more steeply closer to a goal than approach. For example, in face of a threat (e.g., a tiger) a person is unlikely to defer avoidance for later and is unlikely to contemplate compensation by avoiding something else (e.g., rather than escaping this tiger now, I will escape another animal later). However, in the face of an opportunity to approach a reward (e.g., a nice sweater), a person may think that she would skip it and compensate later by getting something else (e.g., "I will not get that sweater now, I will save the money and will buy the expensive shoes later"). This

* It is sometimes mistakenly assumed that the existence of approach or avoidance conflicts is evidence for steeper avoidance (relative to approach) gradients. Indeed, *if* a goal has both positive, approach features and negative, avoidance features, and *if* the latter has a steeper gradient than the former, then people would experience a desire to approach that goal from a distance but would feel an increased need to avoid it as they get closer. This *does not* mean, however, that negative aspects of goals are *always* discounted more steeply than positive aspects. Indeed, *not any ambivalent goal* creates an approach-avoidance conflict. For example, dieters typically do not increasingly avoid a piece of cake as it gets closer to their mouths. Hence, the existence of approach-avoidance conflict cannot serve as evidence for the general contention that avoidance gradients are steeper than approach gradients.

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suggests that the necessity of avoidance decreases more steeply with distance than the necessity of approach. Our model does predict, then, that other things being equal, some types of avoidance goals might create steeper gradients than approach goals.*

In addition, in many goals the negative aspects tend to be more concrete, lower level than positive aspects. This is because typically the goal's positive aspects are central and are part of the goal's main purpose (e.g., "I want to become a lawyer because it is an interesting job that pays well"), whereas the negative aspects are secondary and incidental (law schools are too expensive, exams are tough). Consistent with this analysis and with CLT, Eyal, Liberman, Trope, and Walther (2004) showed that temporal distance decreases the salience of considerations against an action more than the salience of considerations in favor of that action. These researchers also showed that, consistent with CLT, if the level of construal of negative and positive aspects is reversed (that is, if negative aspects become of higher construal level than positive aspects), then temporal distance decreases the salience of positive aspects more than that of negative aspects.

GRADIENTS OF PROMOTION AND PREVENTION GOALS: A REGULATORY FOCUS THEORY PERSPECTIVE

Regulatory focus theory (RFT; Higgins, 1997, 1998; for a recent review, see also Förster & Werth, 2009) makes numerous predictions with respect to approach and avoidance, and, therefore, it is useful to examine its relevance regarding goal gradients. RFT distinguishes between promotion focus concerns with nurturance and prevention focus concerns with security (Higgins, 1997, 1998). Individuals' self-regulation in relation to their hopes and aspirations (ideals) involves *promotion focus* concerns. Because of this positive outcome focus on gains and nongains, the strategic inclination is *approach* in a state of *eagerness* (see Crowe & Higgins, 1997; Higgins, Roney, Crowe, & Hymes, 1994). Individuals' self-regulation in relation to their duties and obligations (oughts) involves *prevention focus* concerns. Because of this negative outcome focus on nonlosses and losses, the strategic inclination is *avoidance* in a state of *vigilance*. An increase in strategic approach motivation (eagerness) should be more evident for people in a promotion, whereas an increase in strategic avoidance motivation (vigilance) should be more evident for people in a prevention focus.

RFT emphasizes the importance of the relations between means and ends, an idea that was later corroborated within regulatory fit theory (RFIT; Higgins, 2000). According to RFIT, when people pursue a goal in a manner that sustains (fit) rather than disrupts (nonfit) their current regulatory orientation, people feel *right* about their goal-pursuit activity. As a result, the *value* of both the activity and the target goal increases and people's engagement in the activity is strengthened (see Higgins, Cesario, Hagiwara, Spiegel, & Pittman, 2010). Lee and Aaker

* Of course, theoretically, there are avoidance goals that can be compensated for and approach goals that cannot. Generally, however, avoidance goals tend to be construed as necessities more than approach goals.

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(2004) showed that in situations of fit, task performance is more fluent, or less difficult. Thus, avoidance means to pursue oughts and approach means to pursue ideals may constitute a fit and increase a task's *value and decrease its difficulty.* Fit thus intensifies motivation in a multiplicative manner (i.e., increases high motivation more than low motivation). Based on this logic, it is possible to predict that fit would be intensified by proximity to the goal, thus producing steeper goal gradients.

Förster et al. (1998) examined this prediction of RFIT on goal gradients. They used arm pressure as an online measure of motivational strength. Arm flexion (in which the direction of force is toward the self) has been shown to be more associated with approach, whereas arm extension (in which the direction of force is away from the self) is more associated with avoidance (see Cacioppo, Priester, & Berntson, 1993; Chen & Bargh, 1999; Förster, 2003, 2004; Förster, Friedman, Özelsel, & Denzler, 2006; Priester, Cacioppo, & Petty, 1996; Solarz, 1960). Each participant solved two sets of seven solvable anagrams. While solving one set, they pressed on the flat surface of a machine on the bottom of a table, inducing arm flexion (i.e., approach), and while solving the other set, they pressed the machine on top of the table, inducing arm extension (i.e., avoidance). Promotion versus prevention focus was either a chronic individual difference (Study 1) or an experimental variable manipulated by framing (Study 2). Both studies found that the approach gradient was steeper for participants with a promotion rather than a prevention focus and the avoidance gradient was steeper for participants with a prevention focus rather than a promotion focus. These effects were independent of participants' expectancies to succeed or to fail in the task, and they were replicated in a third study that used persistence rather than arm pressure as the measure of motivational strength.

In a recent set of studies, we examined approach and avoidance gradients in the domain of sports (Förster & Liberman, 2010). We tested members of runners clubs in a 6,000-m race and examined the influence of chronic approach versus avoidance tendencies by measuring regulatory focus strength before the race (see Förster et al., 1998). It has been shown that people in a promotion focus use approach strategies to attain their goals, whereas people in a prevention focus use avoidance strategies to attain their goals. Furthermore, before the race started, we asked participants to write down what they thought about the goal. Results showed that participants with a promotion focus represented the goal more likely in terms of ideals (e.g., "I want to reach it in order to feel great" or "I want to meet my personal best time"), whereas participants in a prevention focus represented it in terms of oughts (e.g., "I need to be below XX minutes because otherwise fellow students will make fun of me" or "I need it in order to not fail the class"). Shortly before they started, participants were informed that one can reach goals by either approaching desired outcomes (by focusing on the goal, or by investing resources, etc.) or by avoiding undesired outcomes (by avoiding getting distracted, avoiding to think of the difficulty, the pain, etc.). We assessed approach (how much do you focus on approach strategies) versus avoidance motivation (how much do you focus on avoidance strategies) before the race and at 1,000, 2,000, 3,000, 4,000, and 5,000 m, using running experimenters who coded responses. The study showed

that for participants with a prevention focus, avoidance strategies increased, whereas there was no gradient for approach strategies; for participants with a promotion focus, approach strategies increased, whereas there was no gradient for avoidance strategies.

Using the RFT framework, it is possible to predict, in addition, that for prevention goals, more so than for promotion goals, necessity (inability to compensate) would increase more steeply with proximity to the goal, thus producing overall steeper goal gradients. This was indeed the case: We asked participants to what extent they could compensate during the race, and the gradient for compensation was significantly steeper for prevention than for promotion-focused runners. Moreover, importance of the goal increased for prevention-focused participants who focused on oughts but decreased for promotion-focused participants who focused on ideals. Probability, difficulty, and self-efficacy did not change as a function of regulatory foci. To sum up, regulatory focus and regulatory fit need to be taken into account in order to predict gradients.

Promotion goals tend to be more abstract than prevention goals (Pennington & Roese, 2003). From that perspective, too, it is possible to predict, based on CLT, that prevention goals would have steeper gradients than promotion goals. One of the studies with runners examined the relation between goal gradients, goal focus, and concreteness of participants' goals. Results showed that, consistent with CLT, concrete value was intensified, whereas abstract value was attenuated with proximity. More specifically, the study showed that for participants with a more abstract goal (e.g., "I hate losing," "I want to feel great"), the closer they were to the goal, the less valuable the goal was. In contrast, for those with a more concrete goal (e.g., "I do not want that Katja to make fun of me," "I want to impress my favorite teacher"), the value of the goal increased closer to the goal.

CONCLUSIONS AND FUTURE DIRECTIONS

Despite the widely accepted notion that motivation always increases closer to a goal, a closer look at extant theories of motivation, and especially on the standard expectancy-value theory of motivation, suggests that not only the steepness of the gradient but also its direction and shape may change as a result of different effects of distance on expectancy and on value. Building on a recent analysis (Liberman & Förster, 2008; see also Förster & Liberman, 2009), we propose that in order to predict how motivation would change over distance to the goal, one needs to examine distance effects on probability, difficulty, sufficiency, necessity, high-level value, and low-level value and value from fit.

Future research may examine the interactions among those variables. Would, for example, a focus on low-level goals (e.g., Focus on your forehand!) and framing them as a necessity (e.g., You must win!) motivate a prevention-focused tennis player more than a promotion-focused player? And would increasing self-efficacy during training have a weaker effect on the prevention-focused person because goals framed as necessities do not profit from any other increases in expectancy? Furthermore, one may start relating such self-regulatory phenomena to domains other than achievement motivation and performance, such as,

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for example, consumer behavior (Kivetz, Urminsky & Zheng, 2006). Would, for example, a bonus closer to the goal ("With this purchase you already gained 25 points out of 100 for which you will receive an extra coffee") increase motivation to consume and affect preferences? How would expectancy (e.g., "Is it realistic that I go to this café so often that I can gain 100 points?") and value (e.g., "How good is the coffee?") affect motivation in this case? Last but not least, one may open this field of research in the intergroup domain. Would, for example, $E \times V$ play a role when groups are asked to merge or cooperate? *Would decreasing distance to the goal (e.g., by telling group members that they have to start cooperation "right now" via e-mail, as opposed to when the groups actually merge) increase motivation to work together? And in case one company "buys" the other one, would increasing expectancy to successfully cooperate yield weaker effects for the "sold" company because for them merging is likely a necessity, whereas for the "seller" this is related to growth and ideal goals and increasing expectancy of success is important?* We hope that our framework opens the doors to investigation of goal gradients in domains other than achievement motivation.

Admittedly, the study of gradients is difficult because naturally this involves prediction of the many changes that occur over time. Obviously, in the course of goal pursuit, people can get bored or tired, they can lose or gain confidence in the activity, and they may be exposed to facts that make them change their minds and motivation. However, among these many processes, some general factors can be identified. Thus, even though our analysis suggests that there are more such factors than was formerly assumed, it demonstrates that gradients are real, that they can be predicted, and that they actually drive performance and behavior in various domains.

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REFERENCES

Ainslie, G. (1975). Specious reward: A behavioral theory of impulsiveness and impulse control. *Psychological Bulletin, 82*(4), 463–496.

Ainslie, G., & Haslam, N. (1992). Hyperbolic discounting. In G. Loewenstein & J. Elster (Eds.), *Choice over time* (pp. 57–92). New York: Russell Sage.

Atkinson, J. W. (1964). *An introduction to motivation*. Princeton, NJ: Van Nostrand.

Bandura, A. (1989). Self regulation of motivation and action through internal standards and goal systems. In L. A. Pervin (Ed.), *Goal concepts in personality and social psychology* (pp. 19–85). Hillsdale, NJ: Erlbaum.

Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York: Freeman.

Baumeister, R. F., & Heatherton, T. F. (1996). Self regulation failure: An overview. *Psychological Inquiry, 7*(1), 1–15.

Brown, J. S. (1948). Gradients of approach and avoidance responses and their relation to motivation. *Journal of Comparative and Physiological Psychology, 41*, 450–465.

Cacioppo, J. T., Priester, J. R., & Berntson, G. G. (1993). Rudimentary determinants of attitudes II: Arm flexion and extension have differential effects on attitudes. *Journal of Personality and Social Psychology, 65*, 5–17.

Carver, C. S., & Scheier, M. F. (2009). Optimism. In M. R. Leary & R. H. Hoyle (Eds.), *Handbook of individual differences in social behavior* (pp. 330–342). New York: Guilford.

Chen, M., & Bargh, J. A. (1999). Consequences of automatic evaluation: Immediately behavioral predispositions to approach or avoid the stimulus. *Personality and Social Psychology Bulletin, 25*, 215–224.

Crowe, E., & Higgins, E. T. (1997). Regulatory focus and strategic inclinations: Promotion and prevention in decision making. *Organizational Behavior and Human Decision Processes, 69*, 117–132.

Deci, E. L., & Ryan, R. M. (2000). The "what" and "why" of goal pursuit: Human needs and the self determination of behavior. *Psychological Inquiry, 11*, 227–268.

Denzler, M., Förster, J., & Liberman, N. (2009). How goal-fulfillment decreases aggression. *Journal of Experimental Social Psychology, 45*, 90–100.

Edwards, W. (1951). Probability preference among bets with differing expected values. *Psychological Bulletin, 51*, 380–417.

Einhorn, H. J., & Hogarth, R. M. (1986). Judging probably cause. *Psychological Bulletin*, *99*, 3–19.

Elster, J. (1979). *Ulysses and the sirens: Studies in rationality and irrationality.* Cambridge: Cambridge University Press.

Eyal, T., Liberman, N., & Trope, Y. (2008). Judging near and distant virtue and vice. *Journal of Experimental Social Psychology, 44*, 1204–1209.

Eyal, T., Liberman, N., Trope, Y., & Walther, E. (2004). The pros and cons of temporally near and distant action. *Journal of Personality and Social Psychology, 86*, 781–795.

Fishbach, A., & Trope, Y. (2001). Counteractive self-control in overcoming temptation. *Journal of Personality and Social Psychology, 79*, 493–506.

Fishbein, M., & Ajzen, I. (1974). Attitudes toward objects as predictors of single and multiple behavioral criteria. *Psychological Review, 81*, 59–74.

Förster, J. (2003). The influence of approach and avoidance motor actions on food intake. *European Journal of Social Psychology, 33*, 339–350.

Förster, J. (2004). How body feedback influences consumer's evaluation of products. *Journal of Consumer Psychology, 14*, 415–425.

Förster, J., Friedman, R., Özelsel, A., & Denzler, M. (2006). Enactment of approach and avoidance behavior influences the scope of perceptual and conceptual attention. *Journal of Experimental Social Psychology, 42*, 133–146.

Förster, J., Grant, H., Idson, L. C., & Higgins, E. T. (2001). Success/failure feedback, expectancies, and approach/avoidance motivation: How regulatory focus moderates classic relations. *Journal of Experimental Social Psychology, 37*(3), 253–260.

Förster, J., Higgins, E. T., & Idson, L. C. (1998). Approach and avoidance strength during goal attainment: Regulatory focus and the "goal looms larger" effect. *Journal of Personality and Social Psychology, 75*, 1115–1131.

Förster, J., & Liberman, N. (2009). Goal gradients: Challenges to a basic principle of motivation. In J. Forgas, R. Baumeister, & D. Tice (Eds.), *The psychology of self regulation* (pp. 147–162). New York: Psychology Press.

Förster, J., & Liberman, N. (2010). *Goal gradients in runners: How construal level, and regulatory focus moderate the classic value X expectancy relation*. Unpublished manuscript, University of Amsterdam.

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Förster, J., Liberman, N., & Friedman, R. (2007). Seven principles of goal activation: A systematic approach to distinguishing goal priming from priming of non-goal constructs. *Personality and Social Psychology Review, 11*, 211–233.

Förster, J., Liberman, N., & Higgins, E. T. (2005). Accessibility from active and fulfilled goals. *Journal of Experimental Social Psychology, 41*, 220–239.

Förster, J., & Werth, L. (2009). Regulatory focus: Classic findings and new directions. In G. Moskowitz & H. Grant (Eds.), *The psychology of goals* (pp. 392–420). New York: Guilford.

Frederick, S., Loewenstein, G., & O'Donoghue, T. (2003). Time discounting and time preference: A critical review. In G. Loewenstein, D. Read, & R. Baumeister (Eds.), *Time and decision* (pp. 13–86). New York: Russell Sage.

Gailliot, M. T., Baumeister, R. F., DeWall, C. N., Maner, J. K., Plant, E. A., Tice, D. M., … Schmeichel, B. J. (2007). Self-control relies on glucose as a limited energy source: Willpower is more than a metaphor. *Journal of Personality and Social Psychology, 92*, 325–336.

Gilovich, X., Kerr, M., & Medvec, V. H. (1993). The effect of temporal perspective on subjective confidence. *Journal of Personality and Social* Psychology, *64*, 552–560.

Gjesme, T. (1974). Goal distance in time and its effects on the relations between achievement motives and performance. *Journal of Research in Personality, 8*, 161–171.

Gollwitzer, P. M., & Brandstätter, V. (1997). Implementation intentions and effective goal pursuit. *Journal of Personality and Social Psychology, 73*, 186–199.

Higgins, E. T. (1997). Beyond pleasure and pain. *American Psychologist, 52*, 1280–1300.

Higgins, E. T. (1998). Promotion and prevention: Regulatory focus as a motivational principle. In M. P. Zanna (Ed.), *Advances in experimental social psychology* (pp. 1–46). New York: Academic Press.

Higgins, E. T. (2000). Making a good decision: Value from fit. *American Psychologist, 55*, 1217–1230.

Higgins, E. T., Cesario, J., Hagiwara, N., Spiegel, S., & Pittman, T. S. (2010). Increasing or decreasing interest in activities: The role of regulatory fit. *Journal of Personality and Social Psychology, 98*, 559–572.

Higgins, E. T., Roney, C., Crowe, E., & Hymes, C. (1994). Ideal versus ought predilections for approach and avoidance: Distinct self-regulatory systems. *Journal of Personality and Social Psychology, 66*, 276–286.

Hull, C. L. (1934). "The rats' speed of locomotion gradient in the approach to food. *Journal of Comparative Psychology, 17*(3), 393–422.

Hull, C. L. (1943). *Principles of behavior*. New York: Appleton-Century-Crofts.

Keren, G., & Roelofsma, P. (1995). Immediacy and certainty in intertemporal choice. *Organizational Behavior and Human Decision Processes, 63*(3), 287–297.

Kivetz, R., Urminsky, O., & Zheng, Y. (2006). The goal-gradient hypothesis resurrected: Purchase acceleration, illusionary goal progress, and customer retention. *Journal of Marketing Research, 43*, 39–58.

Kruglanski, A. W., Shah, J. Y., Fishbach, A., Friedman, R., Chun, W., & Sleeth-Keppler, D. (2002). A theory of goal systems. In M. P. Zanna (Ed.), *Advances in experimental social psychology* (Vol. 34, pp. 331–378). San Diego, CA: Academic Press.

Lee, A. Y., & Aaker, J. L. (2004). Bringing the frame into focus: The influence of regulatory fit on processing fluency and persuasion. *Journal of Personality and Social Psychology, 86*, 205–218.

Lewin, K. (1926). *Vorsatz, Wille und Bedürfnis: mit Vorbemerkungen über die psychischen Kräfte und Energien und die Struktur der Seele.* Berlin: Springer.

Lewin, K. (1951). *Field theory in social science; selected theoretical papers* (D. Cartwright, Ed.). New York: Harper & Row.

Liberman, N., & Förster, J. (2008). Expectancy, value and psychological distance: A new look at goal gradients. *Social Cognition, 26*, 515–533.

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Liberman, N., & Trope, Y. (1998). The role of feasibility and desirability considerations in near and distant future decisions: A test of temporal construal theory. *Journal of Personality and Social Psychology, 75*, 5–18.

Liberman, N., & Trope, Y. (2003). Temporal construal theory of intertemporal judgment and decision. In G. Loewenstein, D. Read, & R. Baumeister (Eds.), *Time and decision* (pp. 245–276). New York Russel: Sage Foundations.

Liberman, N., & Trope, Y. (2008). The psychology of traversing the here and now. *Science, 322*, 1201–1205.

Liberman, N., Trope, Y., & Stephan, E. (2007). Psychological distance. In E. T. Higgins & A. Kruglanski (Eds.), *Social psychology: Handbook of basic principles* (2nd ed., pp. 353–381). New York: Guilford.

Locke, E. A., & Latham, G. P. (1990). *A theory of goal setting and task performance.* Englewood Cliffs, NJ: Prentice-Hall.

Loewenstein, G., & Elster, J. (Eds.). (1992). *Choice over time*. New York: Russell Sage Foundation.

Losco, J., & Epstein, S. (1977). Relative steepness of approach and avoidance gradients as a function of magnitude and valence of incentive. *Journal of Abnormal Psychology, 86*, 360–368.

Miller, N. E. (1944). Experimental studies of conflict. In J. McVicker Hunt (Ed.), *Personality and the behavior disorders* (Vol. 1, pp. 431–465). New York: Ronald Press.

Miller, N. E. (1959). Liberation of basic S-R concepts: Extension to conflict behavior, motivation and social learning. In S. Koch (Ed.), *Psychology: A study of a science* (Vol. 2, pp. 198–292). New York: McGraw-Hill.

Miller, N. E., & Kraeling, D. (1952). Displacement: Greater generalization of approach than avoidance in a generalized approach-avoidance conflict. *Journal of Experimental Psychology, 43*, 217–221.

Miller, N. E., & Murray, E. J. (1952). Displacement and conflict: Learnable drive as a basis for the steeper gradient of avoidance than of approach. *Journal of Experimental Psychology, 43*, 227–231.

Mischel, W. (1974). Processes in delay of gratification. In L. Berkowitz (Ed.), *Advances in experimental social psychology* (pp. 249–292). New York: Academic Press.

Mitchell, T. R. (1982). Expectancy-value models in organizational psychology. In N. T. Feather (Ed.), *Expectations and actions: Expectancy value models in psychology* (pp. 293–312). Hillsdale, NJ: Erlbaum.

Murray, E. J., & Berkun, M. M. (1955). Displacement as a function of conflict. *Journal of Abnormal Social Psychology, 51*, 47–56.

O'Donoghue, T., & Rabin, M. (2002). *Addiction and present biased preferences* (Working Paper Series: 1041). Department of Economics, Institute for Business and Economic Research, University of California–Berkeley.

Pennington, G. L., & Roese, N. J. (2003). Regulatory focus and temporal distance. *Journal of Experimental Social Psychology, 39*, 563–576.

Priester, J. R., Cacioppo, J. T., & Petty, R. E. (1996). The influence of motor processes on attitudes toward novel versus familiar semantic stimuli. *Personality and Social Psychology Bulletin, 22*, 442–447.

Prelec, D., & Loewenstein, G. (1991). Decision making over time and under uncertainty: A common approach. *Management Science, 37*, 770–786.

Rachlin, H. (1995). Self control: Beyond commitment. *Behavioral and Brain Sciences, 18*(1), 109–159.

Read, D., Loewenstein, G., & Kalyanaraman, S. (1999). Mixing virtue with vice: Combining the immediacy effect and the diversification heuristic. *Journal of Behavioral Decision Making, 12*, 257–273.

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Rigby, W. K. (1954). Approach and avoidance gradients and conflict behavior in a predominantly temporal situation. *Journal of Comparative and Physiological Psychology, 53*, 63–67.

Rotter, J. B. (1966). Generalized expectancies for internal versus external control of reinforcement. *Psychological Monographs, 80*, 1–28.

Savitsky, K., Medvec, V., Charlton, A. E., & Gilovich, T. (1998). What, me worry? Arousal, misattribution and the effect of temporal distance on confidence. *Personality and Social Psychology Bulletin, 24*(5), 529–536.

Schelling, T. (1984). Self command in practice, in policy and in a theory of rational choice. *American Economic Review, 74*(2), 1–11.

Shah, J., & Higgins, E. T. (1997). Expectancy × value effects: Regulatory focus as determinant of magnitude and direction. *Journal of Personality and Social Psychology, 73*, 447–458.

Sherman, S. (1980). On the self-erasing nature of errors of prediction. *Journal of Personality and Social Psychology, 39*(2), 211–221.

Smith, N. W. (1965). GSR measures of cigarette smokers' temporal approach and avoidance gradients. *Psychological Record, 15*, 261–268.

Solarz, A. (1960). Latency of instrumental responses as a function of compatibility with meaning of eliciting verbal signs. *Journal of Experimental Psychology, 59*, 239–245.

Thaler, R. H., & Shefrin, H. M. (1981). An economic theory of self-control. *Journal of Political Economy, 89*, 392–406.

Trope, Y., & Liberman, N. (2003). Temporal construal. *Psychological Review*, *110*, 403–421.

Trope, Y., & Liberman, N. (2010). Construal level theory of psychological distance. *Psychological Review, 117*, 440–463.

Tversky, A., & Kahneman, D. (1992). Advances in prospect theory: Cumulative representation of uncertainty. *Journal of Risk and Uncertainty, 5*, 297–323.

Vroom, V. H. (1964). *Work and motivation.* New York: Wiley.

Weiner, B., Russell, D., & Lerman, D. (1979). The cognition-emotion process in achievement-related contexts. *Journal of Personality and Social Psychology, 37*, 1211–1220.

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6

From Goals to Action

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THE GOAL-ACTION GAP

Goals are "internal representations of desired states" (Austin & Vancouver, 1996, p. 338), and goal intentions are people's self-instructions to achieve these desired states or to perform actions directed toward attaining them (e.g., "I will finish this chapter by dawn!"; Triandis, 1980). Translating one's goals into action is a complex process fraught with potential obstacles. Take, for example, New Year's resolutions. More than 60% of adults make New Year's resolutions, yet only 9% keep them for a whole year (PR Newswire, 1996). In fact, almost one third of people who make resolutions keep them for less than 1 week (PR Newswire, 1996). The small odds of turning such goals into action have even led mental health charities to warn against forming New Year's resolutions (BBC, 2009).

These rates of goal attainment for New Year's resolutions are consistent with accumulated evidence on the intention–behavior "gap" (Sheeran, 2002; Webb & Sheeran, 2006). Although goal intentions are conceptualized as the most immediate and important predictor of behavior and goal attainment in theories of goal striving, models of health behavior, and theories of attitude–behavior relations (summaries by Abraham, Sheeran, & Johnston, 1998; Austin & Vancouver, 1996; Bargh, Gollwitzer, & Oettingen, 2010; Conner & Norman, 2005; Eagly & Chaiken, 1993; Gollwitzer & Moskowitz, 1996; Locke, 2001; Maddux, 1999), a substantial proportion of people—even with strong intentions—fail to attain their goals. For instance, Fife-Schaw, Sheeran, and Norman (2007) used statistical simulations to assess the impact of an intervention that maximized participants' intention scores on rates of performance for 30 behaviors. Findings showed that although the median rate of performance increased by 32% compared to baseline, more than one fifth of the sample still failed to act on their "good"

intentions. Webb and Sheeran (2006) reviewed 47 experiments that were successful in changing intentions and found that a medium to large change in goal intentions (d_+ = 0.66) led to a small to medium change in behavior (d_+ = 0.36). This effect is equivalent to increasing rates of goal attainment from 41% in the control condition to 59% in the experimental condition (cf., Rosenthal & Rubin, 1982). In sum, goals are not always translated effectively into behavior. Thus, elucidating the route from goals to action requires an understanding both of the processes that promote the enactment of intentions and the processes that may undermine intention realization.

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FRAMEWORKS FOR UNDERSTANDING GOAL STRIVING

Several models have been developed to understand the various processes by which goals influence action. These models range from explanations of how people form goals (e.g., goal setting theory, Locke & Latham, 1990; fantasy realization theory, Oettingen, Hönig, & Gollwitzer, 2000; Oettingen & Mayer, 2002), through analyses of factors that influence goal realization (e.g., implementation intentions, Gollwitzer, 1993, 1999; the strength model of self-control, Muraven & Baumeister, 2000), to accounts of how newly adopted behaviors are maintained (Rothman, 2000) and unproductive goals are abandoned (Wrosch, Scheier, Carver, & Schulz, 2003a). Meta-frameworks such as the Rubicon model of action phases (Heckhausen, 1987; Heckhausen & Gollwitzer, 1986, 1987) and control theory (Carver & Scheier, 1982; Powers, 1973) attempt to provide an overview of these processes. The Rubicon model delineates four distinct phases to goal striving. The first is the predecisional phase in which people deliberate over which goal to pursue and then form a goal intention. Second is the preactional phase in which people decide when, where, and how to act. In the third phase, actional phase of the model, behavior is initiated and maintained if necessary. Finally, the outcome of the action is evaluated against what was desired in the postactional phase, and this assessment feeds into deliberations about what goals to pursue in the future. The Rubicon model has formed the basis for several recent reviews of the literature on goal striving (Achtziger & Gollwitzer, 2009; Gollwitzer & Sheeran, 2006).

CONTROL THEORY

The present review uses control theory to contextualize the processes involved in moving from goals to action. Control theory is perhaps the most influential meta-framework for understanding the processes that intervene between setting a goal and attaining that goal (Johnson, Chang, & Lord, 2006). However, the most recent comprehensive reviews of the model date from the late 1990s (Carver & Scheier, 1998, 1999), so an update on what has been learned during the past 10 years seems timely.

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Like the Rubicon model, control theory describes several steps that can be temporally distinguished (e.g., the process of setting goals comes before action). Control theory is, however, based on a discrepancy-reducing feedback loop that reflects the continuous nature of goal striving. Goals serve as reference values (or standards) within the feedback loop that functions "to negate, or reduce, sensed deviations from a comparison value" (Carver & Scheier, 1982, p. 112). Reference values are thought to be represented hierarchically from relatively high level reference values, comprising principles (be goals, e.g., "to be a good parent"), to specific behavioral goals (do goals, e.g., "to help my son with his homework"), and on down the hierarchy to motor programs (e.g., the muscle movements required to write). The idea is that the output of higher levels in the system provides the input to lower levels (e.g., helping one's son with his homework serves the goal of being a good parent). A comparator monitors the current rate of goal progress against the desired rate and signals any discrepancies via affect. When goal progress meets or exceeds expectancies, control theory asserts that the person will feel good. However, when progress falls short, the hypothesis is that the person will experience negative affect (Carver & Scheier, 1990). Once a discrepancy between the current and desired rate of goal progress is detected (e.g., "My son's homework is due tomorrow and I've not had a chance to help him yet"), the person will then respond by either (a) making efforts to reduce this discrepancy, or (b) revising his or her goal (Bandura, 1996; Williams, Donovan, & Dodge, 2000). If external influences (e.g., social or material circumstances) are favorable, these responses in turn impact the environment and determine the subsequent congruity between the current state and the desired state, and so the feedback loop continues.

Control theory thus suggests that four processes are essential for effective translation of goals into action: (1) setting goals or standards, (2) monitoring goal progress, (3) altering responses, and (4) revising or disengaging from unproductive goals. The remainder of this chapter considers evidence concerning each of these four processes in order to elucidate the ingredients of effective goal striving. First, we consider key features of set goals—goal dimensions, goal commitment, and self-regulation of goal setting—and their implications for ongoing goal pursuit and goal attainment. Second, we examine the process of monitoring goal progress. We review evidence concerning the impact of goal activation on the accessibility of goal-relevant information and information relating to competing goals and assess the impact of monitoring goal progress on rates of goal attainment. Third, we examine findings about altering responses. In particular, we focus on the self-regulatory challenges that must be met in order to initiate and maintain successful goal striving and on the role of counteractive self-control (Trope & Fishbach, 2005) and implementation intentions (Gollwitzer, 1993, 1999; Gollwitzer & Sheeran, 2006) in helping people to meet these challenges. Finally, we consider the factors that promote timely and appropriate disengagement from unproductive goals. Figure 6.1 presents an adapted feedback loop showing how these four processes influence the translation of goals into action.

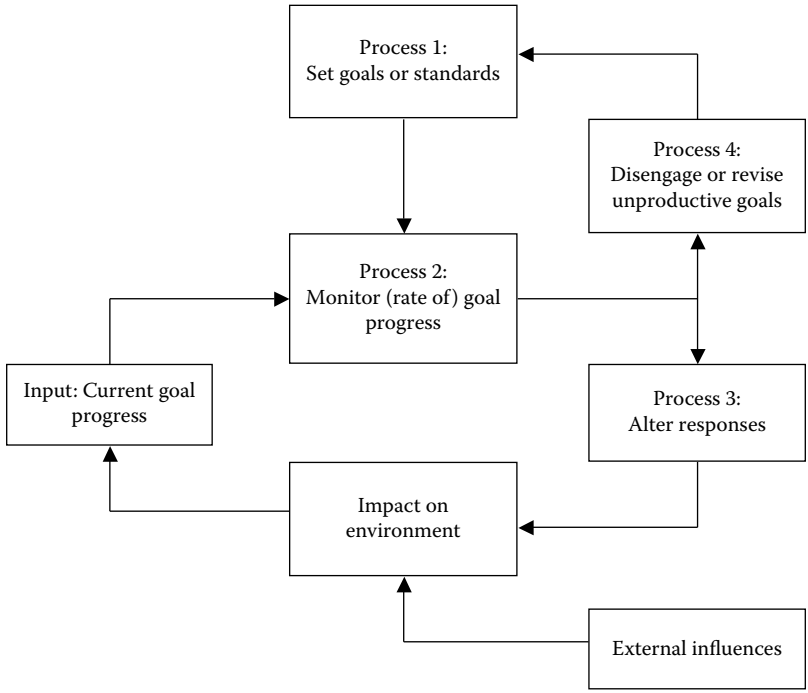


Figure 6.1 Feedback loop showing the key processes involved in translating goals into action. (Adapted from Carver, C. S., & Scheier, M. F., *Psychological Bulletin*, 92, 111–135, 1982.)

PROCESS 1: SETTING GOALS

Goal Dimensions

Goals vary on a number of dimensions that can influence their likelihood of being successfully translated into action. Fujita and MacGregor (Chapter 3, this volume) describe evidence pertaining to eight dimensions: (1) abstract versus concrete goals, (2) long-term versus short-term goals, (3) goals specifying means versus ends, (4) approach versus avoidance goals, (5) activation versus inhibition, (6) promotion versus prevention, (7) intrinsic versus extrinsic, and (8) performance versus mastery. Below we briefly review three additional dimensions that have specific implications for the relationship between goals and action: (1) difficult versus easy goals, (2) specific versus general goals, and (3) realistic versus unrealistic goals.

Difficult Goals Versus Easy Goals Goal-setting theory (Locke & Latham, 1990) focuses on two dimensions of goals that can influence performance: difficulty and specificity. *Goal difficulty* refers to the level of knowledge and skill that is required to achieve a goal (Locke, Shaw, Saari, & Latham, 1981) and, usually, is operationally defined in relative rather than absolute terms. For example, a sample of participants might be asked to rate the difficulty of consuming more vegetables relative to the difficulty of consuming more fruit.

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Goal-setting theory proposes that, after taking account of self-efficacy, the relationship between goal difficulty and performance tends to be positive and linear. That is, the best performance occurs as a function of difficult rather than easy goals. Brehm's theory of motivation (Brehm & Self, 1989; Brehm, Wright, Solomon, Silka, & Greenberg, 1983; Wright & Brehm, 1989) suggests that this might be because difficult goals present a challenge that people attempt to meet by mobilizing effort; so long as a desired goal is perceived as achievable, engagement will be a direct function of task difficulty. In general, meta-analyses support a linear relationship between goal difficulty and performance (Locke & Latham, 1990; Locke et al., 1981), although saturation is observed at very high levels of goal difficulty (i.e., when people are likely to give up; Erez & Zidon, 1984) and when potential motivation (i.e., the task's incentive value or ability to meet needs or higher-order goals) is low (Gendolla & Richter, 2006; for a review, see Wright, 2008).

Specific Goals Versus General Goals In relation to the second dimension—specificity—goal-setting theory proposes that specific goals are more effective than general "do-your-best" goals without a specific reference point (Locke & Latham, 1990; Locke et al., 1981). The classic study by Latham and Yukl (1975) asked a group of loggers to set a "difficult but attainable" production goal. A second group of loggers were simply urged to "do their best" and to provide permission for the research team to collect their weekly performance data. Consistent with the idea that specific goals improve performance, workers who set a production goal cut more cubic feet of wood per week than did participants asked to do their best. Recently, this finding was replicated in relation to public service improvement—setting specific performance standards for schools was associated with better examination results by pupils (Boyne & Chen, 2007).

Realistic Goals Versus Unrealistic Goals Considerable evidence suggests that people are unrealistically optimistic about the likely duration, ease, and consequences of goal striving (Polivy & Herman, 1999, 2000, 2002). Dieters, for example, may assume that weight loss will be relatively easy and influence many aspects of their lives (Brownell & Wadden, 1992), and undergraduates underestimate the amount of time it will take them to complete coursework (Buehler, Griffin, & Ross, 1994). People may even expose themselves to temptations that actually undermine goal attainment in the (mistaken) belief that they will be able to resist such temptations (Nordgren, van Harreveld, & van der Pligt, 2009). Such optimism may accrue from the failure to consider past performance during goal setting, for example by construing past failures as irrelevant to the current goal (Buehler et al., 1994), or as far from inevitable (Polivy & Herman, 2002). The "cold-to-hot empathy gap" (Loewenstein, 1996) or failure to account for the impact of visceral inputs (e.g., arousal, hunger) when one is in a cold (e.g., calm, satiated) state may also be influential. For instance, Nordgren, van der Pligt, and van Harreveld (2008) found that satiated dieters set more ambitious weight-loss goals than did dieters who were hungry, and smokers who were craving a cigarette

had less intention to quit than did participants who had smoked a cigarette just before taking part in the experiment.

One response to the phenomenon of unrealistic goal setting has been to find ways to promote greater realism. For instance, Buehler et al. (1994, Study 4) showed that participants who were instructed both to recall relevant past experiences about an assigned task and to make links between those experiences and their goals for the current task gave more realistic time completion estimates compared to participants who were merely asked to recall past experiences or to participants given no instructions.

More recently, Zhang and Fishbach (2010) investigated whether optimistic goal setting might actually have potential benefits. They proposed that making optimistic predictions about future goal attainments could constitute a self-control strategy that helps people to deal more effectively with obstacles during goal pursuit. Findings from five studies supported this prediction. Participants set themselves more ambitious goals when they anticipated more obstacles to goal attainment than few such obstacles. In addition, more optimistic goal setting resulted in better performance than did less optimistic goal setting. Findings suggested that the mechanism by which optimistic goal setting influences performance is that greater effort is allocated to ambitious goals (i.e., greater task persistence) than to less ambitious goals. Findings also revealed that when the importance of accurate goal setting is emphasized, greater anticipated obstacles led participants to form less ambitious goals and reduced efforts to overcome these obstacles. Thus, unrealistic goals may actually benefit rates of goal attainment by ensuring that effort is expended when one's progress is hindered.

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Goal Commitment

A central tenet of control theory (Carver & Scheier, 1982) is that goals serve as reference values or standards for ongoing perception and behavior. Goals thus involve cognitive representations (e.g., end points, milestones) and have been studied extensively in these terms (Kruglanski et al., 2002). However, a question remains about how cognitive representations engender motivation (i.e., mobilization of effort and allocation of resources in order to attain the goal). What imbues standards with value and energizes striving for the goal? Aarts, Custers, and colleagues recently discovered that attaching positive affect to goal representations may account for energization in the pursuit of goals (Aarts, Custers, & Holland, 2007; Aarts, Custers, & Marien, 2008; Custers & Aarts, 2005). In one study (Aarts et al., 2008), participants were either subliminally primed with physical exertion words (e.g., vigorous) or primed with the same words followed by subliminal presentation of positive adjectives, such that positive affect was attached to the exertion words. A control group was primed with neutral words. Subsequently, participants had to squeeze a handgrip for 3.5 s on three occasions as part of the experiment. Findings showed that the two primed groups were faster both to squeeze the handgrip and to reach maximum handgrip force compared to controls. These findings are in line with accumulated findings, indicating that the cognitive accessibility of goals influences performance (see Custers, Eitam, & Bargh, Chapter 8, this volume).

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However, consistent with the idea that positive affect promotes motivation, participants in the priming-plus-positive affect group exhibited greater mean force (i.e., effort) on the handgrip task over the course of the experiment. Thus, it appears that when goals are tagged with positive affect, people expend effort, mobilize energy, and devote resources to attaining those goals. Crucially, the experiment of Aarts et al. (2008) demonstrated that participants need not be aware of this affective tag for motivated behavior to ensue.

Measures of (conscious) goal commitment (e.g., "I intend to reach goal Z!," "I will try to do Z!") are assumed to capture the amount of time and effort that people will devote to reaching their goals (Ajzen, 1991), and meta-analyses indicate that the strength of goal intentions or goal commitment is reliably associated with rates of goal attainment (Armitage & Conner, 2001; Klein, Wesson, Hollenbeck, & Alge, 1999; Sheeran, 2002). However, as Ajzen (1991) pointed out, strong goal commitment on its own does not guarantee goal attainment. Two additional considerations are important. First, people must possess the resources, skills, opportunity, or cooperation needed to turn commitment into action, that is, they must have *actual control* over performing the behavior (see Sheeran, Trafimow, & Armitage, 2003, for an empirical demonstration). Second, commitment to the goal must not change during the interim between setting the goal and enacting it. If people change their minds, for instance, because of new information, then the original commitment measure can no longer be expected to predict behavior.

A substantial body of research has accumulated on factors that make for strong goal intentions that are designed to capture goal commitments, are resistant to change, and predict behaviors over extended time periods (reviews by Cooke & Sheeran, 2004; Sheeran, 2002). For instance, studies indicate that intentions better predict behavior when intentions are not only positive but also stable over time (Conner, Norman, & Bell, 2002; Conner, Sheeran, Norman, & Armitage, 2000; Sheeran & Abraham, 2003; Sheeran, Orbell, & Trafimow, 1999). In one study (Conner et al., 2002), temporal stability of intention was computed from measures of intention taken 6 months apart (times 1 and 2), which demonstrated improved consistency between time-2 intentions and behavior measured 6 years later (time 3). Stable goal intentions have also been found to attenuate the impact of past performance on subsequent behavior (Conner et al., 2002; Sheeran et al., 1999). Temporal stability of intention has a stronger effect on the intention–behavior relation, compared to other properties of intention (e.g., accessibility, certainty; Cooke & Sheeran, 2004), and mediates the effects of established moderators of this relation (e.g., self-schemas, anticipated regret; Sheeran & Abraham, 2003). Evidence also indicates that goal commitments that are temporally stable are more resistant to attack compared to less stable goal commitments (Cooke & Sheeran, 2010). In sum, temporal stability is a key indicator of strong goal commitments and is associated with improved prediction of behavioral outcomes.

Self-Regulation of Goal Setting

Goals differ not only on various dimensions and strength of commitment but also in terms of the type of self-regulatory thought that goes into their formation. Pham

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and Taylor (1999; Taylor, Pham, Rivkin, & Armor, 1998) investigated how participants' mental simulations of goals influence subsequent performance. Participants practiced imagining themselves gaining a high score in an upcoming exam (outcome simulation) or practiced imagining themselves studying for that exam (process simulation). Findings indicated that the process simulation benefited exam performance, whereas the outcome simulation did not. Mediation analyses indicated that the process simulation improved grades, not by increasing motivation or self-efficacy, but by reducing anxiety about the exam and promoting study plans. Process simulations appear mainly to benefit goal attainment when people are faced with a single choice. When choices have to be made between alternatives and there are substantive tradeoffs between desirability and feasibility considerations, then process simulations can harm performance (Thompson, Hamilton, & Petrova, 2009). This is because process simulations lead people to a focus on both means and ends. Process simulations thus engender greater difficulty in making decisions, which, in turn, reduces the quality and quantity of performance (Iyengar & Lepper, 2000; Thompson et al., 2009, Study 4).

Fantasy realization theory (Oettingen et al., 2000; Oettingen & Mayer, 2002) distinguishes three modes of self-regulatory thought during goal setting: (1) fantasizing about a desired future, (2) dwelling upon a negative reality, and (3) mentally contrasting fantasy with reality. Fantasizing involves the wishful imagination of desired outcomes and is typically manipulated by inviting participants to vividly imagine the most positive aspects of attaining their goal. Dwelling on a negative reality, on the other hand, involves reflecting on the obstacles, barriers, and hindrances in one's current experience that obviate achievement of the goal. This mode of thinking can be induced by asking participants to mentally elaborate on the most important obstacles that stand in the way of goal attainment (Oettingen, Pak, & Schnetter, 2001). In isolation, both of these modes of thinking are assumed to lead to goal commitments of modest quality because the person neglects expectancy information (how feasible is obtaining the goal); that is, the person is too wrapped up in thoughts about how wonderful the future will be or how terrible things are at present to take the likelihood of goal attainment into account. However, there is benefit to combining and contrasting these two modes of thought. This *mental contrasting* route to goal setting involves juxtaposing one's fantasies about the future with obstacles from one's present reality that get in the way of realizing that future. Typically, participants are invited to imagine vividly the best thing about attaining their goal, then imagine the biggest obstacle standing in their way, and then repeat this exercise for the second best thing and second biggest obstacle. Engaging in mental contrasting in this manner should induce "a necessity to act" (Oettingen et al., 2001, p. 737), to turn one's negative reality into one's desired future, if so doing is feasible. This mode of self-regulatory thought is expectancy based because high-quality goal commitment should only emerge if the person has both engaged in mental contrasting and has high expectations of success.

Several studies have supported these predictions. Compared to participants with high expectations who merely fantasized about the desired future or dwelled upon the negative reality, participants with high expectations who mentally

contrasted future and reality showed higher quality goal commitment in terms of greater anticipated disappointment about not achieving their goal and greater inclination to plan. These participants were also faster to initiate action and exhibited greater observer-rated effort and performance (Oettingen et al., 2001). Mediation analyses have shown that energization, measured via changes in systolic blood pressure and self-reports, is the intervening variable that explains the relationship between expectations and task performance when participants have mentally contrasted fantasy with reality (Oettingen et al., 2009).

A long history of research attests to the benefits of mental practice in promoting athletic and sports performance (Kossylin & Moulton, 2009). Mental practice combined with physical practice appears to be more effective than mental or physical practice on its own (Brouziyane & Molinaro, 2005; Grouios, 1992). Recent research suggests, however, that goal attainment can be promoted by combining mental imagery with simple embodied manipulations that have minimal physical resemblance to the focal activity (Sherman, Gangi, & White, 2010). Participants watched a health video while either imagining themselves flossing their teeth or while touching a piece of floss and imagining themselves flossing their teeth. Analysis of the number of flosses returned after 1 week indicated greater intention-behavior consistency in the embodied imagery condition compared to the imagery-only condition. Equivalent findings were obtained in a second study of exercise behavior where the embodied imagery condition involved walking on the spot while viewing a health video. In sum, the types of goals that people set, their commitment to those goals, and the ways that people think and act when setting their goals can each have an important impact on rates of goal attainment.

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PROCESS 2: MONITORING GOAL PROGRESS

According to control theory (Carver & Scheier, 1982), the second key process in translating goals into action is monitoring goal progress. Monitoring involves periodically noting the qualities being expressed in behavior and comparing these perceptions with salient reference values (Carver & Scheier, 1990). The person can monitor the behavior itself (e.g., number of desserts eaten per week) or monitor the outcomes of behavior (e.g., weight gain; Abraham & Michie, 2006). Monitoring may also vary on a temporal dimension (e.g., hourly, daily, or weekly monitoring) and with respect to different levels of the control hierarchy (e.g., at the principle level vs. the behavioral level).

Monitoring involves comparing information about current behavior against a desired standard so attention must be directed toward goal-relevant information. The idea that information relevant to monitoring goal progress is a processing priority is exemplified in Goschke and Kuhl's (1993) demonstration of "intention superiority" effects, whereby goal-relevant information receives greater activation compared to irrelevant information. Recently, Johnson et al. (2006) meta-analyzed evidence on the processing of goal-related information and found support for three hypotheses. First, goals were found to prime closely related information. In particular, goal activation reduced response latencies to information related to the

goal ($d_+ = -0.34$) and increased the likelihood that goal-related information will be accessed ($d_+ = 0.46$). For instance, Aarts and Dijksterhuis (2000a) found that priming the goal to travel resulted in shorter response latencies to participants' characteristic means of transportation than to alternative means. Aarts and Dijksterhuis (2000b) further found that when participants were under cognitive load, they were likely to access their characteristic means of transport even when instructed not to do so—participants seemed to find it hard to suppress this information about their goal.

Second, Johnson et al. (2006) found that activating a personal goal curbs the activation of competing goals ($d_+ = -0.22$). The research by Shah, Friedman, and Kruglanksi (2002) on goal shielding showed that subliminal activation of goals reduced the accessibility of alternative goals. These effects were more pronounced the more committed participants were to the focal goal and the more the alternative goal served the same higher-order goal as the focal goal. Inhibiting alternative goals is not only valuable in terms of conserving working memory resources that may be needed to monitor goal progress, however. Shah et al. also found that reduced activation of the alternative goal was directly related to greater persistence and performance in relation to the focal goal (see also Shah & Kruglanski, 2002).

Once goals have been attained or the window of opportunity for their attainment has passed, it is no longer necessary to monitor goal progress, so goal-related information should not continue to receive greater activation. This third hypothesis was supported by several findings (Johnson et al., 2006). Information about completed goals was found to be less accessible (a) in lexical decision tasks ($d_+ = -0.43$), (b) when personal goals were established and the comparison involved neutral information ($d_+ = -0.22$), and (c) when the accessibility of completed goal information was compared with to-be-completed goal information ($d_+ = -0.20$). Reduced activation of completed goal information is likely to be highly functional as the person is once more receptive to alternative goals that may be relevant to the situation at hand (Wrosch, Scheier, Miller, Schulz, & Carver, 2003b). In summary, the meta-analysis from Johnson et al. suggests that people monitor their progress to goal attainment by keeping goal-relevant information active while inhibiting the activation of irrelevant information and competing goals. These processes are switched off when the goal is no longer relevant.

Early research suggested that focusing attention on the self is needed to make reference values salient and to aid identification of discrepancies between the current and desired state (Duval & Wicklund, 1972). For example, Carver (1974) used a Milgram-esque paradigm in which participants were asked to deliver shocks to a learner under the cover story that high levels of shocks would improve learning. Self-focused attention was manipulated by asking half of the participants to complete this task in front of a mirror. Consistent with the idea that self-focus improved discrepancy detection, participants who performed the task in front of a mirror delivered larger shocks to the learners than did control participants; self-focused participants' behavior was closer to the (experimenter-provided) standard of delivering high shocks to improve learning (see also Dijksterhuis & van Knippenberg, 2000; Slapion & Carver, 1981).

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Recent research, however, suggests that the detection of discrepancies may be automatic. Aarts, Gollwitzer, and Hassin (2004) primed participants with the goal of earning money and investigated how quickly and intensively they worked in order to take part in a prize draw. Findings showed that priming induced participants to work faster and harder but only when they needed money (i.e., when there was a discrepancy between participants' actual and desired states). Discrepancy detection could be deemed automatic because debriefing indicated that participants were not aware of the operation of the goal of making money and thus could not have consciously monitored progress with their goal. Whereas goal priming generates a discrepancy from the actual state by introducing a new standard (the activated goal), discrepancies can also accrue from changing the actual state so that it no longer matches the desired standard. Custers and Aarts (2007) investigated such discrepancies by presenting participants with goal-discrepant situations (e.g., "The shoes you put on look dirty") and assessing the accessibility of actions that are instrumental for resolving the discrepancies (e.g., "polish"). Findings showed that goal-discrepant situations automatically activated instrumental responses, but only when the relevant goal was accessible. Subliminal priming of the goal of being well groomed (Study 2B) meant that the process of discrepancy detection must have occurred outside of participants' awareness (i.e., automatically).

Numerous empirical studies attest to the importance of monitoring for turning goals into action. For example, Polivy, Herman, Hackett, and Kuleshnyk (1986) manipulated the ability of restrained eaters under preload to monitor how much participants ate in a taste test. Participants were asked to taste individually wrapped chocolates and to "taste as many as necessary to ensure accurate ratings." Participants in the "public attention" condition were told to leave their chocolate wrappers on the table beside them. This meant that participants (and the experimenter) could easily monitor how many chocolates they had eaten. Participants in the "self-attention" condition were told to leave their wrappers on the table until they had finished tasting and then to put them in the wastebasket (which was already half-full). This condition allowed participants to monitor how many chocolates they had eaten, but this information did not become public because the wrappers were added to the wastebasket before the experimenter returned. Finally, participants in the "no attention" condition put wrappers straight in a half-full wastebasket and had no opportunity to monitor their consumption. Consistent with the idea that monitoring goal progress is needed to reach weight-control goals, findings showed that participants ate more chocolates in the no-attention condition as compared to the other two conditions.

Equivalent findings were obtained in a recent meta-analysis of behavioral interventions for physical activity and healthy eating (Michie, Whittington, Abraham, McAteer, & Gupta, 2009). Interventions that prompted participants to monitor progress with their goals (e.g., by asking participants to keep an activity diary; Arao et al., 2007) had a significantly greater impact on goal achievement ($d = 0.41$) compared to interventions that did not use self-monitoring ($d = 0.26$). In fact, self-monitoring explained more between-study heterogeneity than 26 other

behavior change techniques that were investigated in the review. These findings indicate that self-regulatory failures can occur in important applied domains when people do not effectively check how well their actions meet behavioral standards and attest to the importance of monitoring goal progress in promoting effective goal striving.

PROCESS 3: ALTERING RESPONSES

Once goals have been set and ongoing goal pursuit is being monitored, control theory suggests that the next self-regulatory task is to act on discrepancies as and when they arise. For instance, if negative affect signals that the rate of goal progress is slower than desired, the person must *initiate* a response that will move him or her closer to the desired goal. Effective goal striving may also require that the person *maintain* this response until the discrepancy is reduced. We consider these issues in turn.

Initiation

One of the key self-regulatory tasks for the successful initiation of a desired response is identifying a suitable opportunity in which to act (Gollwitzer, 1999). Identifying a good opportunity involves an assessment of whether the anticipated contextual circumstances will support or hamper instrumental responses (i.e., "Is the particular time, place, and circumstance conducive to getting started with my goal?"). There is evidence that people actively select situations that support their current concerns and motives (Emmons & Diener, 1983). Situation selection can be stable in that people choose situations that sustain behavior(s) consistent with their personality traits (Buss, 1987; Costa & McCrae, 1980), but also dynamic, varying according to the person's current concerns. For example, a student faced with an upcoming exam might decide to study in the library rather than at home in order to avoid the temptation to watch a favorite television program (Trope & Fishbach, 2005).

Once the opportunity to act has been identified, it is necessary to seize it in order to translate one's goal into action. Seizing one's opportunity may be especially difficult when (a) the relative balance of short-term costs versus long-term benefits favors inaction (e.g., when one has to get out of bed early to get to the gym before work; Hall & Fong, 2007), or (b) there is a deadline for performing the behavior or when the opportunity to act is presented only briefly (Gollwitzer & Sheeran, 2006). For example, Dholakia and Bagozzi (2003, Study 2) found that when there was only a limited window of opportunity to visit a website only 37% of participants who formed goal intentions were successful at accomplishing this task.

One way to ensure that good opportunities are seized is to form a plan specifying how to respond when the anticipated opportunity arises. Implementation intentions (Gollwitzer, 1993, 1999; Gollwitzer & Sheeran, 2006) are if-then plans that link suitable opportunities for goal striving (specified in the if part of the plan) with goal-directed responses (specified in the then part of the plan). For example,

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one might supplement the goal to visit a website with the if-then plan "If it is 3 p.m. and I am at home, then I will turn on my computer and spend 5 minutes on the website!" Dholakia and Bagozzi (2003) found that participants who formed an implementation intention specifying when, where, how, and for how long they planned to visit a website were much more likely to visit (86% did so), even when the website was available for only a short time.

Implementation intentions have been shown to be effective because they delegate action control from the self to relevant situational cues (Gilbert, Gollwitzer, Cohen, Oettingen, & Burgess, 2009). The *if (opportunity)–then (response)* structure of implementation intentions means that people are highly sensitive to opportunities to act that they have selected (e.g., Aarts, Dijksterhuis, & Midden, 1999) and respond swiftly to those opportunities (Gollwitzer & Branstätter, 1997; Webb & Sheeran, 2007). A meta-analysis of 94 studies (Gollwitzer & Sheeran, 2006) found that implementation intention formation had a medium to large effect on goal attainment ($d_+ = 0.65$). Reliable effects of implementation intentions have been observed in a wide variety of goal domains, including health and environmental behaviors (e.g., Bamberg, 2000; Holland, Aarts, & Langendam, 2006; Milne, Orbell, & Sheeran, 2002; Sheeran & Orbell, 2000), completion of personal projects (e.g., Koestner, Lekes, Powers, & Chicoine, 2002), and emotion control (e.g., Schweiger-Gallo, Keil, McCulloch, Rockstroh, & Gollwitzer, 2009; Webb, Ononaiye, Sheeran, Reidy, & Lavda, 2010).

Another means of ensuring that the person capitalizes on suitable opportunities involves shifting the temporal balance of costs and benefits by imposing self-penalties for failure, self-rewards for appropriate responding, or by bolstering the subjective value of the instrumental response (i.e., *counteractive self-control*; Trope & Fishbach, 2005). For example, Trope and Fishbach (2000) showed that participants set higher self-penalties for failing to strive for a difficult goal (abstain from food for 3 days) relative to an easier goal (abstain from food for 6 hours), and they were more willing to receive a reward after a medical procedure (as opposed to before) if the procedure was described as highly uncomfortable. Participants were also likely to see a test as worthwhile and valuable (i.e., evaluatively bolster the test) when the opportunity to take the test was less rather than more convenient.

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Maintenance

Once an instrumental response has been initiated, the person must flexibly step up efforts to maintain that response until the desired outcome is achieved (Mischel, Cantor, & Feldman, 1996). Rothman (2000) proposed that the factors that determine effective maintenance of goal striving are different from those that determine effective initiation. In particular, whereas motivation and expectancies drive action initiation, maintenance depends on perceived satisfaction with received outcomes. That is, a person will maintain a response that produces outcomes with which they are satisfied. Support for these ideas comes from studies of smoking cessation and weight loss (Hertel et al., 2008; Rothman & Jeffrey, 1998, cited in Rothman, 2000). For example, Rothman and Jeffrey (1998) found that women who

maintained weight loss attributed more benefits to losing weight than did women who initially lost the same amount of weight but failed to maintain their weight loss.

The idea that maintenance depends on satisfaction with outcomes might seem to conflict with control theory's assertion that a reduced discrepancy between current and desired state makes it more likely that the person will coast ("not necessarily stop, but ease back such that subsequent rate of progress returns to the criterion," or shift to striving for alternative goals; Carver, 2003, p. 246). However, Rothman (2000) argued that maintenance is best conceptualized as an avoidance-based self-regulatory system in which the target is to sustain the discrepancy between a current state and an undesired reference state. Consistent with this idea, Fuglestad, Rothman, and Jeffery (2008) found that regulatory focus (Higgins, 1998, 2000) had differential effects on the initiation versus maintenance of goal striving. Promotion-focused participants (who show eagerness in pursuing desired end states) were better at initiating weight loss and quitting smoking, whereas prevention-focused participants (who show vigilance in avoiding undesirable end states) were better at maintaining these outcomes.

Central to effective maintenance is the process of safeguarding goal striving from potential threats. Safeguarding goal striving, also been termed *goal shielding* (Shah et al., 2002) and *preventing derailment* (Gollwitzer & Sheeran, 2006), involves ensuring that the desired response is protected from external (e.g., situations that activate competing goals) and internal threats (e.g., detrimental self-states like negative mood or depleted regulatory resources). Goal-shielding theory (Shah et al., 2002) suggests that competing goals can create an "approach–approach" conflict, pulling resources away from a focal goal and influencing commitment, progress, and the development of effective means, as well as emotional responses, to positive and negative feedback concerning striving efforts (Shah & Kruglanski, 2002). As the meta-analysis by Johnson et al. (2006) indicates, selective attention to information about the focal goal may be crucial in resolving such approach–approach conflicts.

There is also evidence that people can deal with potential threats to goal striving automatically via a process known as "implicit counteractive self-control" (Trope & Fishbach, 2005). Fishbach, Friedman, and Kruglanski (2003, Study 1) found that presenting threats to goal striving (e.g., competing goals like *TV*) facilitated latencies to words representing the focal goal (e.g., *study*). In another study (Study 5), restrained eaters who waited in a room containing popular high-fat foods (temptation prime) were more likely to select a healthy snack as a reward for participating in the experiment than were participants who sat in a room that contained no foodstuffs (neutral prime). Extensive debriefing revealed that participants had no awareness of the effect of the prime on their behavior. It appears that people automatically respond to threats by increasing the activation level of the focal goal, and this effect is particularly pronounced among individuals who are more successful at self-regulation (see also Papies, Stroebe, & Aarts, 2007).

When people have chronic self-regulatory difficulties or when temptations or competing goals become overwhelming, additional strategies may be needed to safeguard goal striving. Implementation intention formation has proved effective in this regard. For instance, Sheeran, Webb, and Gollwitzer (2005, Study 2)

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activated the goals of being both fast and accurate at a task and found that forming if-then plans to support speed of performance engendered faster responses and did so without compromising response accuracy. Participants in the study by Gollwitzer and Schaal (1998) had to solve taxing arithmetic problems while being repeatedly exposed to attractive, award-winning commercials. Some participants only formed the goal intention not to let themselves get distracted, whereas participants in two implementation intention conditions either planned to work harder in the presence of distractions ("As soon as I see moving pictures or hear sounds, then I will increase my efforts on the arithmetic tasks!"; task-facilitating plan) or they planned to ignore the distractions ("As soon as I see moving pictures or hear sounds, then I will ignore them!"; temptation-inhibiting plan). Findings showed that both types of implementation intentions engendered better task performance compared to the goal intention condition.

In addition to external threats to goal striving, there is also evidence that a number of internal states can increase the goal–action gap. For example, although control theory proposes that negative affect signals discrepancies and so motivates discrepancy-reducing responses, evidence indicates that negative mood actually hampers self-control. In an illustrative experiment, Tice, Bratslavsky, and Baumeister (2001, Experiment 1) found that participants who read a distressing story ate more high-fat snacks in an ostensibly unrelated taste test than did participants who read a control story. Mood no longer influenced snack intake, however, when participants were given a cover story that convinced them that their mood could not be changed ("mood freezing"). The implication is that negative moods lead people to prioritize immediate pleasures in an effort to repair their mood, even though the indulgence may be detrimental to their long-term goals. Effective translation of goals into action therefore often requires that the person either (a) regulate detrimental affective states such that these states no longer threaten goal striving, or (b) shield goal striving from the unwanted influence of affect. There is some evidence that implementation intentions can promote effective emotion regulation (Schweiger-Gallo et al., 2009; Sheeran, Aubrey, & Kellett, 2007) and safeguard ongoing goal pursuit both from unwanted feelings (Bayer, Gollwitzer, & Achtziger, 2010; Sheeran et al., 2007; Webb, Sheeran, et al., in press) and chronic affective states like social anxiety (Webb, Ononaiye, et al., 2010).

A second internal threat to maintaining goal-directed responses is limited self-regulatory resources (Muraven & Baumeister, 2000). Evidence indicates that physical, mental, and emotional self-control tasks draw upon the same pool of resources and that this pool is diminished by successive acts of self-control. For example, Mead, Baumeister, Gino, Schweitzer, and Ariely (2009) found that writing a short essay without using words that contain the letters A and N meant that participants were more likely to cheat on a subsequent math task, compared to participants who wrote an essay without using words that contain the letters X and Z. The self-control needed to inhibit the use of common words on the essay task appeared to deplete the regulatory resources needed to overcome the desire to cheat. This temporary reduction in self-control capacity is termed *ego depletion* (Baumeister, Bratslavsky, Muraven, & Tice, 1998; Muraven, Tice, & Baumeister, 1998). A recent review of 82 studies of the effects of ego depletion revealed a

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medium to large effect (d_+ = 0.62) on self-control performance (Hagger, Wood, Stiff, & Chatzisarantis, 2010).

Overcoming the impact ego depletion has on the maintenance of goal striving requires that the person finds a way to boost his or her limited self-control resources. Several studies suggest that this may be possible. Muraven (2010) found that self-control might be trained via repeated practice, much like a physical muscle (see also Muraven, Baumeister, & Tice, 1999; Oaten & Cheng, 2006a, 2006b). Participants' capacity for self-control was measured using a stop signal procedure (de Jong, Coles, Logan, & Gratton, 1990; Logan, 1994). Next, participants either practiced self-control for a 2-week period (by avoiding sweets or holding a handgrip for as long as possible each day) or did not (participants performed math puzzles or completed a diary). Two weeks later, participants who practiced self-control showed improved performance on the stop signal task compared to baseline (i.e., better self-control), whereas there was no improvement among participants who did not practice self-control. Gailliot et al. (2008) proposed a fast means of boosting self-control—consuming a drink that contains glucose, such as lemonade. The idea is that glucose fuels self-control, so replenishing this energy source should permit repeated acts of goal striving. Consistent with this idea, Gailliot et al. (2008, Study 7) showed that drinking beverages made from powdered drink mixes reduced the impact of an initial exertion of self-control (to ignore words presented on a video) on subsequent Stroop task performance. Martijn and colleagues (Martijn, Alberts, & de Vries, 2006; Martijn, Tenbült, Merckelbach, Dreezens, & de Vries, 2002) suggested that people's expectations about tiredness and limited willpower may also be important influences on ego depletion. Martijn et al. (2002, Experiment 1) challenged participants' expectancies about the impact of emotional suppression by telling some participants that "people may actually perform better on a physical exertion task after an emotional effort" (p. 447). These participants subsequently outperformed participants who had also engaged in emotional suppression task (ego-depletion condition) and participants who engaged in a control task. Ego depletion was eliminated and even reversed when participants' expectancies about the limits of their self-control capacity were challenged.

PROCESS 4: DISENGAGEMENT

The final issue pertaining to the effective translation of goals into action is disengaging from goal striving that has become unproductive (for a review, see Wrosch et al., 2003a). Disengagement may be necessary because (a) the desired outcome has been achieved, (b) it has become clear that the desired outcome is unattainable, or (c) the costs of responding outweigh the benefits. The first challenge is to identify when any of these three circumstances has arisen. Identifying whether the desired outcome has been achieved or is unattainable requires not only well-specified standards for performance (e.g., "I intend to help my child achieve a GPA of 3.5"), but also careful monitoring of ongoing progress (e.g., regularly asking one's child for their test results) and a realistic evaluation of possible outcomes (e.g., "A GPA of 3.5 might not be attainable for my child"). Identifying when responding has become costly is perhaps an even more considerable challenge,

not least because the person may not be aware of the costs accruing to her- or himself or others.

Once the person has identified that disengagement is necessary, the next challenge is to actually cease the ongoing goal pursuit. Several factors can make it difficult to call a halt. For instance, when a response has become a well-rehearsed routine, people may not possess the necessary self-control resources to deviate from that response (Baumeister, Heatherton, & Tice, 1994; Neal & Wood, 2006, cited in Neal, Wood, & Quinn, 2006; Vohs, Baumeister, & Ciarocco, 2005). Similarly, people may be unwilling to relinquish goal striving when they have already invested considerable effort. Such investments are known as sunk costs (Arkes & Blumer, 1985; Garland, 1990) and result in entrapment (Brockner, 1992; Brockner, Rubin, & Lang, 1981) and escalation of commitment (e.g., Tan & Yates, 2002), that is, further investment in a failing course of action. Disengagement may also be hampered by difficulties in deciding how to respond—whether to reduce effort directed at goal striving, relinquish commitment to the goal, or both (Wrosch et al., 2003a).

What strategies promote effective disengagement? Wrosch et al. (2003b) pointed to a series of factors that influence a person's ability to disengage: (a) the clarity with which people anticipate the consequences of their goal pursuit—people who clearly perceive a goal to be unattainable should disengage sooner than people whose perceptions are hazier, (b) approach versus avoidance motivation—individuals who are motivated to avoid failure should disengage sooner than those who are more concerned with attaining success, and (c) attributional style—people who attribute goal failure to lack of ability may have an easier time accepting that the outcome is unattainable than people who attribute failure to situational factors. In addition, evidence points to the influence of type A personality (Schaubroeck & Williams, 1993), dispositional optimism (Aspinwall & Richter, 1999), and conscientiousness (Moon, 2001) on disengagement.

Each of these factors, however, refers to relatively stable features of individuals' personalities and begs the question, how can effective disengagement be promoted? Henderson, Gollwitzer, and Oettingen (2007) argued that forming implementation intentions might be helpful in this regard. To test this hypothesis, participants were all asked to select one strategy that they thought would maximize their performance on a knowledge test from several presented strategies, and then justify their choice of strategy to induce escalation of commitment (Bobocel & Meyer, 1994). Participants in two implementation intention conditions specified what they would do in the face of evidence that their chosen strategy was ineffective ("If I receive disappointing feedback …"). One of the implementation intentions specified reflection ("… then I'll think about how things have been going with my strategy!"), the other specified action ("… then I'll switch my strategy!"). Participants in the control conditions received no instructions or formed the goal intention to use the best strategy during the test. After 10 trials on the general knowledge test, participants were told that their performance was rated poor to moderate relative to others. The critical dependent variable was whether participants would change or maintain their initial strategies. Consistent with the idea that implementation intentions facilitate disengagement from futile

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means of goal striving, participants in both planning conditions were more likely to switch strategies compared to participants in the control or goal intention conditions. A second study (Henderson et al., 2007) indicated that implementation intentions promoted effective disengagement even when participants were under cognitive load.

Appropriate and timely disengagement from unproductive goal striving can free resources to reengage with valued alternative goals (Shah, 2005; Wrosch et al., 2003b). So doing is associated with improved well-being. For example, Wrosch et al. (2003b, Study 1) asked undergraduates to identify goals that they had decided to stop pursuing during the past 5 years and to rate how easy it was to reduce their commitment and effort toward these goals. Participants were also asked to rate the extent to which they generally reengage in new goals if they faced setbacks in ongoing goal pursuits. Findings showed that undergraduates who were able to disengage from unattainable goals and reengage in new goals exhibited higher levels of subjective well-being than students who reported difficulties with goal disengagement and reengagement (see also Miller & Wrosch, 2007; Wrosch, Gregory, Scheier, & de Pontet, 2007).

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ISSUES FOR FUTURE RESEARCH

Several issues warrant further research. We will focus on four of them here. The first concerns the role of emotion in understanding the gap between goals and action. Anticipated emotions such as regret and disappointment appear to play an important role in galvanizing goal commitment (Oettingen et al., 2001; Sheeran & Abraham, 2003) and experienced emotions (e.g., depression, anxiety); both constitute key outcomes of success and failure in goal striving (Wrosch et al., 2007; Wrosch et al., 2003b) and influence how well people shield ongoing goal pursuits from competing goals (Shah et al., 2002). According to control theory, however, positive and negative affect has a functional role in directing action. In particular, the speed of reducing a discrepancy from a set standard is hypothesized to influence affect, and affect in turn is hypothesized to determine effort and performance (Carver, 2003; Carver & Scheier, 1999). Thus, when discrepancies are being reduced quickly, people should experience positive affect and consequently be likely to coast (reduce effort). On the other hand, when the rate of discrepancy reduction is low (progress is too slow), negative affect should accrue and effort increase. Control theory thus accords affect a crucial role in determining the dynamics of goal pursuit. Although some preliminary evidence supports these ideas (e.g., Carver, Lawrence, & Scheier, 1999; Hsee & Abelson, 1991), more research is needed to discover whether affect indeed mediates the relationship between rates of goal progress and intensity of goal striving (Gollwitzer & Rohloff, 1999) and to clarify the functions of automatic affective reactions as compared to consciously experienced or anticipated emotions in goal striving (Baumeister, Vohs, DeWall, & Zhang, 2007).

A second issue that deserves greater attention is the role of energization (motivation). Research on cognitive aspects of goals such as intergoal relations (Shah

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et al., 2002) and processing of goal-relevant information (Johnson et al., 2006) has been complemented by recent work on "hot" features of goals (Aarts et al., 2008; Oettingen et al., 2009). Effort increasingly appears as the key dependent variable in empirical studies (Zhang & Fishbach, 2010), and effort expenditure and energy mobilization may proximally determine task performance (quality, quantity) and rates of goal attainment. Greater deployment of effort allocation measures (including neuroscientific and physiological indices) would permit tests of the role of energization in mediating the relationship between goals and action. So doing could also help to answer important questions about when the various antecedents of effort (e.g., goal commitment, self-concordant goals) lead to greater apportioning of this limited resource to goal striving (e.g., when expectancies are high, when monitoring goal progress is easy) and what concommitants of energization may be needed to secure goal attainment.

Third, an influential line of research on "auto-motives" (Bargh, 1994; Bargh, Gollwitzer, Lee-Chai, Barndollar, & Trotschel, 2001) has shown that the initiation of goal-directed responses can occur automatically, that is, without the person consciously intending to act or being aware of goal activation or a discrepancy from standards (see Custers, Eitam, & Bargh, Chapter 8, this volume). There are now numerous demonstrations that unconscious goal striving exhibits similar properties to conscious efforts to reach a goal (e.g., both types of goals increase in strength over time and are resumed after disruption; for reviews, see Dijksterhuis, Chartrand, & Aarts, 2007; Fitzsimons & Bargh, 2004). More recent research has also begun to investigate differences between conscious and unconscious goal pursuit and when and how shifts between these modes of goal striving may occur (Bongers & Dijksterhuis, 2009; Gollwitzer, Parks-Stamm, & Oettingen, 2009). To complement this work, systematic research is needed that (a) compares and contrasts the processes by which conscious and unconscious goals are translated into action, and (b) investigates how conscious and unconscious mechanisms combine to enable people to pursue multiple, sometimes conflicting, goals (see also Chapter 9, this volume).

The final related issue for future research is greater integration of research across the topics covered here. For understandable reasons, studies that focus, for example, on features of set goals rarely also examine goal monitoring or the initiation and maintenance of responses. Similarly, research on maintaining responses only occasionally makes reference to goal dimensions (Fugelstad et al., 2008) or the type of thinking that went into setting the goal (e.g., mental contrasting). Even within the topics reviewed here, particular foci are apparent. For instance, research on altering responses concentrates on response initiation; few studies have examined maintenance processes over the length of time needed to observe meaningful outcomes (Rothman, 2000) or assessed processes of goal reengagement after maintenance failure. Although there are good reasons why research on the goal–action gap has not so far been integrated, there are also good reasons why it should be: The insights needed to offer a full account of the processes that go from goals to action are only likely to arise when the issues of setting, monitoring, and implementing goals are studied together and assessed in both laboratory and field settings.

CONCLUDING REMARKS

For a long time it was assumed that setting a goal or forming a behavioral intention more or less guaranteed behavioral performance and goal attainment. However, during the past 10 to 15 years research has both revealed that there is often a substantial gap between goals and action and made substantial progress in identifying the key processes that explain the goal–action gap. The present review used control theory as a meta-framework for discussing research pertaining to four key processes: (1) goal setting, (2) monitoring, (3) altering responses, and (4) disengagement. Although substantial insights have been gleaned into each of these processes, further research on bridging the gap between goals and action is still needed—not least to ensure that mental health charities can declare it safe to form New Year's resolutions.

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REFERENCES

Aarts, H., Custers, R., & Holland, R. W. (2007). The nonconscious cessation of goal pursuit: When goals and negative affect are coactivated. *Journal of Personality and Social Psychology, 92*, 165–178.

Aarts, H., Custers, R., & Marien, H. (2008). Preparing and motivating behavior outside of awareness. *Science, 319*, 1639.

Aarts, H., & Dijksterhuis, A. (2000a). Habits as knowledge structures: Automaticity in goal-directed behavior. *Journal of Personality and Social Psychology, 78*, 53–63.

Aarts, H., & Dijksterhuis, A. (2000b). The automatic activation of goal directed behavior: The case of travel habit. *Journal of Environmental Psychology, 20*, 75–82.

Aarts, H., Dijksterhuis, A., & Midden, C. (1999). To plan or not to plan? Goal achievement or interrupting the performance of mundane behaviours. *European Journal of Social Psychology, 29*, 971–979.

Aarts, H., Gollwitzer, P. M., & Hassin, R. (2004). Goal contagion: Perceiving is for pursuing. *Journal of Personality and Social Psychology, 87*, 23–37.

Abraham, C., & Michie, S. (2008). A taxonomy of behavior change techniques used in interventions. *Health Psychology, 27*, 379–387.

Abraham, C., Sheeran, P., & Johnston, M. (1998). From health beliefs to self-regulation: Theoretical advances in the psychology of action control. *Psychology and Health, 13*, 569–591.

Achtziger, A., & Gollwitzer, P. M. (2009). Rubikonmodell der handlungsphasen [Rubicon model of action phases]. In V. Brandstätter & J. H. Otto (Eds.), *Handbuch der Allgemeinen psychologie: Motivation und emotion* (pp. 150–156). Göttingen: Hogrefe.

Ajzen, I. (1991). The theory of planned behaviour. *Organizational Behaviour and Human Decision Processes, 50*, 179–211.

Arao, T., Oida, Y., Maruyama, C., Mutou, T., Sawada, S., Matsuzuki, H., & Nakanishi, Y. (2007). Impact of lifestyle intervention on physical activity and diet of Japanese workers. *Preventive Medicine, 45*, 146–152.

Arkes, H. R., & Blumer, C. (1985). The psychology of sunk cost. *Organizational Behavior and Human Performance, 35*, 129–140.

Armitage, C. J., & Conner, M. (2001). Efficacy of the theory of planned behaviour: A meta-analytic review. *British Journal of Social Psychology, 40*, 471–499.

Aspinwall, L. G., & Richter, L. (1999). Optimism and self-mastery predict more rapid disengagement from unsolvable tasks in the presence of alternatives. *Motivation and Emotion, 23*, 221–245.

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Austin, J. J., & Vancouver, J. B. (1996). Goal constructs in psychology: Structure, process, and content. *Psychological Bulletin, 120*, 338–375.

Bamberg, S. (2000). The promotion of a new behavior by forming an implementation intention: Results of a field experiment in the domain of travel mode choice. *Journal of Applied Social Psychology, 23*, 573–587.

Bandura, A. (1996). Failures in self-regulation: Energy depletion or selective disengagement? *Psychological Inquiry, 7*, 20–24.

Bargh, J. A. (1994). The four horsemen of automaticity: Awareness, efficiency, intention, and control in social cognition. In R. S. Wyer & T. K. Srull (Eds.), *Handbook of social cognition* (pp. 1–40). Hillsdale, NJ: Erlbaum.

Bargh, J. A., Gollwitzer, P. M., & Oettingen, G. (2010). Motivation. In S. Fiske, D. Gilbert, & G. Lindzey (Eds.), *Handbook of social psychology* (5th ed., pp. 268–316). New York: Wiley.

Bargh, J. A., Gollwitzer, P. M., Lee-Chai, A., Barndollar, K., & Trotschel, R. (2001). The automated will: Nonconscious activation and pursuit of behavioral goals. *Journal of Personality and Social Psychology, 81*, 1014–1027.

Baumeister, R. F., Bratslavsky, E., Muraven, M., & Tice, D. M. (1998). Ego-depletion: Is the active self a limited resource? *Journal of Personality and Social Psychology, 74*, 1252–1265.

Baumeister, R. F., Heatherton, T. F., & Tice, D. M. (1994). *Losing control: How and why people fail at self-regulation*. San Diego, CA: Academic Press.

Baumeister, R. F., Vohs, K. D., DeWall, C. N., & Zhang, L. (2007). How emotion shapes behavior: Feedback, anticipation, and reflection, rather than direct causation. *Personality and Social Psychology Review, 11*, 167–203.

Bayer, U. C., Gollwitzer, P. M., & Achtziger, A. (2010). Staying on track: Planned goal striving is protected from disruptive internal states. *Journal of Experimental Social Psychology, 46*, 505–514

BBC. (2009, January 1). Resolutions 'bad for your health.' Retrieved December 13, 2010, from http://news.bbc.co.uk/1/hi/uk/7806776.stm

Bobocel, D. R., & Meyer, J. P. (1994). Escalating commitment to a failing course of action: Separating the roles of choice and justification. *Journal of Applied Psychology, 79*, 360–363.

Bongers, K. C. A., & Dijksterhuis, A. (2009). Consciousness as a trouble-shooting device? The role of consciousness in goal pursuit. In E. Morsella, J. A. Bargh, & P. M. Gollwitzer (Eds.), *Oxford handbook of human action* (pp. 587–602). Oxford: Oxford University Press.

Boyne, G. A., & Chen, A. A. (2007). Performance targets and public service improvement. *Journal of Public Administration Research and Theory, 17*, 455–477.

Brehm, J. W., & Self, E. (1989). The intensity of motivation. *Annual Review of Psychology, 40*, 109–131.

Brehm, J. W., Wright, R. A., Solomon, S., Silka, L., & Greenberg, J. (1983). Perceived difficulty, energization, and the magnitude of goal valence. *Journal of Experimental Social Psychology, 19*, 21–48.

Brockner, J. (1992). The escalation of commitment to a failing course of action: Toward theoretical progress. *Academy of Management Review, 17*, 39–61.

Brockner, J., Rubin J. Z., & Lang, E. (1981). Face-saving and entrapment. *Journal of Experimental Social Psychology, 17*, 68–79.

Brouziyne, M., & Molinaro, C. (2005). Mental imagery combined with physical practice of approach shots for golf beginners. *Perceptual and Motor Skills, 101*, 203–211.

Brownell, K. D., & Wadden, T. A. (1992). Etiology and treatment of obesity: Understanding a serious, prevalent, and refractory disorder. *Journal of Consulting and Clinical Psychology, 60*, 505–517.

Buehler, R., Griffin, D., & Ross, M. (1994). Exploring the "planning fallacy": Why people underestimate their task completion times. *Journal of Personality and Social Psychology, 67*, 366–381.

Buss, D. M. (1987). Selection, evocation, and manipulation. *Journal of Personality and Social Psychology, 53*, 1214–1221.

Carver, C. S. (1974). Facilitation of physical aggression through objective self-awareness. *Journal of Experimental Social Psychology, 10*, 365–370.

Carver, C. S. (2003). Pleasure as a sign that you can attend to something else: Placing positive feelings within a general model of affect. *Cognition and Emotion, 17*, 241–261.

Carver, C. S., Lawrence, J. W., & Scheier, M. F. (1999). Self-discrepancies and affect: Incorporating the role of feared selves. *Personality and Social Psychology Bulletin, 25*, 783–792.

Carver, C. S., & Scheier, M. F. (1982). Control theory: A useful conceptual framework for personality-social, clinical, and health psychology. *Psychological Bulletin, 92*, 111–135.

Carver, C. S., & Scheier, M. F. (1990). Origins and functions of positive and negative affect: A control process view. *Psychological Review, 97*, 19–35.

Carver, C. S., & Scheier, M. F. (1998). *On the self-regulation of behavior*. New York: Cambridge University Press.

Carver, C. S., & Scheier, M. F. (1999). Themes and issues in the self-regulation of behavior. In R. S. Wyer Jr. (Ed.), *Advances in social cognition* (Vol. 12, pp. 1–105). Mahwah, NJ: Erlbaum.

Conner, M., & Norman, P. (2005). *Predicting health behaviour* (2nd ed.). Buckingham, U.K.: Open University Press.

Conner, M., Norman, P., & Bell, R. (2002). The theory of planned behavior and healthy eating. *Health Psychology, 21*, 194–201.

Conner, M., Sheeran, P., Norman, P., & Armitage, C. J. (2000). Temporal stability as a moderator of relationships in the theory of planned behaviour. *British Journal of Social Psychology, 39*, 469–493.

Cooke, R., & Sheeran, P. (2004) Moderation of cognition-intention and cognition-behaviour relations: A meta-analysis of properties of variables from the theory of planned behaviour. *British Journal of Social Psychology, 43*, 159–186.

Cooke, R., & Sheeran, P. (2010). *Properties of behavioral intentions: Factor structure and consequences for behavior, information processing, and resistance to attack*. Manuscript under review.

Costa, P. T., & McCrae, R. R. (1980). Still stable after all these years: Personality as a key to some issues in aging. In P. B. Baltes & O. G. Brim (Eds.), *Life span development and behavior* (Vol. 3, pp. 65–102). New York: Academic Press.

Custers, R., & Aarts, H. (2005). Positive affect as implicit motivator: On the nonconscious operation of behavioral goals. *Journal of Personality and Social Psychology, 89*, 129–142.

Custers, R., & Aarts, H. (2007). Goal-discrepant situations prime goal-directed actions if goals are temporarily or chronically accessible. *Personality and Social Psychology Bulletin, 33*, 623–633.

de Jong, R., Coles, M. G., Logan, G. D., & Gratton, G. (1990). In search of the point of no return: The control of response processes. *Journal of Experimental Psychology: Human Perception and Performance, 16*, 164–182.

Dholakia, U. M., & Bagozzi, R. P. (2003). As time goes by: How goal and implementation intentions influence enactment of short-fuse behaviors. *Journal of Applied Social Psychology, 33*, 889–922.

Dijksterhuis, A., & van Knippenberg, A. (2000). Behavioural indecision: Effects of self-focus on automatic behaviour. *Social Cognition, 18*, 55–74.

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Dijksterhuis, A., Chartrand, T. L., & Aarts, H. (2007). Automatic behavior. In J. A. Bargh (Ed.), *Social psychology and the unconscious: The automaticity of higher mental processes* (pp. 51–131). Philadelphia: Psychology Press.

Duval, S., & Wicklund, R. A. (1972). *A theory of objective self-awareness*. New York: Academic Press.

Dweck, C. S. (1986). Motivational processes affecting learning. *American Psychologist, 41*, 1040–1048.

Eagly, A. H., & Chaiken, S. (1993). *The psychology of attitudes*. Fort Worth, TX: Harcourt Brace Jovanovich.

Emmons, R. A., & Diener, E. (1983). Situation selection as a moderator of response consistency and stability. *Journal of Personality and Social Psychology, 51*, 1013–1019.

Erez, M., & Zidon, I. (1984). Effect of goal acceptance on the relationship of goal difficulty to performance. *Journal of Applied Psychology, 69*, 69–78.

Fife-Schaw, C., Sheeran, P., & Norman, P. (2007). Simulating behaviour change interventions based on the theory of planned behaviour: Impacts on intention and action. *British Journal of Social Psychology, 46*, 43–68.

Fishbach, A., Friedman, R. S., & Kruglanski, A. W. (2003). Leading us not into temptation: Momentary allurements elicit overriding goal activation. *Journal of Personality and Social Psychology, 84*, 269–309.

Fitzsimons, G. M., & Bargh, J. A. (2004). Automatic self-regulation. In R. F. Baumeister & K. D. Vohs (Eds.), *Handbook of self-regulation: Research, theory, and applications* (pp. 151–170). New York: Guilford.

Fuglestad, P. T., Rothman, A. J., & Jeffery, R. W. (2008). Getting there and hanging on: The effect of regulatory focus on performance in smoking and weight loss interventions. *Health Psychology, 27*, 260–270.

Gailliot, M. T., Baumeister, R. F., DeWall, C. N., Maner, J. K., Plant, E. A., Tice, D. M., Brewer, L. E., & Schmeichel, B. J. (2007). Self-control relies on glucose as a limited energy source: Willpower is more than a metaphor. *Journal of Personality and Social Psychology, 92*, 325–336.

Garland, H. (1990). Throwing good money after bad: The effect of sunk costs on the decision to escalate commitment to an ongoing project. *Journal of Applied Psychology, 75*, 728–731.

Gendolla, G. H. E., & Richter, M. (2006). Cardiovascular reactivity during performance under social observation: The moderating role of task difficulty. *International Journal of Psychophysiology, 62*, 185–192.

Gilbert, S. J., Gollwitzer, P., Cohen, A-L., Oettingen, G., & Burgess, P. W. (2009). Separable brain systems supporting cued versus self-initiated realization of delayed intentions. *Journal of Experimental Psychology: Learning, Memory and Cognition, 35*, 905–915.

Gollwitzer, P. M. (1993). Goal achievement: The role of intentions. In W. Stroebe & M. Hewstone (Eds.), *European review of social psychology* (Vol. 4, pp. 141–185). Chichester, Engl.: Wiley.

Gollwitzer, P. M. (1999). Implementation intentions: Strong effects of simple plans. *American Psychologist, 54*, 493–503.

Gollwitzer, P. M., & Brandstätter, V. (1997). Implementation intentions and effective goal pursuit. *Journal of Personality and Social Psychology, 73*, 186–199.

Gollwitzer, P. M., & Moskowitz, G. B. (1996). Goal effects on action and cognition. In E. T. Higgins & A. W. Kruglanski (Eds.), *Social psychology: Handbook of basic principles* (pp. 361–399). New York: Guilford.

Gollwitzer, P. M., Parks-Stamm, E. J., & Oettingen, G. (2009). Living on the edge: Shifting between nonconscious and conscious goal pursuit. In E. Morsella, J. A. Bargh, & P. M. Gollwitzer (Eds.), *Oxford handbook of human action* (pp. 603–624). Oxford: Oxford University Press.

Downloaded by [Karen Hudson] at 03:29 22 March 2015

Gollwitzer, P. M., & Rohloff, U. B. (1999). The speed of goal pursuit. In R. S. Wyer (Ed.), *Advances in social cognition* (Vol. 12, pp. 147–159). Hillsdale, NJ: Erlbaum.

Gollwitzer, P. M., & Schaal, B. (1998). Meta-cognition in action: The importance of implementation intentions. *Personality and Social Psychology Review, 2*, 124–136.

Gollwitzer, P. M., & Sheeran, P. (2006). Implementation intentions and goal achievement: A meta-analysis of effects and processes. *Advances in Experimental Social Psychology, 38*, 69–120.

Goschke, T., & Kuhl, J. (1993). Representation of intentions: Persisting activation in memory. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 19*, 1211–1226.

Grouios, G. (1992). Mental practice: A review. *Journal of Sport Behavior, 15*, 42–59.

Hagger, M. S., Wood, C., Stiff, C., & Chatzisarantis, N. L. D. (2010). Ego depletion and the strength model of self-control: A meta-analysis. *Psychological Bulletin, 136*, 495–525.

Hall, P. A., & Fong, G. T. (2007). Temporal self-regulation theory: A model for individual health behavior. *Health Psychology Review, 1*, 6–52.

Heckhausen, H. (1987). Wünschen-Wählen-Wollen [Wishing-weighing-willing]. In H. Heckhausen, P. M. Gollwitzer, & F. E. Weinert (Eds.), *Jenseits des Rubikon: Der Wille in den Humanwissenschaften* (pp. 3–9). Heidelberg: Springer-Verlag.

Heckhausen, H., & Gollwitzer, P. M. (1986). Information processing before and after the formation of an intent. In F. Klix & H. Hagendorf (Eds.), *In memoriam Hermann Ebbinghaus: Symposium on the structure and function of human memory* (pp. 1071–1082). Amsterdam: Elsevier.

Heckhausen, H., & Gollwitzer, P. M. (1987). Thought contents and cognitive functioning in motivational versus volitional states of mind. *Motivation and Emotion, 11*, 101–120.

Henderson, M. D., Gollwitzer, P. M., & Oettingen, G. (2007). Implementation intentions and disengagement from a failing course of action. *Journal of Behavioral Decision Making, 20*, 81–102.

Hertel, A. W., Finch, E. A., Kelly, K. M., King, C., Lando, H., Linde, J. A., Jeffery, R. W., & Rothman, A. J. (2008). The impact of expectations and satisfaction on the initiation and maintenance of smoking cessation: an experimental test. *Health Psychology, 27*, S197–S206.

Higgins, E. T. (1998). Promotion and prevention: Regulatory focus as a motivational principle. *Advances in Experimental Social Psychology, 30*, 1–46.

Higgins, E. T. (2000). Making a good decision: Value from fit. *American Psychologist, 55*, 1217–1230.

Holland, R. W., Aarts, H., & Langendam, D. (2006). Breaking and creating habits on the working floor: A field experiment on the power of implementation intentions. *Journal of Experimental Social Psychology, 42*, 776–783.

Hsee, C. K., & Abelson, R. P. (1991). Velocity relation: Satisfaction as a function of the first derivative of outcome over time. *Journal of Personality and Social Psychology, 60*, 341–347.

Iyengar, S. S., & Lepper, M. R. (2000). When choice is demotivating: Can one desire too much of a good thing? *Journal of Personality and Social Psychology, 79*, 995–1006.

Johnson, R. E., Chang, C. H., & Lord, R. G. (2006). Moving from cognition to behavior: What the research says. *Psychological Bulletin, 132*, 381–415.

Klein, H. J., Wesson, M. J., Hollenbeck, J. R., & Alge, B. R. (1999). Goal commitment and the goal setting process: Conceptual clarification and empirical synthesis. *Journal of Applied Psychology, 84*, 885–896.

Koestner, R., Lekes, N., Powers, T. A., & Chicoine, E. (2002). Attaining personal goals: Self-concordance plus implementation intentions equals success. *Journal of Personality and Social Psychology, 83*, 231–244.

Downloaded by [Karen Hudson] at 03:29 22 March 2015

Kosslyn, S. M., & Moulton, S. T. (2009). Mental imagery and implicit memory. In K. D. Markman, W. M. P. Klein, & J. A. Suhr (Eds.), *The handbook of imagination and mental simulation* (pp. 35–51). New York: Psychology Press.

Kruglanski, A. W., Shah, J. Y., Fishbach, A., Friedman, R., Chen, W. Y., & Sleeth-Keppler, D. (2002). A theory of goal systems. *Advances in Experimental Social Psychology, 34*, 311–378.

Latham, G. P., & Yukl, G. A. (1975). Assigned versus participative goal setting with educated and uneducated woods workers. *Journal of Applied Psychology, 60*, 299–302.

Locke, E. A. (2001). Self-set goals and self-efficacy as mediators of incentives and personality. In M. Erez, U. Kleinbeck, & H. Thierry (Eds.), *Work motivation in the context of the globalizing economy* (pp. 13–26). Mahwah, NJ: Erlbaum.

Locke, E. A., & Latham, G. P. (1990). *A theory of goal-setting and task performance*. Englewood Cliffs, NJ: Prentice-Hall.

Locke, E. A., Shaw, K. N., Saari, L. M., & Latham, G. P. (1981). Goal setting and task performance: 1969–1980. *Psychological Bulletin, 90*, 125–152.

Loewenstein, G. (1996). Out of control: Visceral influences on behavior. Organizational *Behavior and Human Decision Processes, 65*, 272–292.

Logan, G. D. (1994). On the ability to inhibit thought and action: A user's guide to the stop signal paradigm. In D. Dagenback & T. H. Carr (Eds.), *Inhibitory processes in attention, memory, and language* (pp. 189–239). San Diego, CA: Academic Press.

Maddux, J. E. (1999). Expectancies and the social cognitive perspective: Basic principles, processes, and variables. In I. Kirsch (Ed.), *How expectancies shape experience* (pp. 17–40). Washington, DC: American Psychological Association.

Martijn, C., Alberts, H. J. E. M., & de Vries, N. K. (2006). Maintaining self-control: The role of expectancies. In D. T. D. de Ridder & J. B. F. de Wit (Eds.), *Self-regulation in health behavior* (pp. 161–191). Chichester: Wiley

Martijn, C., Tenbült, P., Merckelbach, H., Dreezens, E., & de Vries, N. K. (2002). Getting a grip on ourselves: challenging expectancies about loss of energy after self-control. *Social Cognition, 20*, 441–458.

Mead, N. L., Baumeister, R. F., Gino, F., Schweitzer, M. E., & Ariely, D. (2009). Too tired to tell the truth: Self-control resource depletion and dishonesty. *Journal of Experimental Social Psychology, 45*, 594–597.

Michie, S., Whittington, C., Abraham, C., McAteer, J., & Gupta, S. (2009). Effective techniques in healthy eating and physical activity interventions: A meta-regression. *Health Psychology, 28*, 690–701.

Miller, G. E., & Wrosch, C. (2007). You've gotta know when to fold 'em: Goal disengagement and systemic inflammation in adolescence. *Psychological Science, 18*, 773–777.

Milne, S. E., Orbell, S., & Sheeran, P. (2002). Combining motivational and volitional interventions to promote exercise participation: Protection motivation theory and implementation intentions. *British Journal of Health Psychology, 7*, 163–184.

Mischel, W., Cantor, N., & Feldman, S. (1996). Principles of self-regulation: The nature of willpower and self-control. In E. T. Higgins & A. W. Kruglanski (Eds.), *Social psychology: Handbook of basic principles* (pp. 329–360). New York: Guilford.

Moon, H. (2001). The two faces of conscientiousness: Duty and achievement striving in escalation of commitment dilemmas. *Journal of Applied Psychology, 86*, 533–540.

Muraven, M. (2010). Building self-control strength: Practicing self-control leads to improved self-control performance. *Journal of Experimental Social Psychology, 46*, 465–468.

Muraven, M., & Baumeister, R. F. (2000). Self-regulation and depletion of limited resources: Does self-control resemble a muscle? *Psychological Bulletin, 126*, 247–259.

Muraven, M., Baumeister, R. F., & Tice, D. M. (1999). Longitudinal improvement of self-regulation through practice. *Journal of Social Psychology, 139*, 446–457.

Downloaded by [Karen Hudson] at 03:29 22 March 2015

Muraven, M., Tice, D. M., & Baumeister, R. F. (1998). Self-control as a limited resource: Regulatory depletion patterns. *Journal of Personality and Social Psychology, 74*, 774–789.

Neal, D. T., Wood, W., & Quinn, J. M. (2006). Habits—a repeat performance. *Current Direction in Psychological Science, 15*, 198–202.

Nordgren, L. F., van der Pligt, J., & van Harreveld, F. (2008). The instability of health cognitions: Visceral states influence self-efficacy and related health beliefs. *Health Psychology, 27*, 722–727.

Nordgren, L. F., van Harreveld, F., & van der Pligt, J. (2009). The restraint bias: How the illusion of self-restraint promotes impulsive behavior. *Psychological Science, 20*, 1523–1528.

Oaten, M., & Cheng, K. (2006a). Improved self-control: The benefits of a regular program of academic study. *Basic and Applied Social Psychology, 28*, 1–16.

Oaten, M., & Cheng, K. (2006b). Longitudinal gains in self-regulation from regular physical exercise. *British Journal of Health Psychology, 11*, 717–733.

Oettingen, G., Hönig, G., & Gollwitzer, P. M. (2000). Effective self-regulation of goal attainment. *International Journal of Educational Research, 33*, 705–732.

Oettingen, G., & Mayer, D. (2002). The motivating function of thinking about the future: Expectations versus fantasies. *Journal of Personality and Social Psychology, 83*, 1198–1212.

Oettingen, G., Mayer, D., Sevincer, A. T., Stephens, E. J., Pak, H., & Hagenah, M. (2009). Mental contrasting and goal commitment: The mediating role of energization. *Personality and Social Psychology Bulletin, 35*, 608–622.

Oettingen, G., Pak, H., & Schnetter, K. (2001). Self-regulation of goal setting: Turning free fantasies about the future into binding goals. *Journal of Personality and Social Psychology, 80*, 736–753.

Papies, E., Stroebe, W., & Aarts, H. (2007). Pleasure in the mind: Restrained eating and spontaneous hedonic thoughts about food. *Journal of Experimental Social Psychology, 43*, 810–817.

Pham, L. B., & Taylor, S. E. (1999). From thought to action: Effects of process- versus outcome-based mental simulations on performance. *Personality and Social Psychology Bulletin, 25*, 250–260.

Polivy, J., & Herman, C. P. (1999). The effects of resolving to diet on restrained and unrestrained eaters: The "False Hope Syndrome." *International Journal of Eating Disorders, 26*, 434–447.

Polivy, J., & Herman, C. P. (2000). The false hope syndrome: Unfulfilled expectations of self-change. *Current Directions in Psychological Science, 9*, 128–131.

Polivy, J., & Herman, C. P. (2002). If at first you don't succeed. False hopes of self-change. *American Psychologist, 57*, 677–689.

Polivy, J., Herman, C. P., Hackett, R., & Kuleshnyk, I. (1986). The effects of self-attention and public attention on eating in restrained and unrestrained subjects. *Journal of Personality and Social Psychology, 50*, 1253–1260.

Powers, W. T. (1973). *Behavior: The control of perception*. New York: Aldine DeGruyter.

PR Newswire. (1996, December). Slim chance of resolution success says McVitie's Go Ahead! survey. Retrieved November 29, 2010, from http://www.prnewswire.co.uk/cgi/news/release?id=33132

Rosenthal, R., & Rubin, D. B. (1982). A simple, general purpose display of magnitude of experimental effect. *Journal of Educational Psychology*, *74*, 166–169.

Rothman, A. (2000). Toward a theory-based analysis of behavioral maintenance. *Health Psychology, 19*, 64–69.

Schaubroeck, J., & Williams, S. (1993). Type A behavior pattern and escalating commitment. *Journal of Applied Psychology, 78*, 862–867.

Downloaded by [Karen Hudson] at 03:29 22 March 2015

Schweiger-Gallo, I., Keil, A., McCulloch, K. C., Rockstroh, B., & Gollwitzer, P. M. (2009). Strategic automation of emotion regulation. *Journal of Personality and Social Psychology, 96*, 11–31.

Shah, J. Y. (2005). The automatic pursuit and management of goals. *Current Directions in Psychological Science, 14*, 10–13.

Shah, J. Y., Friedman, R., & Kruglanski, A. W. (2002). Forgetting all else: On the antecedents and consequences of goal shielding. *Journal of Personality and Social Psychology, 83*, 1261–1280.

Shah, J. Y., & Kruglanski, A. W. (2002). Priming against your will: How goal pursuit is affected by accessible alternatives. *Journal of Experimental Social Psychology, 38*, 368–383.

Sheeran, P. (2002). Intention-behaviour relations: A conceptual and empirical review. In W. Stroebe & M. Hewstone (Eds.), *European review of social psychology* (Vol. 12, pp. 1–36). London: Wiley.

Sheeran, P., & Abraham, C. (2003). Mediator of moderators: Temporal stability of intention and the intention-behavior relationship. *Personality and Social Psychology Bulletin, 29*, 205–215.

Sheeran, P., Aubrey, R., & Kellett, S. (2007). Increasing attendance for psychotherapy: Implementation intentions and the self-regulation of attendance-related negative affect. *Journal of Consulting and Clinical Psychology, 75*, 853–863.

Sheeran, P., & Orbell, S. (2000). Using implementation intentions to increase attendance for cervical cancer screening. *Health Psychology, 19*, 283–289.

Sheeran, P., Orbell, S., & Trafimow, D. (1999). Does the temporal stability of behavioral intentions moderate intention-behavior and past behavior-future behavior relations? *Personality and Social Psychology Bulletin, 25*, 721–730.

Sheeran, P., Trafimow, D., & Armitage, C. J. (2003). Predicting behavior from perceived behavioural control: Tests of the accuracy assumption of the theory of planned behaviour. *British Journal of Social Psychology, 42*, 393–410.

Sheeran, P., Webb, T. L., & Gollwitzer, P. M. (2005). The interplay between goals and implementation intentions. *Personality and Social Psychology Bulletin*, 31, 87–98.

Sherman, D. K., Gangi, C., & White, M. L. (2010). Embodied cognition and health persuasion: Facilitating intention-behavior consistency via motor manipulations. *Journal of Experimental Social Psychology, 46*, 461–464.

Slapion, M. J., & Carver, C. S. (1981). Self-directed attention and facilitation of intellectual performance among persons high in test anxiety. *Cognitive Therapy and Research, 5*, 115–121.

Tan, H. T., & Yates, J. F. (2002). Financial budgets and escalation effects. *Organizational Behavior and Human Decision Processes, 87*, 300–322.

Taylor, S. E., Pham, L. B., Rivkin, I., & Armor, D. A. (1998). Harnessing the imagination: Mental simulation, self-regulation, and coping. *American Psychologist, 53*, 429–439.

Thompson, D. V., Hamilton, R. W., & Petrova, P. (2009). When mental simulation hinders behavior: The effects of process-oriented thinking on decision difficulty and performance. *Journal of Consumer Research, 36*, 562–574.

Tice, D. M., Bratslavsky, E., & Baumeister, R. F. (2001). Emotional distress regulation takes precedence over impulse control: If you feel bad, do it! *Journal of Personality and Social Psychology, 80*, 53–67.

Triandis, H. C. (1980). Values, attitudes, and interpersonal behavior. In H. E. Howe Jr. & M. Page (Eds.), *Nebraska symposium of motivation* (Vol. 27, pp. 195–259). Lincoln: University of Nebraska Press.

Trope, Y., & Fishbach, A. (2000). Counteractive self-control in overcoming temptation. *Journal of Personality and Social Psychology, 79*, 493–506.

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Trope, Y., & Fishbach, A. (2005). Going beyond the motivation given: Self-control and situational control over behavior. In R. R. Hassin & J. A. Bargh (Eds.), *The new unconscious* (pp. 537–565). New York: Oxford University Press.

Vohs, K. D., Baumeister, R. F., & Ciarocco, N. J. (2005). Self-regulation and self-presentation: Regulatory resource depletion impairs impression management and effortful self-presentation depletes regulatory resources. *Journal of Personality and Social Psychology, 88*, 632–657.

Webb, T. L., Ononaiye, M. S. P., Sheeran, P., Reidy, J. G., & Lavda, A. (2010). Using implementation intentions to overcome the effects of social anxiety on attention and appraisals of performance. *Personality and Social Psychology Bulletin, 36*, 612–627.

Webb, T. L., & Sheeran, P. (2006). Does changing behavioral intentions engender behavior change? A meta-analysis of the experimental evidence. *Psychological Bulletin, 132*, 249–268.

Webb, T. L., & Sheeran, P. (2007). How do implementation intentions promote goal attainment? A test of component processes. *Journal of Experimental Social Psychology, 43*, 295–302.

Webb, T. L., Sheeran, P., Totterdell, P., Miles, E., Mansell, W., & Baker, S. (in press). Using implementation intentions to overcome the effect of mood on risky behaviour. *British Journal of Social Psychology*.

Williams, K. J., Donovan, J. J., & Dodge, T. L. (2000). Self-regulation of performance: Goal establishment and goal revision processes in athletes. *Human Performance, 13*, 159–180.

Wright, R. A. (2008). Refining the prediction of effort: Brehm's distinction between potential motivation and motivation intensity. *Social and Personality Psychology Compass, 2*, 682–701.

Wright, R. A., & Brehm, J. W. (1989). Energization and goal attractiveness. In L. A. Pervin (Ed.), *Goal concepts in personality and social psychology* (pp. 169–210). Hillsdale, NJ: Erlbaum.

Wrosch, C., Gregory, M., Scheier, M. F., & de Pontet, S. B. (2007). Giving up on unattainable goals: Benefits for health? *Personality and Social Psychology Bulletin, 33*, 251–265.

Wrosch, C., Scheier, M. F., Carver, C. S., & Schulz, R. (2003a). The importance of goal disengagement in adaptive self-regulation: When giving up is beneficial. *Self and Identity, 2*, l–20.

Wrosch, C., Scheier, M. F., Miller, G. E., Schulz, R., & Carver, C. S. (2003b). Adaptive self-regulation of unattainable goals: Goal disengagement, goal reengagement, and subjective well-being. *Personality and Social Psychology Bulletin, 29*, 1494–1508.

Zhang, Y., & Fishbach, A. (2010). Counteracting obstacles with optimistic predictions. *Journal of Experimental Psychology: General, 139*, 16–31.

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7

How Feedback Influences Persistence, Disengagement, and Change in Goal Pursuit

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Feedback is essential for pursuing goals. It enables individuals to adjust their efforts and decide which goals to pursue and which to let go, at least temporarily. Thus, feedback affects goal persistence, disengagement, and change. For example, employers give performance evaluations to help an employee decide how much to invest in her job, and a teacher provides grades to students to help students decide how much effort to devote to studying for an exam. In addition, receiving feedback on one's current physical state in a medical checkup influences one's pursuit of health goals, and receiving feedback from close others influences a person's attention to a friend or a spouse. At certain times, people are more likely to attend to any of these goals after receiving positive feedback than after receiving negative feedback, whereas at other times negative feedback prevails. Accordingly, this chapter examines when and how positive and negative feedback influences goal persistence and when it promotes goal disengagement and change.

We distinguish between positive and negative feedback. We define positive feedback as that concerning accomplishments, strengths, and correct responses, and negative feedback as that concerning lack of accomplishments, weaknesses, and incorrect responses. For example, students often receive feedback on academic accomplishments or lack of accomplishments (e.g., when getting on the dean's list vs. failing to do so), their strong versus weak academic areas, and correct versus

incorrect exam answers. In addition to these various types of positive and negative feedback, often the same level of objective achievement can be presented as either positive or negative. For example, a teacher can emphasize that a student solved correctly 90% of the questions on an exam or that she failed to solve 10% of them. Because of these different framings of performance, asking when positive feedback (e.g., emphasizing 90% correct answers) has different motivational consequences than negative feedback (emphasizing 10% of mistakes) is often possible, regardless of the objective level of performance on a goal.

We organize this chapter on feedback and goal pursuit in several parts. We start with a review of research that offers a universal answer: People express greater motivation to persist on a goal after they receive either positive or negative feedback. This research helps us identify the unique self-regulatory processes in which positive versus negative feedback facilitates goal pursuit. As we demonstrate, positive feedback increases motivation when people infer they have greater ability to pursue the goal or associate the positive experience with increased goal value. In contrast, negative feedback increases motivation through a discrepancy-reduction mechanism.

We then review research that identifies the circumstances under which different self-regulatory processes are more likely and, therefore, where positive versus negative feedback will increase motivation to pursue a goal. Specifically, we address attribution theory, mood theory, and our work on the dynamics of self-regulation, to explain when each feedback—positive versus negative—increases motivation.

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HOW FEEDBACK IMPACTS MOTIVATION

Several theories that explore how feedback impacts goal persistence offer a universal answer to the question of whether people persist on a goal more when they receive positive rather than negative feedback on their performance. These theories identify distinct self-regulatory processes in which feedback influences performance motivation. By exploring the separate "cases" for positive versus negative feedback as a motivational force for goal pursuit, we can thus identify the different self-regulatory processes and the role of feedback in each of them.

Positive Feedback Increases Motivation

According to classic psychological theories of motivation, goal persistence is a function of the goal's value multiplied by expectancy of attainment (Atkinson, 1957; Feather, 1982; Fishbein & Ajzen, 1974; Lewin, Dembo, Festinger, & Sears, 1944; Liberman & Förster, 2008; Vroom, 1964). Feedback can possibly increase motivation by raising attainment expectancies as well as the perception that the goal is valuable. In what follows, we review the evidence that feedback impacts expectation and valuation.

The Information in Feedback Beginning with attitudes research, researchers argue that feedback on successful actions encourages individuals to invest more resources in pursuit of other, similar actions. A key finding in that literature is

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that people desire to be consistent and express stable preferences over time (Bem, 1972; Cialdini, Trost, & Newsom, 1995; Festinger, 1957; Harmon-Jones & Mills, 1999). Therefore, after successfully carrying out an action, the likelihood of choosing similar actions on the next opportunity increases. For example, if a person agrees to display a small sign in her window to advocate driving safety, the person will later feel she should choose to engage in actions consistent with her earlier behavior, such as displaying a much larger sign on her lawn to advocate for the cause (Freedman & Fraser, 1966). According to self-perception theory, the reason for this impact of feedback is that people learn about their stable preferences from watching themselves act in a particular way (Bem, 1972). For example, when an individual considers she was successful at her job, she might come to infer she values her job and does it well, more than if she considers her lack of success. As a result, positive feedback provides information that will increase effort investment.

Goal research often makes a similar point, suggesting that positive feedback promotes goal persistence by increasing outcome expectancies and, thus, commitment to a goal. According to Bandura's (1991) self-efficacy theory, positive feedback increases individuals' sense of self-efficacy—that they are competent in pursuing a goal—therefore, their efforts will pay off. Specifically, mastery experiences are an effective way of developing a strong sense of self-efficacy. In comparison, failure and negative feedback weaken a person's sense of self-efficacy. Research on academic performance demonstrated these influences: Students' sense of self-efficacy, which is largely determined by their successful academic experiences, predicted their academic performance after controlling for other variables, including previous academic performance and other people's expectations (Bandura, Barbaranelli, Gian, & Concetta, 2001). In addition, research within an organization context (Audia, Locke, & Smith, 2000) found that employees in the airline and trucking industries who received positive feedback (e.g., they had a fast turnaround time between flights or unloading a shipment) developed a strong sense of self-efficacy and exhibited greater motivation to pursue their work-related goals subsequently.

When positive feedback is useful, negative feedback is often harmful, and, more specifically, negative feedback can undermine motivation by lowering the expectancy of success. Evidence for this impact comes from research on the *what-the-hell effect*: After failing to pursue a goal, individuals concluded they were (at least temporarily) less able to succeed on a goal and, consequently, they disengaged. For example, in one study, smokers gave up on their attempt to quit smoking after smoking a single cigarette because they concluded they were bound to fail, at least in the near future (Cochran & Tesser, 1996; Soman & Cheema, 2004).

Realizing the impact of feedback on outcome expectations, social agents whose role is to give feedback often use positive feedback to increase recipients' commitment and, therefore, their performance. In doing so, they assume such feedback encourages individuals to internalize or integrate new goals into their self-concept, thus increasing the likelihood the individuals will be more committed to pursuing the goal on subsequent occasions (Ryan & Deci, 2000). For similar reasons, some social agents further avoid negative feedback that can promote goal disengagement. We return to these strategic uses of feedback later in this chapter.

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The Affective Consequences of Feedback Another route by which positive feedback increases motivation involves the affective consequences of feedback. Not only does positive feedback carry information about one's accomplishments, strengths, and correct responses, but it also elicits general positive affect as well as specific feelings, including emotions (i.e., feelings that are specific to a source such as feedback) and mood (i.e., general and diffuse feelings that their cause is not identified). The experience of positive affect and feelings can, in turn, become implicitly associated with the goal and thus increase the perceived value of the goal.

In particular, research documented that an implicit association between goal activities and positive evaluations can induce approach motivation without providing any information on the goal or altering one's expectation of success. In this case, the affective consequences of the feedback act as a reward (vs. punishment) in monitoring behavior: The cues for a goal are paired with positive stimuli and individuals feel good about pursuing their goals, which makes them more likely to initiate and persist on these goals. In this route, positive feedback impacts motivation merely via the positive feelings it evokes. Similarly, negative feedback that elicits negative feelings can undermine motivation if these negative feelings are associated with goal-related stimuli and evoke avoidance motivation.

Research that explored the motivational impact of affective cues often used an evaluative-conditioning paradigm to demonstrate how implicit associations between affective cues and goals influence goal pursuit (Aarts, Custers, & Holland, 2007; Aarts, Custers, & Veltkamp, 2008; Custers & Aarts, 2005; see also Ferguson, 2008). Notably, these affective cues were usually not the result of performance feedback; however, it is a reasonable assumption that because feedback has affective consequences, it can trigger these processes. For example, participants in one study grew fond of doing puzzles when the word "puzzles" appeared in proximity to positive affective stimuli (vs. control stimuli). As a result of this manipulation, those for whom doing puzzles was paired with positive affect engaged in puzzles in their free time more than in the absence of positive affective association (Custers & Aarts, 2005). Custers and Aarts further showed that associating doing puzzles with negative affect decreased the evaluation of the behavior, but not the motivation to pursue it. Negative affect only decreased motivation when a preexisting (positive) goal was linked to negative affect, in which case motivation was reduced to the same level as a baseline (Aarts, Custers, & Holland, 2007). For example, priming concepts related to the goal of socializing (using words such as "socializing" and "partying") in proximity to negative affective words (e.g., "pain" and "trash") inhibited accessibility of the goal representation such that it was not different from the baseline, no goal-prime condition (Aarts et al., 2007). Taken together, research on evaluative conditioning finds that positive implicit evaluations increase the desire to pursue a goal and actual effort exertion, whereas negative implicit evaluations cancel out the motivational impact of active goal states. Negative affect thus acts as feedback in the process of goal-directed behavior by decreasing the motivational force of an activated goal that is already positive or desired.

Importantly, this impact of affect as feedback is distinct from the impact of performance feedback on motivation. Affect or feelings provide feedback

for self-regulation even if they are not triggered by performance feedback. We return to this point when addressing the impact of mood attributions. For now, we note that performance feedback has affective consequences, and these affective responses influence goal pursuit.

Overall then, the case for positive (and against negative) feedback comes from research that examines how feedback impacts the expectancy of goal attainment and the value individuals assign to a goal. When positive feedback impacts expectancy and value, it will increase commitment to the goal, and negative feedback will decrease goal commitment.

Negative Feedback Increases Motivation

In a discrepancy model of self-regulation, negative feedback prevails—it promotes goal-directed behavior more than positive or no feedback. Specifically, the cybernetic model describes the process of self-regulation as discrepancy closing (Carver & Scheier, 1998; Miller, Galanter, & Pribram, 1960; Powers, 1973). According to this model, when a person strives toward a desired end state, the motivational system calculates the size of the discrepancy between the present state and the desired state and guides action toward closing the gap between the two. The acronym TOTE (Test-Operate-Test-Exit) is often used to denote this process. According to this notion, once the person identifies a desired end state, she assesses the required effort to reach this state (Test), which leads her to put effort into achieving it (Operate), which then requires another assessment of the distance (Test), which cycles around recursively until the process ends once the end state is achieved (Exit). For example, a person may perceive he needs to go on a diet. He calculates how much weight to lose (Test), trims calories and exercises (Operate), and steps on the scale from time to time (Test). He stops dieting when the gap is closed because he has successfully reached his goal (Exit), unless he concludes the goal is out of reach and alters it.

Research by Carver and Scheier (1990) developed these ideas into a self-regulatory model of feedback loops. Their model claims that performance outcomes elicit positive and negative emotions, which provide feedback for the self-regulatory system. Positive emotions provide positive feedback, suggesting the rate of closing the gap to goal attainment is faster than expected. In this situation, people reduce their effort or "coast." In contrast, negative emotions provide negative feedback, suggesting the rate of closing the gap is slower than intended. In this situation, people increase their effort investment. A main prediction from this model is that people will work harder toward a goal when they receive negative feedback that makes them feel bad about their goal than when they receive positive feedback that makes them feel good about that goal.

Indirect empirical support for the inhibiting impact of positive feedback comes from studies that provided feedback on one goal and then measured effort investment in pursuit of another goal. The feedback loop model predicts that positive emotions are a sign to relax pursuit of a focal goal and focus on another, presumably neglected goal (Carver, 2003); hence these studies induced success and positive mood in one goal context and assessed participants' interest in attending to

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goals in another context. For example, Trope and Pomerantz (1998) tested whether people who had a successful experience are more interested in learning about their weaknesses and areas of improvement in another context. They found that after having a successful experience that induced positive mood, participants wanted to learn about areas of self-liabilities more than participants who had experienced failure and were therefore in a negative mood. Reed and Aspinwall (1998) similarly found that caffeine users who had an opportunity to affirm their kindness—a procedure that provided a positive feedback of oneself—were subsequently more open to information about the potential health threats from consuming caffeine than those who were not afforded the chance to affirm their kindness prior to receiving the negative information. These studies provide indirect support for Carver and Scheier's model because participants directed their efforts to another goal rather than relaxed their efforts on the focal goal (e.g., switching from pursuing their kindness to health goal).

Congruent with the prediction put forth by cybernetic models, research on licensing effects documented that positive feedback on successes signals sufficient accomplishment and that one can attend to another goal. Such an inference "licenses" the individual to direct efforts elsewhere (Khan & Dhar, 2006). For example, research on moral licensing finds that expressing egalitarian attitudes in one context increases the likelihood that a person will engage in discriminatory actions in another context because the positive feedback from the initial behavior justifies relaxing the egalitarian goal (Monin & Miller, 2001). Similarly, Khan and Dhar (2006) argued that consumers pay small tokens to justify hedonic choice, for example, consumers give a small amount of money to charity, which subsequently justifies the purchase of guilt-provoking hedonic items (e.g., hot fudge sundae; Strahilevitz & Myers, 1998).

By that logic, negative feedback should increase persistence. Indeed, research on the sunk-cost effect has found that people justify their prior failed efforts by persisting with a course of actions that pursues the same failed goal because they are not getting positive feedback on making sufficient progress on the goal (Arkes & Ayton, 1999; Arkes & Blumer, 1985; Thaler 1991). To illustrate, participants in one study were given the chance to purchase a season's worth of university theater tickets at full price, at a slight discount, and at a steep discount. Compared with those who purchased full price tickets, those who purchased discounted tickets attended fewer plays, thus, those who had "sunk" the most money into buying the tickets (and received negative feedback on paying too much) were most motivated to attend the theater, even if they would prefer to spend their time another way (Arkes & Blumer, 1985).

In his self-discrepancy theory, Higgins (1987) similarly proposed that discrepancies—indicated by negative feedback—motivate goal adherence. Higgins's theory distinguishes between the different types of goals individuals pursue—promotion and prevention goals—and that evoke different processes of discrepancy closing. The basic distinction is between goals that obtain pleasure and goals that avoid pain (e.g., get food vs. stay alive). Self-regulation with a promotion focus centers on increasing the presence of positive outcomes or gains, whereas self-regulation with a prevention focus involves fixating on decreasing the presence or

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absence of negative outcomes or losses. The emotional feedback of pursuing promotion goals further differs from those of prevention goals. For promotion goals, successful pursuit results in happiness and failure results in sadness, because these emotions characterize the presence versus absence of gains. In contrast, for prevention goals, successful pursuit results in feeling calm and failure results in anxiety, because these emotions characterize the absence versus presence of losses. Thus, the experience of negative promotion emotion (e.g., sadness) motivates pursuit of promotion goals, whereas the experience of negative prevention emotion (e.g., anxiety) motivates pursuit of prevention goals.

More recent work by Higgins, Förster, and colleagues on regulatory focus theory argues that negative feedback is particularly effective for the pursuit of prevention goals and might be less effective for the pursuit of promotion goals. In one study, Förster, Grant, Idson, and Higgins (2001) measured the strength of motivation by the amount of time participants spent trying to solve a series of anagrams. Participants either pursued the goal with a promotion orientation (gaining points for correct solutions) or with a prevention orientation (trying not to lose points for missing solutions). The researchers found that success feedback increased motivation more than failure feedback for those who were pursuing a promotion goal (gaining points), but failure feedback increased motivation more than success feedback for those who were pursuing prevention goals (avoid losing points). Consistent with the effect of "a goal looms larger" in goal-directed behavior (Hull, 1934; Kivetz, Urminsky, & Zheng, 2006; Losco & Epstein, 1977), these effects of feedback became more pronounced as the goal end state became closer.

But, it is not only goals that vary by their focus on promotion versus prevention. Individuals, too, vary by their chronic strategy for approaching their goals—a promotion versus prevention strategy—and these chronic strategies often influence their motivation to invest in a goal, depending on the framing of the goal as fitting their chronic strategy or not. For instance, in one study (Shah, Higgins, & Friedman, 1998), participants were first tested for their preexisting promotion versus prevention orientation. They then performed an anagrams task and were either told they would earn an extra dollar if they solved 90% of the possible anagrams (promotion frame) or that they would avoid losing a dollar of pay if they did not miss more than 10% of the words (prevention frame). Those with a chronic promotion focus performed better when they were assigned to the condition emphasizing a promotion strategy (solve 90% of the anagrams), whereas those with a chronic prevention focus performed better when they were assigned to the condition emphasizing the prevention-related strategy (miss less than 10% of the anagrams).

Evidence for the undermining impact of positive feedback also comes from research on implicit self-regulation. This research finds that positive feedback on goal completion results in disengagement or "postfulfillment inhibition": a temporary state of inhibiting the goal that was achieved. For instance, in one study (Förster, Liberman, & Higgins, 2005), participants reviewed a series of pictures with the goal of finding a picture of eyeglasses. After finding the picture, participants took longer recognizing the word "eyeglasses" in a lexical decision task

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compared with participants who were not searching for the eyeglasses picture to begin with. Thus, positive feedback on goal fulfillment (finding the eyeglasses) resulted in postfulfillment inhibition of the construct of eyeglasses—inhibition that is a functional self-regulatory strategy that enables individuals to put aside a completed goal and switch to something else. Thus, whereas some research on implicit self-regulation documented that active goals inhibit competing ones (e.g., the goal to work out inhibits the goal to study; Shah, Friedman, & Kruglanski, 2002), once a person receives positive feedback on goal attainment, the focal goal is inhibited and competing goals become more accessible and readily pursued.

To summarize, the research that emphasizes the motivating impact of negative feedback often portrays self-regulation as a process of making progress toward reducing a discrepancy. Individuals who pursue a goal wish to progress at a sufficient pace, and negative feedback increases their motivation by signaling their progress is insufficient. This process of self-regulation is different from the one portrayed by research emphasizing the motivating impact of positive feedback, and we conclude that no universal answer exists regarding which feedback is more motivating. Rather, it depends on the self-regulatory processes, which can give advantage to either valence of feedback. Specifically, feedback that provides information on the value of a goal and expectancy of attainment (i.e., commitment) has a different impact than feedback that provides information on the level of progress toward a goal. In what follows, we identify when each of these self-regulatory processes—evaluating commitment versus monitoring progress—will take place and thus the circumstances under which each form of feedback—positive versus negative—is more effective at motivating goal pursuit. We argue that both processes characterize goal striving (although most likely, evaluating commitment dominates goal setting), and there are several variables that determine which process takes place.

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WHEN POSITIVE VERSUS NEGATIVE FEEDBACK INCREASES MOTIVATION

The research reviewed thus far assumes that when positive feedback is motivating, negative feedback undermines motivation for goal pursuit, and when negative feedback is motivating, positive feedback undermines motivation. That research identifies the different processes of self-regulation but often leaves open the question of when each process is more likely and thus when each type of feedback is more effective in promoting goal-directed behavior. In order to address this question, in this section we review research on attribution theory, including mood attributions, and our research program on the dynamics of self-regulation.

Attribution Theory

Research on attribution theory traditionally addresses the relative impact of positive and negative feedback in the context of achievement motivation (see Elliot &

Dweck, 2005, for a review on achievement motivation). It suggests that the attribution of feedback determines its impact of performance on achievement (e.g., academic) goals. Beginning with Weiner's (1974) attribution theory, research suggested that individuals make three types of attributions of achievement feedback: locus of control (internal vs. external), stability (causes change over time or not), and controllability (high vs. low). These attributions give meaning to the feedback that determines its motivational consequences. For example, a student who receives positive feedback on her academic achievement will increase her efforts if she attributes her success to an internal (vs. external) locus of control and unstable causes such as effort (vs. stable cause such as talent). That student will also be motivated to study if she receives negative feedback and attributes it to an external factor (difficult test) or an internal factor that is unstable (lack of effort).

Research by Dweck and colleagues expands attribution theory and identifies lay theories that people hold in the context of achievement motivation and that guide their responses to feedback. Dweck's model draws a distinction between two implicit theories of intelligence that vary by the attribution of academic performance: "Entity" theorists view intelligence as an unchangeable, fixed characteristic, whereas "incremental" theorists view intelligence as malleable and increasing through effort. In turn, negative feedback undermines learning motivation among entity theorists who infer their ability is low, but less so for incremental theorists who infer they have not put enough effort into the task (Dweck & Leggett, 1988; Elliott & Dweck, 1988). Dweck's model received support across various academic settings. For example, in a field study with college students, those students who performed poorly on proficiency examinations were less interested in taking remedial classes when they held an entity theory of intelligence than when they held an incremental theory of intelligence (Hong, Chiu, Dweck, Lin, & Wan, 1999). Other studies found that the attributions of feedback to ability versus effort influence the strategy people use to repair their self-esteem after receiving negative academic feedback. In one study, those who believed in fixed intelligence (entity theory) chose defensive strategies such as downward comparison to less successful individuals or undergoing a tutorial on already mastered material. In contrast, those who believed in improvable intelligence (incremental theorists) chose remedies in the form of self-improvement strategies, including upward comparisons and a tutorial on material that had not yet been mastered (Nussbaum & Dweck, 2008).

Effects of entity versus incremental theories also emerged in other self-regulatory contexts and in the pursuit of a variety of goals. For example, research by Miele and Molden (2010) on fluency effects found that when materials were conveyed in a disfluent fashion (e.g., participants had to read blurry and hard-to-read fonts vs. easy-to-read fonts), entity theorists rated their comprehension as lower, whereas incremental theorists rated their comprehension as higher. Presumably, the negative perceptual feedback from disfluent materials deterred entity theorists from working harder to process the information, but the same negative feedback encouraged incremental theories to increase their efforts to overcome the deterrence.

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Mood Attributions

Other attribution research examines the impact of mood attribution on goal persistence and change. As stated earlier, feedback has affective consequences, including specific emotions and unspecified moods. These affective consequences mediate the impact of feedback on goal pursuit (Baumeister, Vohs, DeWall, & Zhang, 2007; Carver & Scheier, 1998; Higgins, 1987). In particular, because moods do not have a clear source, the attribution of (negative or positive) moods that resulted from feedback to different sources alters the impact of feedback on subsequent motivation.

Research on the mood-as-information perspective examined this notion (Schwarz & Clore, 1983). This research asserts that positive mood provides information that the environment is safe and that the cost of making the wrong decision is relatively negligible, whereas negative mood signals threat and lack of positive outcomes. People use their mood as information on which to base various judgments, including life satisfaction, the value of their goals, and so on. However, this information is discounted if people attribute their mood to a source unrelated to the subject of the judgment (e.g., the weather). For example, in Schwarz and Clore's (1983) studies, when participants were in a positive mood, they reported higher life satisfaction unless their good mood was attributed to a source unrelated to this particular judgment, therefore, leading them to disregard their feelings (see also Gendolla & Krusken, 2002). The mood-as information perspective further suggests (although it has yet to be empirically demonstrated) that misattributing one's mood to an unrelated source could lead one to overcorrect for its possible influences (Schwarz & Clore, 2007; Wilson & Brekke, 1994). In such cases, the effect of mood is not only discounted but rather is reversed. For example, in evaluating a potential goal end state, a person might boost her valuation when she is in a positive mood, unless she attributes her mood to unrelated source (e.g., an earlier event). If the mood appears irrelevant, the person might worry that her positive mood colors her positive evaluation of her goal, consequently leading her to overcorrect for this possible bias by intentionally evaluating the goal more negatively.

A related view was recently offered by Clore and Huntsinger (2007), who suggested that positive mood validates and negative mood invalidates accessible cognitions. According to their model, people ask themselves how they feel about different things, including their goals. Positive mood signals that the goal is valuable (a go signal), whereas negative mood signals that it lacks value (a no-go signal). In accordance with research on mood-as-information, research on mood as a "go or no-go" signal assumes that mood provides information for self-regulation to the extent that it is deemed goal-relevant, that is, to the extent that a person believes it is valuable feedback.

Other research attests that attribution of mood to a goal-irrelevant source may also impact self-regulation, although the mood no longer conveys information on performance. The reason is that the experience of positive affect is associated with approach responses (Cacioppo, Gardner, & Berntson, 1999) and feelings of resourcefulness (Aspinwall & Taylor, 1997; Raghunathan & Trope, 2002; Trope &

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Pomerantz, 1998), both of which increase the tendency to adopt and then pursue an accessible goal. For example, Fishbach and Labroo (2007) found that positive-mood participants tended to adopt whichever goals were salient in the situation, whereas negative-mood participants rejected pursuit of these salient goals.

Research on stop rules offers yet another perspective for the role of mood attributions in self-regulation. This research suggests that positive mood results in disengagement when people interpret it as a signal that they have done enough ("Stop when you feel you have done enough"). In contrast, positive mood increases goal engagement when people interpret it as a signal that they like the task ("Stop if you do not like the task"; Hirt, Melton, McDonald, & Harackiewicz, 1996; Martin, Ward, Achee, & Wyer, 1993). To illustrate, participants in one study (Martin et al., 1993) were asked to read a series of behaviors before forming an impression of the actors of these behaviors. The task of forming impressions was ambiguous: Participants could either view it as interesting and enjoyable or as a chore they had to complete. When told to read about a fictitious person's various behaviors until they had enough information, those in a positive mood stopped reading sooner than those in a negative mood because their positive mood informed participants that they had done enough. In contrast, when told to stop when they were no longer having a good time, those in a negative mood stopped reading the list of behaviors sooner than those in a positive mood; those who experienced positive mood inferred that they can—and should—continue working.

Overall then, attribution and mood theories suggest that either positive or negative feedback can promote goal pursuit, depending on the meaning people give to feedback on their goals and to their resulting mood. Mood theory further suggests that not only does feedback have affective consequences that influence self-regulation, but it also influences self-regulation directly, when it is not the outcome of feedback. We next move to research on feedback and how it impacts goal pursuit depending on the dynamic of self-regulation individuals follow.

Dynamics of Self-Regulation

Our research program on the dynamics of self-regulation identifies the conditions under which positive versus negative feedback increases the motivation to adhere to a goal. This research program distinguishes between two patterns of goal pursuit that have opposite implications for when positive and negative feedback facilitate goal persistence versus justify disengagement and switching to another goal (see Fishbach, Zhang, & Koo, 2009, for a review). We suggest that when individuals pursue a goal, their level of performance can signal either commitment to a desirable end state or pace of progress toward this state. When people interpret pursuit of a goal as a signal of their commitment, they *highlight* that goal after successful pursuit. That is, they prioritize the goal by making consistent choices after successes and forgoing the goal after lack of successes. When people interpret pursuing a goal as a signal of their progress, they *balance* between this goal and others. In doing so, they alternate goals after successes and focus on pursuing the focal goal after unsuccessful actions. To illustrate, a student who infers her level of commitment based on academic performance will

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highlight her goal by focusing on her academic work after experiencing successes (e.g., a high mark on a paper) and forgoing her academic work after experiencing a lack of success (e.g., a poor exam grade). In contrast, a student who infers his level of progress on the basis of academic performance will balance by forgoing academic work after successes, because sufficient progress was achieved, but increase his effort after lack of successes, because negative feedback signals more work is needed.

According to this model, two factors promote goal-directed behavior: (1) the presence of goal commitment, which people infer from positive feedback on successes, and (2) the lack of goal progress, which they infer from negative feedback on failures. Conversely, low commitment, which people infer from failing to pursue a goal, and sufficient progress, which they infer from successfully pursuing a goal, can both undermine the motivation to choose actions that further a focal goal. Importantly, these two representations of goal striving—expressing commitment versus making progress—characterize goals that do not have a particular end state as well as goals that do (e.g., general health and career goals vs. meeting a charity goal or completing an assignment at work). Often, both representations are equally plausible; however, at times, one representation is more plausible than the other. For example, when people invest in a goal without making progress (e.g., in sunk cost situations, Arkes & Ayton, 1999), they will infer greater commitment but not progress. Or when people pursue a goal under externally imposed controls, they will infer making progress without also inferring greater commitment. As an illustration, Finkelstein and Fishbach (2010) found that imposed healthy eating (e.g., when we asked people to eat food framed as "healthy") makes people hungrier than when they choose to eat healthy food or when they eat the same food framed as "tasty" without emphasizing its healthy characteristics.

Notably, these goal representations do not comprise a stage model (e.g., goal setting vs. striving, see for example, the Rubicon model of action phases; Heckhausen & Gollwitzer, 1987). Rather, self-regulators both evaluate their commitment and monitor their progress in the course of striving toward a goal, and they monitor their efforts according to their goal representation and with respect to past actions they have taken and upcoming actions they plan to take. A number of variables, then, influence whether people represent goal pursuit in terms of commitment or progress, and thus whether they then exhibit a dynamic of highlighting and increase engagement in response to positive feedback, or a dynamic of balancing and increase engagement in response to negative feedback. We next review these variables, which we summarize in Table 7.1.

TABLE 7.1 Factors That Determine the Dynamic of Self-Regulation

Commitment-Induced Highlighting	Progress-Induced Balancing
Questioning commitment	Questioning progress
Action options are presented apart	Action options are presented together
Salient superordinate goal	Nonsalient superordinate goal
Low commitment	High commitment

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Framing Questions Asking individuals whether their actions reflect their commitment to a goal versus progress on the goal may influence how they frame these actions to themselves and consequently whether their motivation increases in response to positive or negative feedback. The reason framing questions have such an impact is that to answer the questions, individuals need to adopt the appropriate goal frame in explaining their level of performance for themselves, at least temporarily.

In a study that demonstrates the effect of framing questions, Fishbach and Dhar (2005) asked participants to recall successful goal pursuits in several domains and then manipulated the representation of these successes by asking participants whether they expressed their level of goal commitment or had made progress toward their goals by pursuing them. Participants then indicated their motivation to attend to another, competing goal. For example, with regard to academic goals, student participants in the commitment frame indicated whether they felt committed to academic tasks when they studied, whereas participants in the progress frame indicated whether they felt they had made progress on their academic tasks when they studied. All participants then indicated their interest in socializing with friends that night after completing a day of studying. They found that those who answered progress questions expressed more interest in switching to the socializing goal than those who answered commitment questions; hence, they were more likely to seek a balance between positive feedback on their academic goal and attending to alternative, social goals.

Framing questions impact the meaning people imbue to past actions and thus whether they highlight the focal goal or balance between the focal goal and competing alternatives in the present. In addition, framing questions can also change the meaning of actions people plan to pursue in the future, and these planned actions will then influence present goal pursuit as a function of the dynamic of self-regulation. To demonstrate the effect of planned, future goal actions, Zhang, Fishbach, and Dhar (2007) compared goal pursuit among those who considered the meaning of future actions to their commitment versus progress toward their goal. They found that planned actions can signal commitment and competence (Bandura, 1997; Taylor & Brown, 1988; Weiner, 1979), which promote persistence toward the focal goal in the present, or they can signal upcoming progress toward goal attainment, which substitutes for present actions and encourages the pursuit of inconsistent goal actions (Oettingen & Mayer, 2002). For example, a planned workout can signal to the gym user that he is highly committed to staying in shape or that he is about to make progress toward the health goal. If the gym user infers commitment, he will be inclined to exercise today, whereas if he infers progress, he will be more inclined to procrastinate today. In this way, planned actions provide impactful feedback for self-regulation in the present.

Presentation Format Another factor that influences the dynamic of self-regulation and one's response to feedback is the arrangement of choice options. People often make selections from choice sets that include options that serve multiple goals. For example, people can search for movies at a store that contains educational films and light comedies, select from highbrow news magazines or

lowbrow tabloids on a newsstand, or select songs from a set that includes classical or popular music. In such situations, the presence of multiple-choice alternatives activates the goals that correspond to each option (Shah & Kruglanski, 2003), and the arrangement of the alternatives influences people's perceptions of them as competing against versus complementing each other and, accordingly, their dynamic of self-regulation. For example, the presence of healthy fruits and unhealthy candies activates health versus indulgence goals, and the perceived relationship between these goals as competing versus complementary influences the dynamic of self-regulation individuals follow across several choices (e.g., whether a person who had a piece of fruit chooses to have another piece of fruit or to have some candy subsequently).

Fishbach and Zhang (2008) found that presenting choice options apart in two separate choice sets (e.g., two bowls) versus together in one choice set (e.g., one bowl) determines whether individuals perceive the choice as conflicting versus complementary. When the options are apart, they seem conflicting and thus promote a highlighting dynamic of choice: A person responds to feedback on a successful goal-related choice by choosing the same goal again. However, when the options are together, they seem complementary and hence promote a balancing dynamic of choice: A person responds to feedback on successful goal pursuit by switching to another goal.

To demonstrate these effects, Fishbach and Zhang (2008) gave participants a choice between a healthy bag of carrots and an unhealthy chocolate bar. Presenting the items in separate piles increased participants' likelihood of making healthy choices (taking the carrots), compared with presenting the items in a single, unsorted pile, presumably because when the items were presented separately, participants planned to choose healthily for now and later, whereas when the items were presented together, participants were planning to eat unhealthily now but healthily later. Indeed, in another study, when healthy and unhealthy menu items were presented together (i.e., on the same menu), participants chose healthy items consistently, for now and for later, whereas when menu items were presented apart, participants chose unhealthily in the present and then switch to something healthier for the next course.

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Superordinate Goal Whether individuals increase goal pursuit in response to positive feedback in a commitment frame or negative feedback in a progress frame partially depends on their attention to the specific action or subgoal as opposed to its superordinate goal (e.g., a specific workout vs. health goals). If the superordinate goal is salient, successful performance can signal commitment to this goal more than it can provide a sense of progress, because the overall goal is far from reach. Therefore, positive feedback would increase a person's motivation to highlight the goal by pursuing consistent actions. If, however, the superordinate goal is not salient and a person focuses on the specific activity, positive feedback signals goal progress, even fulfillment, and motivates balancing by moving away from the goal.

In a study that tested the effect of superordinate goal accessibility, Fishbach, Dhar, and Zhang (2006) examined when gym users choose to follow a successful

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workout with a healthy beverage. In order to increase the accessibility of the superordinate health goal, participants completed an experimental survey attached to either a "health and fitness" hardcover book or a phone directory. Both books served as clipboards. We provided feedback on participants' successful workouts by having them evaluate their own workouts relative to another (fictitious) participant who either exercised very little or a lot. We found that when the superordinate health goal was salient (the "health and fitness" clipboard), those who received positive feedback that they exercised more than another person expressed greater interest in getting healthy food than those who received negative feedback that they exercised less than another person. In contrast, in the absence of the superordinate goal prime, those who received negative feedback expressed greater interest to eat healthily than those who received positive feedback (Figure 7.1).

Other studies (Fishbach et al., 2006) found that temporal distance has a similar impact on how people respond to feedback because temporal distance increases the focus on abstract goals (Liberman & Trope, 1998; Trope & Liberman, 2003; Vallacher & Wegner, 1987). Thus positive feedback on distant goals increases motivation to pursue the same goals in the present because it signals a boost in commitment. In addition, negative feedback on proximal goals increases present motivation because it signals insufficient goal progress.

Commitment Level Preexisting levels of commitment to a goal also determine whether people interpret their actions as a signal of commitment or of progress and their subsequent response to feedback. People wish to evaluate their commitment when it is relatively low, and consequently, they are more likely to persist on the goal after receiving positive feedback signaling the goal is important and worthwhile. However, when goal commitment is high, people ask about their pace of progress and are more likely to persist on a goal after

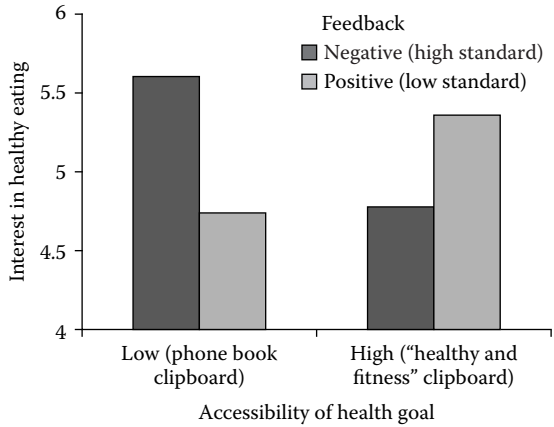


Figure 7.1 Interest in healthy eating as a function of accessibility of health goal and feedback (positive: comparison to a low social standard; negative: comparison to a high social standard).

receiving negative feedback because negative feedback signals to committed individuals greater discrepancy and need for progress (Wicklund & Gollwitzer, 1982). For example, in one study, participants who demonstrated preexisting commitment to their choice of profession exhibited enhanced performance on work-related tasks when they got negative feedback, a pattern that was not observed among those not committed to their choice of profession (Brunstein & Gollwitzer, 1996).

In another series of studies that tested the impact of commitment, Koo and Fishbach (2008) used goals with a clear end state to which they manipulated initial commitment (high vs. low) and participants' attention to what they had accomplished versus what remained for them to accomplish. When goals have a clear end state, any accomplishment (e.g., 50% to date) can also be framed as a lack of accomplishment (e.g., 50% to go) without altering the objective information on the level of goal attainment. The question they addressed was which feedback is more motivating: feedback on completed or remaining actions. They found that when commitment was low, emphasizing completed actions (positive feedback) increased goal persistence more than emphasizing remaining actions (negative feedback). An emphasis on remaining actions, in contrast, increased goal persistence when commitment was high.

For example, in one study (Koo & Fishbach, 2008), student participants reported greater motivation to study for an exam in a course they were not already committed to (e.g., a pass/fail course) if they received positive feedback on their completed actions. However, students reported greater motivation to study for an exam in a course they were highly committed to (e.g., a letter grade course) if they received negative feedback on their missing actions (Figure 7.2). Thus, when commitment was low, students studied because they had completed some coursework before (positive feedback) and thus they highlighted the study goal. When commitment was high, students studied because they had remaining, uncompleted coursework (negative feedback), thus they exhibited a dynamic of balancing between past and present efforts.

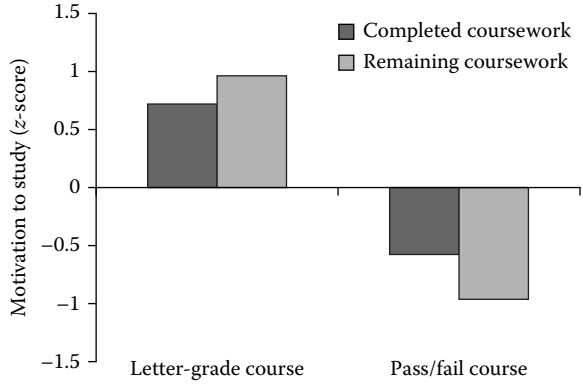


Figure 7.2 Motivation to study as a function of commitment (high: letter-grade course; low: pass/fail course), and focus on competed versus remaining coursework.

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Whereas research on self-regulation often concerns the pursuit of personal goals (e.g., career, academic, and health goals), many goals individuals pursue are goals shared with a collection of individuals (Weldon, Jehn, & Pradhan, 1991; Zander, 1980). For example, individuals often engage in social movements with others, donate to charities, and accomplish chores with housemates. In studies that examined performance on shared goals, we tested how feedback on a group's performance influences a person's contribution to the shared goal as a function of the person's commitment (Koo & Fishbach, 2008) or identification with the group (Fishbach, Henderson, & Koo, 2011). This research found that when commitment to the shared goal is low, people invest more resources if they receive information on other group members' contributions (positive feedback) versus lack of contributions (negative feedback), because existing contributions indicate the goal is important. That is, people's actions follow (or highlight) other group members' actions. In contrast, if people are already committed to the shared goal and wish to evaluate the group's progress, they invest more resources if they receive information on other group members' lack of (vs. existing) contributions, because lack of contributions indicates more effort is required to achieve the goal. That is, people's actions compensate (or balance) for other group members' lack of actions.

For example, in a field study, Koo and Fishbach (2008) measured contributions to a charity campaign to help AIDS orphans in Africa. The solicited population included regular donors who made monthly donations to this charity ("hot list") and new donors who indicated interest in donating but had not yet made any contributions ("cold list"). The two groups varied by their commitment level, which was higher for those on the hot list than the cold list. The solicitation letter indicated a goal to raise ₩10 million and that approximately half of the money had already been raised through various channels. Depending on experimental condition, the letter further emphasized either accumulated or missing contributions to complete the campaign goal. The study found that among the cold-list donors, emphasizing 50% accumulated contributions (positive feedback) increased contributions. This pattern reflects highlighting other group members' contributions by contributing more if others had already done so. In contrast, among the hot-list donors, emphasizing that 50% of contributions were missing (negative feedback) increased contributions. This pattern reflects a dynamic of balancing by using one's own contributions to make up for others' lack of contributions (Figure 7.3).

In summary, research on the dynamics of self-regulation extends research on attribution theory and mood theory by identifying the conditions under which different self-regulatory processes—the ones where positive versus negative feedback increase goal adherence—are more likely. According to this line of research, positive feedback on successes promotes goal pursuit when it signals that a person is committed, including that that goal is worthwhile, enjoyable, and within reach. Negative feedback on lack of successes promotes motivation when it signals a discrepancy—that the rate of progress is insufficient. The result is a dynamic of highlighting when feedback informs one's commitment and a dynamic of balancing when feedback informs one's progress. In the reminder of this chapter, we examine the implications of research on feedback on the level

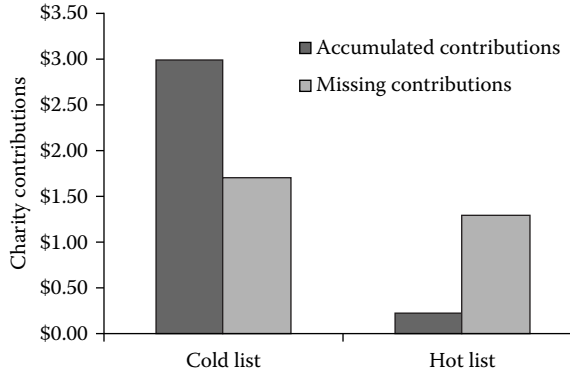


Figure 7.3 Charity contribution as a function of commitment (high: hot list; low: cold list), and focus on accumulated versus missing contributions.

of aspiration that self-regulators exhibit and to the strategic use of feedback to motivate the self and others.

IMPLICATIONS

Feedback Impacts Level of Aspiration

We reviewed research on the impact of feedback on goal striving: the motivation to persist on a goal. In addition, feedback on goal pursuit impacts the level of performance or standards individuals aspire to achieve, that is, their level of aspiration (Lewin et al., 1944).

Exploring how individuals set their standards is particularly relevant for exploring motivation in the context of goals that follow a goal ladder, in which each goal is a step toward pursuing another, more advanced goal. For example, career paths often follow a trajectory in which an entry-level position is a step toward a more advanced position in the organization, and learning goals often follow a path from a beginner level to an intermediate level and then to an advanced level. In these goal ladders, a tradeoff exists between repeating the same level and moving forward to a more advanced level. For example, a student who completes a class can choose to take a more advanced class in the same topic (i.e., climb up the goal ladder) or repeat the same (beginner) level for another topic.

The feedback individuals receive on their present goal pursuits influences what goal level they set for themselves subsequently. Specifically, feedback on missing actions to complete the goal increases the level of aspiration more than feedback on completed actions because it directs individuals to focus on making progress. In contrast, feedback on completed actions increases commitment and, hence, satisfaction with the present level of engagement. To illustrate these influences of feedback, Koo and Fishbach (2010) asked participants to review a set of unfamiliar musical pieces. After each piece, participants received feedback on either (a) the portion of the task they had completed, (b) the portion of the task that remained, or (c) their present position in the task (e.g., "You are on number 3"). They found that

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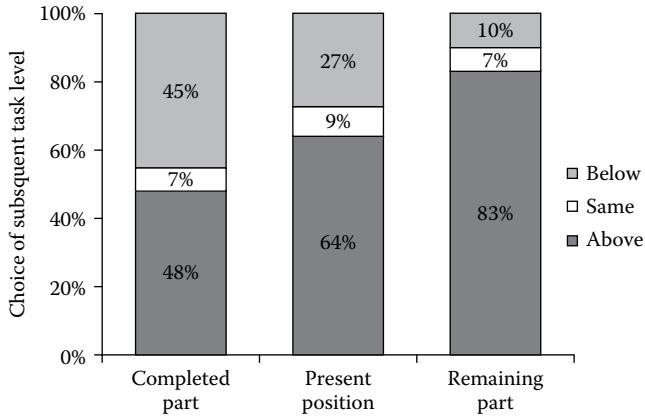


Figure 7.4 Choice of a subsequent task level (below, same, or above), as a function of feedback on completed progress, present position, and remaining progress on present task.

upon completing their evaluations, participants who received feedback on remaining, unaccomplished actions chose to advance to a higher task level more than those who received feedback on completed actions or on their current position (Figure 7.4).

In another field study, Koo and Fishbach (2010) examined the level of aspiration among employees in an advertising agency. The employees considered either the tasks they completed that year or their upcoming tasks for that year. They then indicated whether they would like to move on to more challenging roles for the next year and how satisfied they were with their current roles in their organization. They found that when employees focused on missing (vs. completed) actions, they expressed greater interest in advancing to more demanding roles for the next year and were less satisfied with their current roles. Thus negative feedback on missing actions increased the level of aspiration in the workplace, whereas positive feedback on completed actions increased job satisfaction.

Overall, in a goal ladder, positive feedback that is taken as a signal of commitment promotes staying on the present level of goal engagement, whereas negative feedback that is taken as a signal of lack of progress promotes moving to a more advanced goal. This finding also has implications for research on intrinsic versus extrinsic motivation (Higgins & Trope, 1990; Kruglanski, 1975; Sansone & Harackiewicz, 1996). Feedback on completed actions appears to increase the intrinsic incentives associated with engaging in a goal, including the experience of enjoyment, involvement, or importance, whereas feedback on remaining actions increases the extrinsic incentives associated with making progress and attaining the goal.

Strategic Use of Feedback

People use feedback strategically (though not necessarily consciously) to increase their own or someone else's motivation to persist on a goal. Thus, not only do people

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respond to feedback but they also give and seek feedback in order to increase their and others' motivation to pursue goals. Whereas a large proportion of feedback research concerns people's responses to feedback—how it influences their subsequent motivation—we next explore the implications for feedback giving and seeking. We assume feedback providers (e.g., educators, coaches, parents, and bosses) use feedback to motivate the recipient. Additionally, feedback seekers actively solicit feedback from those around them (e.g., friends, family members, colleagues, and neighbors) in order to motivate themselves.

In general, across the three modalities of feedback—giving, receiving, and responding—a relationship exists between experience and valence of feedback: individuals shift toward negative feedback as the receiver of the feedback gains more experience or expertise in pursuing a goal. In this section, we demonstrate the shift in mastery goals, such as acquiring a new skill, as well as investing resources in relationship goals.

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Shifting in Responding to Feedback Positive feedback is effective when it signals commitment, and negative feedback is effective when it signals discrepancy. Then, as individuals gain expertise, their focus on evaluating commitment decreases and their focus on monitoring progress or discrepancy increases. The reason is that novices wish to evaluate their commitment more than experienced individuals do. As a result, the same feedback would impact the novice's commitment but impact the expert's sense of goal progress. For example, college freshmen are more likely to ask themselves whether college is right for them, whereas college seniors are more likely to ask about the pace of their progress toward earning their degree and whether they will graduate on time. These changes imply that novices will work harder in response to positive feedback and experts will increase their efforts in response to negative feedback. For example, the freshmen would study harder after receiving positive feedback such as a good grade, and seniors would study harder after receiving negative feedback such as a bad grade.

In a study that illustrates this shift toward responding to negative feedback, Louro, Pieters and Zeelenberg (2007) explored how dieters respond to feedback on their effort to lose weight as a function of how far along they are on their diet. These researchers found that those dieters who felt good about their achievement at the beginning of their diet increased their effort more than those who were disappointed with their achievement. But later on the pattern reversed: Those who felt good toward the end of their diet, when they were about to meet their weight-loss goal, relaxed their dieting efforts compared to those who were less satisfied with their achievement.

Shifting in Seeking Feedback A similar shift toward negative feedback exists in feedback seeking: Experts seek more negative feedback than novices. To illustrate this point, Finkelstein and Fishbach (2011) compared feedback seeking among U.S. college students enrolled in advanced and beginner French classes. They found that students enrolled in the beginner class were more interested than advanced students in taking the class with an instructor who emphasizes what they did well (positive feedback). The advanced students, in contrast, were

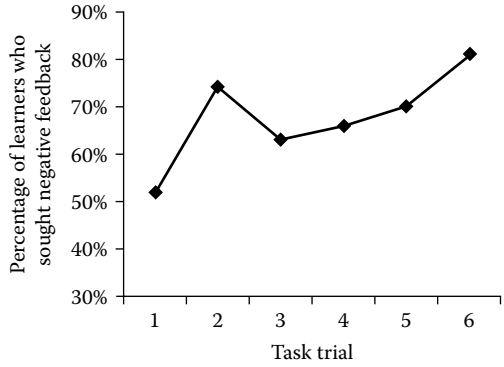


Figure 7.5 Proportion of learners seeking negative feedback as a function of progress on the task (i.e., gained expertise).

more interested than beginner students in taking the class with an instructor who emphasizes how they could improve (negative feedback).

In another study (Finkelstein & Fishbach, 2011), participants learned a new task (U.S. students typing in German) and could choose between receiving feedback either on their mistakes or on their correct responses after each typing session, which was comprised of a medium-length paragraph, for up to six sessions (i.e., trials). As participants progressed through the learning sessions, they gained expertise and a larger proportion of them sought negative feedback on their mistakes (Figure 7.5).

Shifting in Feedback Giving A shift in preference toward negative feedback also exists for feedback givers. As the recipient of the feedback advances from a novice to an expert status in a particular domain, feedback givers increase the share of negative feedback they provide. Finkelstein and Fishbach (2011) demonstrated this trend in a study that examined the feedback individuals give to a team member as a function of his assumed expertise. Participants had to help their team member prepare for an important presentation by providing positive and negative feedback on his practice presentation. They found that evaluators provided more negative feedback (but not less positive feedback) when they believed their team member was an experienced team member (2 years in) as opposed to new to the team (2 months in).

Feedback Shift in Relationship Goals People often pursue their goals with significant others who are helpful in achieving these goals. People feel closer to significant others who are instrumental for the self's goals—that is, those who encourage the advancement of the goals—and they pull away from noninstrumental others (Fitzsimons & Fishbach, 2010; Fitzsimons & Shah, 2008). For example, people feel closer to those they believe will help them achieve their active academic and fitness goals, such as a sibling who serves as a role model, and they draw further from those who thwart these goals, such as a friend who parties all the time.

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Friends also exchange feedback: Relationship partners often criticize or praise one another on their investment of resources (e.g., time, thoughts, and efforts) toward various goals as well as the relationship goal. Next we examine feedback on investment in the relationship—that is, feedback that is given by the relationship partner and refers to the person's investment in the relationship.

The status of the relationship as shallow versus deep influences the valence of the feedback friends exchange on relationship goals. Specifically, those in shallow relationships wish to evaluate the strength of their commitment to the relationship, and negative feedback will undermine their commitment, thereby reducing their motivation to pursue the relationship. However, as the relationship deepens, relationship partners feel more secure about their level of commitment to the relationship goal and are less concerned with the negative impact of exchanging negative feedback (i.e., relationship depth acts as a buffer; Linville, 1987; Showers & Kling, 1996; Trope & Neter, 1994). In addition, for those in deep relationships, negative feedback is further motivating because it implies lack of sufficient investment. Therefore, not only can those in deep relationships tolerate negative feedback, but the same feedback also motivates them to invest resources in the friendship.

Research demonstrates that the deeper partners perceive their relationship to be, the more likely they are to give, seek, and respond to negative feedback by increasing investment in the relationship (Fishbach & Finkelstein, 2011). In a study that demonstrates the shift in feedback giving, Fishbach and Finkelstein (2011) manipulated participants' perception of their relationship depth (deep vs. shallow) by asking questions about their relationship on response scales that activated different standards of evaluation. For example, participants indicated how long they had known each other on a scale where the midpoint was 2 years versus 20 years, making them feel that, by comparison, their relationship is deep versus shallow. They then measured the feedback that participants conveyed in a toast that they wrote for their friend for an upcoming event such as a birthday party. The study found that participants who felt their relationship was deep were more likely to "roast," that is, to criticize their partner through negative feedback, than were those who felt their relationships were shallow.

Other studies documented a similar shift in feedback seeking among relationship partners. As the relationship appeared deeper, participants sought more negative feedback from their friends. In addition, in a study that tested friends' response to feedback, Fishbach and Finkelstein (2011) found that the strength of the relationship influences the length of the conversation after receiving negative feedback from a friend. Participants in this study were chatting with either a shallow acquaintance or close friend online. They started the conversation by soliciting either positive or negative feedback from their partner, and the length of the conversation that followed was measured. They found that participants who solicited negative feedback from a close friend sent more messages (i.e., had a longer conversation) than those who solicited negative feedback from a new acquaintance or those who solicited positive feedback from a new acquaintance or a close friend (Figure 7.6).

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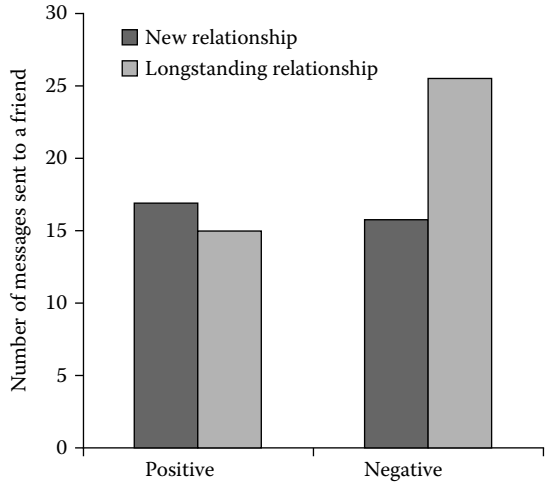


Figure 7.6 Motivation to invest in the relationship (number of messages sent to a friend), as a function of initial feedback (positive vs. negative) and relationship depth (shallow vs. deep).

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To summarize, there is a shift toward negative feedback as people gain expertise or experience on their goals. This shift occurs across three modalities of feedback: seeking, giving, and responding to feedback. Notably, the shift toward negative feedback can also reflect an objective increase in the value of this feedback for the individual, because as people gain expertise, the proportion of their correct responses presumably increases and, therefore, incorrect responses may provide more information. For example, the foreign language student in a beginner class might make more mistakes than the one enrolled in an advanced class, thus feedback on mistakes will be less informative for her. However, these differences in objective level of performance cannot explain the shift in feedback if evaluators use different criteria to evaluate novices versus experts, as they often do. Furthermore, even when the informational value of positive and negative feedback is held constant, research has documented a shift toward negative feedback that is strategic and meant to motivate goal pursuit.

SUMMARY AND CONCLUSIONS

Feedback on self-regulation influences individuals to persist on a goal as well as to seek change. In this chapter, we reviewed research that provides a universal answer to the direction of the impact: Either positive or negative feedback increases the motivation for goal pursuit. Research finds that positive feedback increases motivation when it signals the goal is valuable and the person is successfully able to pursue it. Negative feedback, in contrast, increases motivation when it signals discrepancy with a desired end state.

It follows that whether individuals wish to evaluate their commitment (a function of value and expectancy) or their rate of progress (a function of discrepancy)

will determine when positive versus negative feedback promotes goal pursuit. Accordingly, we next reviewed attribution and mood research and research on the dynamics of self-regulation, which attest that positive feedback is effective for those who wish to evaluate their commitment, and negative feedback is effective for those who wish to evaluate their pace of making progress toward a goal.

An underlying assumption in research reviewed here is that feedback is instrumental; that is, people seek and give feedback to motivate goal pursuit. Clearly, other motives also underlie feedback, such as the desire to enhance self-esteem (Tesser, 1988) or validate a person's view of herself (Swann & Read, 1981). Although we acknowledge that other motives impact the valence of the feedback exchanged, feedback is first and foremost a mechanism for self-regulation and is a crucial element in effectively pursuing an individual's goals. Thus, our focus was not on the different motives feedback can fulfill and the possible interactions between them, but rather, on how and when feedback facilitates (or undermines) self-regulation.

This review further touches on the role of affect, including feelings, moods, and emotions, in translating feedback into action. Accumulating evidence suggests that feedback operates through the affective response it evokes (Baumeister et al., 2007; Carver & Scheier, 1998; Higgins, 1987). Specifically, feedback results in positive or negative feelings, and these affective responses motivate behavioral change. Eliminating the feelings feedback evokes or altering the meaning of those feelings would modify the impact of feedback on behavior. In addition, affect provides feedback for self-regulation when it is not the result of feedback information. Overall then, to fully realize the functions of feedback in self-regulation, researchers should integrate insights from research on the motivational, affective, and cognitive systems.

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REFERENCES

Aarts, H., Custers, R., & Holland, R. W. (2007). The nonconscious cessation of goal pursuit: When goals and negative affect are coactivated. *Journal of Personality and Social Psychology, 92*, 165–178.

Aarts, H., Custers, R., & Veltkamp, M. (2008). Goal priming and the affective-motivational route to nonconscious goal pursuit. *Social Cognition, 26*, 555–577.

Arkes, H. R., & Ayton, P. (1999). The sunk cost and concorde effects: Are humans less rational than lower animals? *Psychological Bulletin, 125*, 591–600.

Arkes, H. R., & Blumer, C. (1985). The psychology of sunk cost. *Organizational Behavior and Human Decision Processes, 35*, 124–140.

Aspinwall, L. G., & Taylor, S. E. (1997). A stitch in time: Self-regulation and proactive coping. *Psychological Bulletin*, *121*, 417–436.

Atkinson, J. W. (1957). Motivational determinants of risk-taking behavior. *Psychological Review, 64*, 359–372.

Audia, P. G., Locke, E. A., & Smith, K. G. (2000). The paradox of success: An archival and a laboratory study of strategic persistence following radical environmental change. *Academy of Management Journal, 43*, 837–853.

Bandura, A. (1991). Social cognitive theory of self-regulation. *Organizational Behavior and Human Decision Processes, 2*, 248–287.

Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York: Freeman/Times Books/ Holt.

Bandura, A., Barbaranelli, C., Gian V. C., & Concetta, P. (2001). Self-efficacy beliefs as shapers of children's aspirations and career trajectories. *Child Development, 72,* 187–206.

Baumeister, R. F., Vohs, K. D., DeWall, C. N., & Zhang, L. Q. (2007). How emotion shapes behavior: Feedback, anticipation, and reflection, rather than direct causation. *Personality and Social Psychology Review, 11*, 167–203.

Bem, D. J. (1972). Self-perception theory. In L. Berkowitz (Ed.), *Advances in experimental social psychology* (Vol. 6, pp. 1–62). New York: Academic Press.

Brunstein, J. C., & Gollwitzer, P. M. (1996). Effects of failure on subsequent performance: The importance of self-defining goals. *Journal of Personality and Social Psychology, 70*, 395–407.

Cacioppo, J. T., Gardner, W. L., & Berntson, G. G. (1999). The affect system has parallel and integrative processing components: Form follows function. *Journal of Personality and Social Psychology, 76*, 839–855.

Carver, C. S. (2003). Pleasure as a sign you can attend to something else: Placing positive feelings within a general model of affect. *Cognition and Emotion, 17*, 241–261.

Carver, C. S., & Scheier, M. F. (1990). Origins and functions of positive and negative affect: A control-profess view. *Psychological Review, 97*, 19–35.

Carver, C. S., & Scheier, M. F. (1998). *On the self-regulation of behavior*. New York: Cambridge University Press.

Cialdini, R. B., Trost, M. R., & Newsom, J. T. (1995). Preference for consistency: The development of a valid measure and the discovery of surprising behavioral implications. *Journal of Personality and Social Psychology, 69*, 318–328.

Clore, G. L., & Huntsinger, J. R. (2007). How emotions inform judgment and regulate thought. *Trends in Cognitive Sciences, 11*, 393–399.

Cochran, W., & Tesser, A. (1996). The "what the hell" effect: Some effects of goal proximity and goal framing on performance. In L. L. Martin & A. Tesser (Eds.), *Striving and feeling: Interactions among goals, affect, and self-regulation* (pp. 99–120). Hillsdale, NJ: Erlbaum.

Custers, R., & Aarts, H. (2005). Positive affect as implicit motivator: On the nonconscious operation of behavioral goals. *Journal of Personality and Social Psychology, 89*, 129–142.

Dweck, C. S., & Leggett, E. L. (1988). A social cognitive approach to motivation and personality. *Psychological Review, 95*, 256–273.

Elliot, A. J., & Dweck, D. S. (2005). *Handbook of competence and motivation.* New York: Guilford.

Elliott, E. S., & Dweck, C. S. (1988). Goals: An approach to motivation and achievement. *Journal of Personality and Social Psychology, 54*, 5–12.

Feather, N. T. (1982). *Expectations and actions: Expectancy-value models in psychology*. Hillsdale, NJ: Erlbaum.

Ferguson, M. J. (2008). On becoming ready to pursue a goal you don't know you have: Effects of nonconscious goals on evaluative readiness. *Journal of Personality and Social Psychology, 95*, 1268–1294.

Festinger, L. (1957). *A theory of cognitive dissonance*. Oxford, Engl.: Row, Peterson.

Finkelstein, S. R., & Fishbach, A. (2010). When healthy food makes you hungry. *Journal of Consumer Research, 37*, 1–11.

Finkelstein, S. R., & Fishbach, A. (2011). *The expert's curse: Shifting to negative feedback*. Unpublished manuscript, University of Chicago.

Fishbach, A., & Dhar, R. (2005). Goals as excuses or guides: The liberating effect of perceived goal progress on choice. *Journal of Consumer Research, 32*, 370–377.

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Fishbach, A., Dhar, R., & Zhang, Y. (2006). Subgoals as substitutes or complements: The role of goal accessibility. *Journal of Personality and Social Psychology, 91*, 232–242.

Fishbach, A., & Finkelstein, S. R. (2011). *Close friends stab you in the front: Long-standing friends exchange more negative feedback*. Unpublished manuscript, University of Chicago.

Fishbach, A., Henderson, D. H., & Koo, M. (2011). Pursuing goals with others: Group identification and motivation resulting from things done versus things left undone. *Journal of Experimental Psychology: General*. Advance online publication. doi:10.1037/a0023907

Fishbach, A., & Labroo, A. A. (2007). Be better or be merry: How mood affects self-control. *Journal of Personality and Social Psychology, 93*, 158–173.

Fishbach, A., & Zhang, Y. (2008). Together or apart: When goals and temptations complement versus compete. *Journal of Personality and Social Psychology, 94*, 547–559.

Fishbach, A., Zhang, Y., & Koo, M. (2009). The dynamics of self-regulation. *European Review of Social Psychology, 20*, 15–34.

Fishbein, M., & Ajzen, I. (1974). Attitudes towards objects as predictors of single and multiple behavioral criteria. *Psychological Review, 81*, 59–74.

Fitzsimons, G. M., & Fishbach, A. (2010). Shifting closeness: Interpersonal effects of personal goal progress. *Journal of Personality and Social Psychology, 98*, 525–549.

Fitzsimons, G. M., & Shah, J. Y. (2008). How goal instrumentality shapes relationship evaluations. *Journal of Personality and Social Psychology, 95*, 319–337.

Förster, J., Grant, H., Idson, L. C., & Higgins, E. T. (2001). Success/failure feedback, expectancies, and approach/avoidance motivation: How regulatory focus moderates classic relations. *Journal of Experimental Social Psychology, 37*, 253–260.

Förster, J., Liberman, N., & Higgins, E. T. (2005). Accessibility from active and fulfilled goals. *Journal of Experimental Social Psychology, 41*, 220–239.

Freedman, J. L., & Fraser, S. C. (1966). Compliance without pressure: Foot-in-door technique. *Journal of Personality and Social Psychology, 4*, 195–202.

Gendolla, G. H. E., & Krusken, J. (2002). Mood state, task demand, and effort-related cardiovascular response. *Cognition & Emotion, 16*, 577–603.

Harmon-Jones, E., & Mills, J. (Eds.). (1999). *Cognitive dissonance: Progress on a pivotal theory in social psychology.* Washington, DC: American Psychological Association.

Heckhausen, H., & Gollwitzer, P. M. (1987). Thought contents and cognitive functioning in motivational versus volitional states of mind. *Motivation and. Emotion, 11*, 101–120.

Higgins, E. T. (1987). Self-discrepancy: A theory relating self and affect. *Psychological Review, 94*, 319–340.

Higgins, E. T., & Trope. Y. (1990). Activity engagement theory: Implications of multiply identifiable input for intrinsic motivation. In E.T. Higgins & R. M. Sorrentino (Eds.), *Handbook of motivation and cognition: Foundations of social behavior* (Vol. 2, pp. 229–264). New York: Guilford.

Hirt, E. R., Melton, R. J., McDonald, H. E., & Harackiewicz, J. M. (1996). Processing goals, task interest, and the mood-performance relationship: A meditational analysis. *Journal of Personality and Social Psychology, 71*, 245–261.

Hong, Y. Y., Chiu, C., Dweck, C. S., Lin, D., & Wan, W. (1999). Implicit theories, attributions, and coping: A meaning system approach. *Journal of Personality and Social Psychology, 77*, 588–599.

Hull, C. L. (1934). The rat's speed-of-locomotion gradient in the approach to food. *Journal of Comparative Psychology, 17*, 393–422.

Khan, U., & Dhar, R. (2006). Licensing effect in consumer choice. *Journal of Marketing Research, 43*, 259–266.

Kivetz, R., Urminsky, O., & Zheng, Y. (2006). The goal-gradient hypothesis resurrected: Purchase acceleration, illusionary goal progress, and customer retention. *Journal of Marketing Research, 43*(1), 39–58.

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Koo, M., & Fishbach, A. (2008). Dynamics of self-regulation: How (un)accomplished goal actions affect motivation. *Journal of Personality and Social Psychology, 94*, 183–195.
Koo, M., & Fishbach, A. (2010). Climbing the goal ladder: How upcoming actions increase level of aspiration. *Journal of Personality and Social Psychology, 99*, 1–13.
Kruglanski, A. W. (1975). Endogenous exogenous partition in attribution theory. *Psychological Review, 82*, 387–406.
Lewin, K., Dembo, T., Festinger, L., & Sears, P. S. (1944). Level of aspiration. In J. McHunt (Ed.), *Personality and behavioral disorders* (pp. 333–378). New York: Ronald Press.
Liberman, N., & Förster, J. (2008). Expectancy, value, and psychological distance: A new look at goal gradients. *Social Cognition, 5*, 515–533.
Liberman, N., & Trope, Y. (1998). The role of feasibility and desirability considerations in near and distant future decisions: A test of temporal construal theory. *Journal of Personality and Social Psychology, 75*, 5–18.
Linville, P. W. (1987). Self-complexity as a cognitive buffer against stress-related illness and depression. *Journal of Personality and Social Psychology, 52*, 663–676.
Losco, J., & Epstein, S. (1977). Relative steepness of approach and avoidance gradients as a function of magnitude and valence of incentive. *Journal of Abnormal Psychology, 86*, 360–368.
Louro, M. S., Pieters, R., & Zeelenberg, M. (2007). Dynamics of multiple goal pursuit. *Journal of Personality and Social Psychology, 93*(2), 174–193.
Martin, L. L., Ward, D. W., Achee, J. W., & Wyer, R. S. (1993). Mood as input: People have to interpret the motivational implications of their moods. *Journal of Personality and Social Psychology, 64*, 317–326.
Miele, D. B., & Molden, D. C. (2010). Naive theories of intelligence and the role of processing fluency in perceived comprehension. *Journal of Experimental Psychology: General, 139*, 535–557.
Miller, G. A., Galanter, E., & Pribram, K. H. (1960). *Plans and the structure of behavior*. New York: Holt.
Monin, B., & Miller, D. T. (2001). Moral credentials and the expression of prejudice. *Journal of Personality and Social Psychology, 81*, 33–43.
Nussbaum, A. D., & Dweck, C. S. (2008). Defensiveness vs. remediation: Self-theories and modes of self-esteem maintenance. *Personality and Social Psychology Bulletin, 34*, 599–612.
Oettingen, G., & Mayer, D. (2002). The motivating function of thinking about the future: Expectations versus fantasies. *Journal of Personality and Social Psychology, 83*, 1198–1212.
Powers, W. T. (1973). *Behavior: The control of perception*. Oxford, Engl.: Aldine.
Raghunathan, R., & Trope, Y. (2002). Walking the tightrope between feeling good and being accurate: Mood as a resource in processing persuasive messages. *Journal of Personality and Social Psychology, 83*, 510–525.
Reed, M. B., & Aspinwall, L. G. (1998). Self-affirmation reduces biased processing of health-risk information. *Motivation and Emotion, 22*, 99–132.
Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist, 55*, 68–78.
Sansone, C., & Harackiewicz, J. M. (1996). I don't feel like it: The function of interest in self-regulation. In L. L. Martin & A. Tesser (Eds.), *Striving and feeling: Interactions among goals, affect, and self-regulation* (pp. 203–228). Hillsdale, NJ: Erlbaum.
Schwarz, N., & Clore, G. L. (1983). Mood, misattribution, and judgments of well-being: Informative and directive functions of affective states. *Journal of Personality and Social Psychology, 45*, 513–523.
Schwarz, N., & Clore, G. L. (2007). Feelings and emotional experiences. In A. W. Kruglanski & E. T. Higgins (Eds.), *Social psychology: Handbook of basic principles* (2nd ed., pp. 385–407). New York: Guilford.

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Shah, J. Y., Friedman, R., & Kruglanski, A. W. (2002). Forgetting all else: On the antecedents and consequences of goal shielding. *Journal of Personality and Social Psychology, 83*, 1261–1280.

Shah, J., Higgins, E. T., & Friedman, R. S. (1998). Performance incentives and means: How regulatory focus influences goal attainment. *Journal of Personality and Social Psychology, 74*, 285–293.

Shah, J. Y., & Kruglanski, A. W. (2003). When opportunity knocks: Bottom-up priming of goals by means and its effects on self-regulation. *Journal of Personality and Social Psychology, 84*(6), 1109–1122.

Showers, C. J., & Kling, K. C. (1996). Organization of self-knowledge: Implications for recovery from sad mood. *Journal of Personality and Social Psychology, 70*, 578–590.

Soman, D., & Cheema, A. (2004). When goals are counterproductive: The effects of violation of a behavioral goal on subsequent performance. *Journal of Consumer Research, 31*, 52–62.

Strahilevitz, M., & Myers, J. G. (1998). Donations to charity as purchase incentives: How well they work may depend on what you are trying to sell. *Journal of Consumer Research, 24*, 434–446.

Swann, W. B., & Read, S. J. (1981). Self-verification processes: How we sustain our self-conceptions. *Journal of Experimental Social Psychology, 17*, 351–372.

Taylor, S. E., & Brown, J. D. (1988). Illusion and well-being: A social psychological perspective on mental health. *Psychological Bulletin, 103*(2), 193–210.

Tesser, A. (1988). Toward a self-evaluation maintenance model of social behavior. In L. Berkowitz (Ed.), *Advances in experimental social psychology* (Vol. 21, pp. 181–228). San Diego, CA: Academic Press.

Thaler, R. H. (1991). *Quasi rational economics.* New York: Russell Sage.

Trope, Y., & Liberman, N. (2003). Temporal construal. *Psychological Review, 110*, 403–421.

Trope, Y., & Neter, E. (1994). Reconciling competing motives in self-evaluation: The role of self-control in feedback seeking. *Journal of Personality and Social Psychology, 66*, 646–657.

Trope, Y., & Pomerantz, E. M. (1998). Resolving conflicts among self-evaluative motives: Positive experiences as a resource for overcoming defensiveness. *Motivation and Emotion, 22*, 53–72.

Vallacher, R. R., & Wegner, D. M. (1987). What do people think they're doing: Action identification and human behavior. *Psychological Review, 94*, 3–15.

Vroom, V. H. (1964). *Work and motivation*. New York: Wiley.

Weiner, B. (1974). *Achievement motivation and attribution theory.* Morristown, NJ: General Learning Press.

Weiner, B. (1979). A theory of motivation for some classroom experiences. *Journal of Educational Psychology, 71*, 3–25.

Weldon, E., Jehn, K. A., & Pradhan, P. (1991). Processes that mediate the relationship between a group goal and improved group performance. *Journal of Personality and Social Psychology, 61*, 555–569.

Wicklund, R. A., & Gollwitzer, P. M. (1982). *Symbolic self-completion*. Hillsdale, NJ: Erlbaum.

Wilson, T. D., & Brekke, N. (1994). Mental contamination and mental correction: unwanted influences on judgment and evaluations. *Psychological Bulletin, 116*, 117–142.

Zander, A. (1980). The origins and consequences of group goals. In L. Festinger (Ed.), *Retrospections on social psychology* (pp. 205–235). New York: Oxford University Press.

Zhang, Y., Fishbach, A., & Dhar, R. (2007). When thinking beats doing: The role of optimistic expectations in goal-based choice. *Journal of Consumer Research, 34*, 567–578.

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8

Conscious and Unconscious Processes in Goal Pursuit

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It is hard to miss that we are capable of consciously reflecting on our thoughts, our doings, and the world around us. When we wake up in the morning, conscious experiences usually follow quickly and remain with us during the day. When it comes to our actions, we reflect on the things we do, the things we did, and the things we are going to do. These conscious reflections are a defining feature of our species. For Descartes, they even provided proof of our very existence. Because these conscious reflections often accompany our actions, it is not a surprise that the scientific investigation of human behavior—heavily influenced by Descartes—has assigned a key role to consciousness: Our goals and actions are assumed to originate in our conscious minds and to be guided by our conscious reflections on what we do.

Of course, this is exactly the way it seems to us. But we may be biased, as we are—by definition—more likely to be conscious of the conscious processes that accompany our actions and goal pursuits than of the processes that operate outside the scope of our awareness (Dennett, 1991). Yet sometimes we are able to catch glimpses of these processes. We may wake up from a day dream, only to notice that we have driven several miles, taking exits and stopping at lights without any

conscious recollections other than the interesting thoughts we were indulging in. Although most of the time such absence of awareness of what we are doing is without much consequence, it may cause our pursuits to go astray, such as when we realize that we have driven to work instead of to a friend's house on a Sunday. And we may only become aware that we were trying hard to impress our friends after one of them asks us if we could please stop bragging. At such moments, it feels as if our mind has a mind of its own, taking care of business when we are not "there." This suggests that consciousness may not be as mandatory for our actions and pursuits as is commonly assumed.

Although consciousness's exclusive mandate for instigating and guiding human behavior had already been questioned by Freud and ignored by behaviorists (Skinner, 1938; Watson, 1925), one of the first studies to directly challenge the near axiom that conscious intention is the cause of human action appeared about 25 years ago. In a groundbreaking experiment, Libet, Gleason, Wright, and Pearl (1983) asked participants to move their index fingers at a moment of their choosing while looking at a clock with one rotating hand. Their task was to report the position of the hand at the moment they decided to move. In addition, the timing of the actual movement of the finger was measured while the preparation of the action in the brain was timed by means of an electroencephalogram. It was found that although the decision to move preceded the actual finger movement, preparation of the action was well on its way by the time participants became conscious of the decision to move (see also Soon, Brass, Heinze, & Haynes, 2008). In the face of these findings, Libet, who strongly opposed the idea of a free will, had no choice but to conclude that the actual preparation of their behavior had started out unconsciously.

One could still argue, however, that even though the movement itself was initiated before the awareness of the intention to act, this unconscious process was the outcome of the participant's conscious adoption of a goal suggested by the experimenter (i.e., move a finger at will). Research in social cognition, though, has demonstrated that even such goals themselves may be adopted and enacted without conscious awareness of doing so. Goals are represented in the minds of people as part of knowledge structures that include information about the goal, the means by which it can be attained, and the social context in which it has been pursued before (Bargh, 1990; Bargh & Gollwitzer, 1994). As a consequence, social situations and stimuli in the surroundings can activate or prime goals in people's minds, outside of their awareness (Bargh, 1990).

Bargh, Gollwitzer, Lee-Chai, Barndollar, and Trötschel (2001), for instance, had participants solve a word search puzzle in which words related to achievement—a highly desirable goal for U.S. students—were embedded and their performance was measured on a second task. It was found that although participants claimed that their behavior on the second task was not influenced by the first, students who were exposed to the achievement words outperformed the others on the second task. Other experiments revealed that priming an achievement goal prompts behavioral qualities that are characteristic for motivation or volition, such as persistence in solving the puzzles. Together, these findings suggest that goal pursuit can originate from unintentional, nondeliberative processes that operate outside

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conscious awareness, leading to behavior that is similar to conscious goal pursuit (Bargh et al., 2001; Chartrand & Bargh, 1996).

The findings above further challenge the idea that conscious processes are required for goal pursuit. In this chapter, we explore the role of conscious and unconscious processes in goal pursuit in more detail. We will first briefly examine theories on goal pursuit and define several distinct stages in the process of pursuing a goal in which consciousness is assumed to play a crucial role. We then examine the recent literature in various fields in order to identify the contribution of consciousness at these stages, presenting evidence that suggests the processes at each stage could work unconsciously. Based on these analyses, we will conclude that the process of goal pursuit can, to a large extent, operate unconsciously, but we will point out a number of questions that are still unanswered and require further research.

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THEORIES OF GOAL PURSUIT

Goals are generally defined as desired states one aims to attain, with states referring to outcomes or behaviors (Bargh, Gollwitzer, & Oettingen, 2010; Fishbach & Ferguson, 2007). One could hold the goal to be rich, go sailing, or get a sandwich from the corner store. Although these and other goals vary in their level of abstractness, they have in common that realizing them requires instrumental or goal-directed actions, which all, to some degree, require effort. When we say that someone has a goal, his or her behavior typically converges on that particular outcome, and the motivation for that goal is reflected by the persistence of one's behavior and the effort one invests. Although the concept of a goal can be used to refer to a particular state of the real world, it is more often used to refer to a mental representation of a particular desired state in the minds of people.

When trying to understand how goals affect behavior, the first tough question we must answer is how do these goals get there? Why does someone's mind feature the goal to be rich or get a sandwich? It is assumed by most contemporary theories on goal pursuit that goals are set in a process that involves conscious decisions and reflections. This process starts out with a number of options for goal pursuit that are either given (e.g., when you have to decide between going out or studying tonight) or have to be generated (e.g., What am I going to do tonight?).

Although theories differ in the specific information that is assumed to be used to select the goal to pursue (see, for example, Bandura, 1986; Deci & Ryan, 1985; Fishbein & Ajzen, 1975; Gollwitzer, 1990; Locke & Latham, 2002), they all share the basic approach that goals are generally set based on their expected value. The expected value principle, first formulated by Tolman (1932), holds that the motivation to realize a certain outcome of state is the product of its value and the expectancy of being able to realize it. Hence, whether a particular outcome or state is set as a goal depends on its value or desirability and the expectancy of being able to attain the goal, or its feasibility.

In most situations, more than one outcome is considered, and goal setting comes down to making a choice between several options. In such choice situations, the options can usually be seen as having different attributes on which they

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can be compared. For example, junk food is easy to obtain but unhealthy, sushi is delicious but expensive, and a barbeque is great fun but not if it is raining. How people choose between various options with different attributes is described by multiattribute utility theory (see, for example, Keeney & Raiffa, 1976). Pondering on the options that come to mind, people compare the different options on various attributes, assigning more weight to some attributes (e.g., taste) than others (e.g., healthiness), arriving at an overall utility for each option. People eventually adopt or set the option as a goal that has the largest overall expected utility or value (i.e., the option that is the most desirable). Based on this assessment, a conscious intention to pursue the goal is assumed to be formed, which is regarded to be a prerequisite for goal-directed action (Bandura, 1986; Deci & Ryan, 1985; Fishbein & Ajzen, 1975; Gollwitzer, 1990; Locke & Latham, 2002; Tolman, 1932).

After having formed an intention to pursue a particular option, the proper means have to be selected, based on the goal that is to be attained, but also on the situation in which the goal has to be pursued (e.g., drive to the mall to buy pizza, or order out if the mall is closed). These means can also be seen as attributes of the option (e.g., eating pizza can be attained by driving to the mall or by ordering out). When selecting between these means, the same principle of expectancy value operates: The means that are the most feasible and most desirable (or least undesirable) are selected and executed in order to pursue the goal.

In a dynamic world, however, selecting a particular means from memory to suit the situation at hand is often not enough for goal attainment, as the specific effects of the same actions are different each time around (Powers, 1973). Calling for pizza delivery may work fine one day, but the next day you may have to redial because the line is busy or call another line if nobody answers. At some point you may have to decide to switch to sushi after all, if delivery time is over three hours. In order to successfully attain a goal (e.g., eating), the effects of the goal-directed actions have to be monitored, and the actions themselves may sometimes need to be tuned or replaced altogether (Carver & Scheier, 1998).

In sum, theories on goal pursuit differ in their specifics, but in general a number of distinct stages can be identified. First, options for goal pursuit are received or generated. From this set, one option is selected and set as a goal to pursue based on desirability and feasibility that is determined by taking into account various attributes on which the options vary. This process of goal setting ultimately results in an intention to realize the goal. After goal setting, the proper means have to be selected by which the goal can be pursued in the given situation. During pursuit, the progress toward the goal has to be monitored to tune pursuit, based on the feedback that is received, in order to successfully attain the goal (Figure 8.1).

Most theories on goal pursuit treat goal setting and goal pursuit as a conscious affair. The stage in which options are assessed on desirability and feasibility, for instance, is essentially seen as a conscious decision-making process (Fishbein & Ajzen, 1975; Gollwitzer, 1990). But the prominent role of consciousness is most visible in the transition from deliberation to actual goal pursuit. This step, which was described by Gollwitzer (1990) as "crossing the Rubicon," is regarded as a crucial act of conscious will, which creates an intention that is required for goal pursuit to occur, according to all models (e.g., Bandura, 1986; Fishbein & Ajzen,

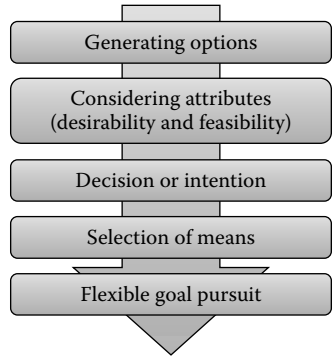


Figure 8.1 Stages of the process of conscious goal pursuit.

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1975; Gollwitzer, 1990; Locke & Latham, 2002). In the remainder of this chapter, we will take a look at the various stages of goal pursuit, examining the role of conscious processes and the extent to which these are influenced, or can be bypassed, by unconscious processes.

Unconscious Processes in Conscious Goal Setting

During goal setting people select a particular option as a goal to pursue. In experimental research, this process is often prompted by explicitly asking people to choose between different options (e.g., consuming different kinds of drinks) or by simply asking them what they want to do. Although conscious awareness usually accompanies goal-setting tasks, research suggests that explicitly stated goals and wants are susceptible to, and to some degree a product of, processes that occur outside of conscious awareness.

The Role of Mental Accessibility

First, unconscious processes may strongly affect the outcomes of the goal-setting process if the options for pursuit are not given, but they have to be generated before a choice can be made. When someone is coming over for dinner and you have to decide what to cook, how do you come up with the options from which to choose? You may try to think of a dish you recently cooked for other people or grab a cookbook for inspiration. But regardless of the execution of these strategies that you may be aware of, some options may pop up in your mind out of the blue ("Of course: spicy tuna with scallops!").

The key to understanding why options come to mind or not lies in the level of accessibility of mental concepts. The more accessible a mental concept, the more likely it is to be used by cognitive processes that are operating, such as decision-making processes or impression formation (Eitam & Higgins, 2010; Higgins, 1996). In a classic study, Higgins, Rholes, and Jones (1977) exposed participants either to words related to the concept "adventurous" or to the concept "reckless," which should render the particular concept more accessible. In a second, seemingly unrelated task, participants were found to use the concept that was rendered more accessible (i.e., primed) more often when they had to form an impression of

Donald who crossed the Atlantic in a sailboat: Participants primed with the term "reckless" saw this behavior more often as reckless, whereas participants primed with the term "adventurous" saw the behavior more often as adventurous. Thus, priming is understood to increase the probability that a certain concept will be used by cognitive processes because it activates the concept's mental representation (for a recent review, see Eitam & Higgins, 2010).

Determining Options Research shows that priming can indeed affect goal setting when people have to describe what they aim to attain in a given situation or at a certain point in time. For instance, Holland, Hendriks, and Aarts (2005) examined whether the mere perception of odor is capable of directly influencing the goals people set. They exposed participants to the scent of all-purpose cleaner without participants being consciously aware of the presence of the scent. Because the scent of all-purpose cleaner was shown to enhance the accessibility of the concept of cleaning, Holland et al. hypothesized that this concept would also be more likely to be used in determining one's future home activities. Thus, as a measure of goal setting, participants were asked to list five activities they wanted to do during the rest of the day. The results showed that in the scent condition 36% of the participants included cleaning in their goals compared to 11% in the control group. These findings suggest that representations of behavioral concepts that are temporarily accessible are more likely to be used when people are asked to set or specify their goals (see also Kay & Ross, 2003).

In another study, Custers and Aarts (2007a) explored the effects of temporal and chronic accessibility of the goal to look well groomed on goal setting. In one experiment, participants first engaged in a task in which half of them were primed by flashing words related to the concept of looking neat or well groomed (something that was rather desired in the student population) on the less sensitive parts of the retina (i.e., parafoveal priming; Bargh & Pietromonaco, 1982). Next, they were asked to list five words that described how they would like to look (i.e., specify their goals in the domain of physical appearance). At the end of the experiment, participants were asked to report how frequently they pursued the goal to look well groomed. Priming was indeed found to affect goal setting: Participants who seldom pursued the goal to look well groomed listed the goal rarely in the control condition, but frequently, and high on their list when they were primed. Participants who frequently pursued this goal, however, listed it often and on top of their list regardless of the priming manipulation. This means that for them, the goal representation was chronically accessible. These studies show that when people are asked to explicate their goals in a specific domain, their response is influenced by the accessibility of goal-relevant information in memory.

In short, these data demonstrate that priming of a particular goal concept can influence conscious goal setting if the set of options from which the goal has to be selected has not yet been determined. In the case of conscious goal setting, priming of a goal concept simply increases the chance that the concept is used and reflected upon as a potential goal to pursue by the conscious cognitive processes that operate during goal setting. In this respect, these priming effects on goal setting are not fundamentally different from other concept priming effects

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on social perception and cognition (Higgins, 1996; Wyer & Srull, 1986). Because a particular option has to come to mind before it can be considered, priming may have pervasive effects on goal setting and subsequent behavior. Indeed, marketing strategies such as placing products in prominent places in a store or advertising particular brands may succeed not because they change the extent to which these options are regarded as desirable, but simply because they cause these options (e.g., buying brand X) to be considered (Thaler & Sunstein, 2009).

Determining Desirability and Feasibility But even when the choice set is fixed or determined, unconscious processes can play a role in conscious goal setting. Such processes have been shown to play an important role in comparing multiple options that differ on multiple attributes. Some choices may be fairly simple, such as deciding between buying a black or a blue pen. But deciding which house to buy or where to go for vacation becomes complex very quickly as there are many more options and attributes to be considered.

Based on the notion that conscious processes are by nature limited in capacity (Nørretranders, 1991) and not very good at handling large amounts of information, whereas unconscious processes handle large amounts of information well, Dijksterhuis, Bos, Nordgren, and Van Baaren (2006) have suggested that complex choices are better left to unconscious thought. In those cases, it is better to "sleep on it" than to consciously ponder all the pros and cons, trying to integrate them in order to arrive at a decision.

In an experiment by Dijksterhuis (2004), participants had to choose between different apartments, with different attributes. Whereas one apartment was close to the city but had an unfriendly landlord, the other one was big, but farther from the city. All participants were presented with the information about four apartments, of which one was overall the best and one the worst. Afterward, participants were separated into three groups. In the "immediate" group, participants had to rate the four apartments on general preference immediately, whereas the "conscious thought" group had to do this after a period of conscious deliberation. For the "unconscious thought" group, there was the same amount of time between the presentation of the information and the ratings, but during this time participants engaged in a demanding n-back task, which prevented them from engaging in any other conscious thought. It was found that participants in the conscious thought group did not do better than the ones in the immediate group, but that participants in the unconscious thought group outperformed the other two groups, preferring the best apartment over the worst more often.

The exact mechanism behind this unconscious thought effect is still under investigation, but one of the reasons that unconscious thought results in a better decision is because it is better in handling the weighing of the different attributes (Dijksterhuis & Nordgren, 2006). In one study by Dijksterhuis (2004), participants were asked to rate their preferences for different roommates, having engaged in conscious or unconscious thought first or immediately after receiving the information. Afterward, they also rated how important they thought the different attributes on which the roommates varied (e.g., tidiness). Remarkably, it was found that for participants who engaged in conscious thought, their preference ratings

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were not more in line with the explicitly reported importance of the attributes than participants in the other conditions. Actually, although the difference did not reach significance, they appeared to do worse than participants who engaged in unconscious thought.

Unconscious thought is not a passive affair. Recent studies have shown that one has to have the goal to come to a decision in order for unconscious choice to take place. In a study by Bos, Dijksterhuis, and Van Baaren (2008), participants were exposed to information about both cars and roommates and were instructed to reach a decision in only one of these two domains before being given the opportunity to engage in unconscious thought. The results show that participants were better able to distinguish between the best and the worst option in the domain on which they were instructed to reach a decision than in the other domain. When it comes to goal setting, this suggests that unconscious process may play a role in integrating and weighing information about options on different aspects, but only if one is trying to reach a decision and select a goal to pursue.

Whereas unconscious processes may affect the weighting process and integration of information, unconscious processes may also influence the evaluations and weights of the attributes themselves. In the same way that options have to come to mind for them to enter the choice set, attributes have to come to mind before they can be considered. When deliberating on whether to go on a vacation to Las Vegas or spend time hiking in the Rockies, the outcome of the decision will depend greatly on the attributes that enter the decision process. When thinking of having fun and how to spend your nights, Las Vegas may have a higher chance of getting selected, whereas thinking about the costs of the trip and how you will feel during the mornings will make you choose the Rockies. The accessibility of different attributes may be influenced in many ways. It has, for instance, been demonstrated that after being exposed to either positive or negative information, people automatically become more likely to see the corresponding attributes of a particular option (de Liver, van der Pligt, & Wigboldus, 2007).

Verplanken and Holland (2002) biased the accessibility of attributes in an even more direct way. Participants had to decide on which television set to buy from a choice of 20 televisions. These televisions varied on attributes and were depicted in a matrix indicating how favorable or unfavorable a particular television was on each dimension. Before being exposed to this information, though, participants read a description from another person, which included the values that this person held. In one group, some of these values were related to environmental friendliness; in the other group, the values were not. It was found that this priming increased the weight of the environmental friendliness–related dimension in the decision process, but only for participants for whom environmental friendliness was a central value. Hence, priming appears to bias weighting of attributes according to the person's own values.

Finally, unconscious processes can directly influence the selection between options. In a classic experiment, Nisbet and Wilson (1977) found that the order in which options are presented determines which options are selected without people being aware of it, even though the options were identical. Participants were asked to examine several pairs of stockings and determine which was the best piece of

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clothing. Although the stockings were all the same, participants overall preferred the rightmost to the leftmost stocking presented. When asked to specify the reasons for their choice, participants confabulated and generated reasons such as the quality of the fabric or the color. Importantly, they were unaware of the influence of the order of the stockings on their choices.

The examples given above may not be exhaustive, but they indicate ways in which unconscious processes can play an important role in conscious goal setting. They do so first by influencing which options come to mind. Unconscious processes can also be involved and in some situations do better than conscious processes in the integration and weighting of the different attributes of options. Again, whether specific attributes are considered or not depends on their accessibility. Finally, if this process does not result in a clear preference, certain features of the choice situation may cause one option to stand out, which causes this option to be chosen more often, even though people are not aware of this influence and explain their choice in terms of preferences.

Even though these findings point to an important role of unconscious processes in conscious goal setting, the processes discussed above all operate based on a person engaging in conscious goal setting. To put it differently, the person first has to be motivated, or has to have a goal, to engage in goal setting before unconscious processes kick in. Whether the person is motivated to comply to an experimenter's request to decide what to do in the afternoon, or whether one decides to set a goal on one's own, a conscious decision to set a goal is still required before unconscious processes can affect goal setting and thereby their subsequent goal pursuit.

Evidence for Unconscious Goal Adoption

Recent findings suggest that consciously selecting and setting a goal are not always necessary for goal pursuit to occur. The effects of achievement priming on behavior obtained by Bargh et al. (2001), alluded to above, have been replicated in a number of studies with different performance measures. Various studies have demonstrated that exposing people to words or images related to achievement in a prior task, or subtle cues in the environment related to achievement, increased people's performance on another task (Fitzsimons & Bargh, 2003; Shah, 2003) even in everyday life settings. In a recent study, for example, Shantz and Latham (2011) asked people to generated possible uses of various objects and write down their answers on a form. The answer form also featured pictures related to achievement, such as the picture of a woman winning a race, or pictures unrelated to achievement. Participants primed with achievement outperformed those in the control group in generating more ways to use the objects. It appears that priming the achievement concept increases the extent to which an achievement goal is pursued. It should be noted that in most of these experiments, researchers explicitly probed for conscious decisions to pursue the goal, and participants were not aware of the goal that was primed, its influence on their behavior, or both (Bargh & Chartrand, 2000).

Similar results have been found for other goals and other priming procedures. Exposing people to words or occupations related to helping, for instance, or to

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descriptions of behavior from which this goal could be inferred has been found to increase the amount of effort that was invested in the helping behavior (Aarts, Gollwitzer, & Hassin, 2004; Custers, Maas, Wildenbeest, & Aarts, 2008). Custers et al. (2008), for instance, gave participants the task to unscramble sentences that contained words referring to occupations related to helping. After that, participants were asked to fill out a form at the desk of the experimenter. The experimenter, who was faking a cold, then accidentally dropped the tissue next to the participant. It was found that participants primed with occupations related to helping were more likely to pick up the tissue, even when this tissue was dirty and looked like it had been used. Priming of helping related social groups, then, seemed to motivate people to help, as they were even able to overcome obstacles (i.e., picking up dirty tissues) to pursue the helping goal. Similar effects have been obtained when priming people with significant others that hold particular goals (Fitzsimons & Bargh, 2003; Shah, 2003).

Goals can also be primed by situations or objects that are associated with goals. One of the first experiments to demonstrate this was a study by Bargh, Raymond, Pryor, and Strack (1995) on the relation between power and sex. Using parafoveal priming, the concept of power was rendered more accessible in male participants. It was found that in men who were more likely to sexually harass or aggress, this rendered the concept of sex more accessible. Also, these men rated women as more attractive after being primed with the power concept, suggesting that they were more motivated to have sex.

But such priming may also occur by means of subtle cues in the environment. People do, for instance, become more competitive when seeing a leather briefcase placed on the desk (Kay, Wheeler, Bargh, & Ross, 2004) and talk more softly when looking at a picture of a library (Aarts & Dijksterhuis, 2003). Scents seem to directly affect behavior, too, even when people are not engaged in goal setting. In another experiment by Holland et al. (2005), participants were exposed to the subtle scent of cleaning agent and were then placed at a somewhat dirty desk. Even though none of the participants were aware of the scent, and participants were not asked to reflect on their goals, participants exposed to the scent of cleaning agent were more likely to clean their desk. People's goal pursuits, then, seem to be influenced by goal-related cues in the environment, even though people are not aware of these cues or the goals they may lead them to pursue.

It has to be noted, though, that in most of the experiments reported above it is not impossible for participants to become aware of the primes, even though the awareness probes in the experiments above suggest otherwise. As such, these experiments do not effectively rule out the possibility that participants may have become aware of the primes and were pursuing goals of which they were consciously aware.

This criticism has been ruled out by recent experiments in which researchers have employed subliminal priming to exclude the possibility that people become aware of the primes and their effect on behavior. Subliminal priming refers to the presentation of stimuli with an intensity that is too low to reach the threshold of conscious awareness. Typically, people cannot consciously detect these stimuli, but they are nevertheless influenced by them. Whether subliminal stimulation can

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convey meaningful information has been debated for quite some time (Abrams & Greenwald, 2000). However, recent findings provide compelling evidence that subliminal primes affect people's responses (Schlaghecken & Eimer, 2004), activate semantically related knowledge (Naccache & Dehaene, 2001), and even influence cognitive control in tasks (Lau & Passingham, 2007).

Making use of this subliminal priming technique, an increasing number of studies have demonstrated priming effects on goal pursuit. Such effects have been found on task performance after priming with achievement-related words (Hart & Albarracín, 2009), enhanced fluid consumption in a taste task after priming with drinking-related words (Strahan, Spencer, & Zanna, 2002), and an increase in instrumental behavior leading to specific goals (e.g., helping another person by providing useful comments) after priming with names of significant others (Fitzsimons & Bargh, 2003) or occupations associated with these goals (Aarts et al., 2005; Custers et al., 2008).

Together, the research described above suggests that goal pursuit can be evoked and conducted outside awareness, without people being aware of the source of their goal pursuit or its influence on their behavior, and without them engaging in deliberative goal setting. These results show that priming not only instigates appropriate instrumental actions, but that it also leads to persistence, helping the person to overcome obstacles that stand between the person and the goal. But if these processes indeed occur unconsciously, how do they work? How does priming translate into effective action, and, if no conscious deliberation occurs, how can feasibility and desirability of the goal be incorporated into the process of determining that a goal is worth the effort to realize it?

Underlying Mechanisms in Unconscious Goal Pursuit

The assumption of theories on goal pursuit is that people have to consciously deliberate on the feasibility and desirability of options for goal pursuit, and it implies that, according to those theories, these aspects are not part of the mental representation of the goal. This may be true for entirely novel goals, but most of our goals are pursued on a regular basis. It has been argued that through learning, assessments of desirability and feasibility, as well as the means that are usually selected to pursue a goal, can become integrated in its representation (Aarts & Dijksterhuis, 2000; Bargh, 1997; Bargh et al., 2001). As a result, conscious deliberation is no longer necessary and drops out of the equation, as priming a goal representation also activates information about desirability and will result, through spread of activation, in activation of the representations of the means we usually select to pursue the goal in a given situation (Bargh & Chartrand, 1999).

Although priming effect on conscious goal setting can be understood by assuming that the primed concept becomes more accessible to cognitive processes, direct priming effects on goal pursuit itself are better understood from the viewpoint of the mental representation that is activated by priming. When activated, this mental representation influences goal pursuit not because the information is used by ongoing processes but because activating the representation itself puts mental processes in motion (Bargh, Green, & Fitzsimons, 2008).

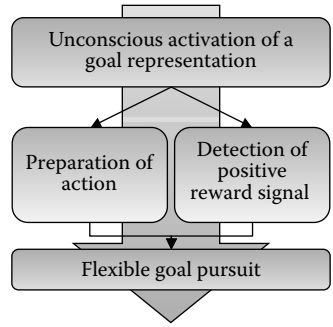


Figure 8.2 Proposed model by which unconscious activation of a goal representation leads to flexible goal pursuit.

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It has recently been argued that when a particular option for goal pursuit is primed, conscious assessments of feasibility and desirability can be replaced by two basic processes (Figure 8.2) that are instigated and operate without conscious awareness (Custers & Aarts, 2005, 2010). First, because activation of a goal representation will activate instrumental actions if the action is feasible, a conscious assessment of feasibility is not necessary: If the goal is feasible instrumental actions will be prepared; if it is not feasible, no preparation occurs. Second, it is assumed that desirable outcomes are associated to a positive affective tag, which gives rise to a reward signal once a goal representation is activated. This reward signal is assumed to lead to the allocation of the required physical or mental resources to the prepared instrumental behaviors in order for them to be executed. As a result, activated goals can instigate behavior in a two-step process: If the associated instrumental actions that will lead to attainment of the goal are available in the given situation, their representations will be activated, preparing the brain for those actions. If the goal is also desirable, this accompanying reward signal will lead to the allocation of resources to those actions, which translates the prepared actions in overt behavior. As a result, the pursuit of a goal does not necessarily require conscious deliberation. If the goal is feasible and desirable, activation of the goal will automatically lead to behavior preparation and overt behavior.

Unconscious Behavior Preparation When a goal representation is activated, instrumental actions do not always have to be consciously selected. Repeatedly pursuing a goal via a certain course of behavior forges a strong cognitive link between the goal representation and the representation of this behavior, so that activation of a goal can automatically lead to the activation of the habitual means for goal pursuit. This way, for example, we do not have to think deliberately how to get to work in the morning, as the goal of going to work automatically activates the idea of using one's bike or car; we do not have to consider all available bars when we go for a drink, because the goal of going for a drink automatically activates the representation of walking to the bar we usually visit. Hence, although there may be more than one means to a particular goal, the one that has proven

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itself in the past will be the one representation most likely to be activated when a goal is primed.

This automatic selection of habitual means or instrumental actions has been demonstrated in a number studies and was first tested in the domain of travel behavior (Aarts & Dijksterhuis, 2000). Participants who had been primed with certain travel goals (e.g., going to classes) showed an increased activation of certain means for traveling (e.g., biking). However, this effect occurred only among those students who habitually used a bicycle to reach their travel goals. These findings were replicated and extended in the domain of the habitual drinking of alcohol among students in the United Kingdom (Sheeran et al., 2005), where it was shown that activating the goal of socializing increased the accessibility of the concept of drinking, but only among those student participants who were regular drinkers of alcohol in social situations. In addition, after a socializing prime, these students were more likely to drink alcohol as a reward for their participation in the experiment. These results indicate that the activation of a goal automatically activates the representation of its associated habitual instrumental actions.

Recent findings suggest that activating the representations of such actions automatically prepares the execution of these actions in the brain. The idea that our minds can prepare our actions without us even being aware of it may sound strange and perhaps a little unnerving. How would our mind know what to do? But if we consider our most basic actions, it becomes evident that just the opposite is the case. It is often hard or even impossible to verbally report how we perform the actions we consciously initiate. Do you know how you stay balanced on a bike? Grasp a cup of coffee? Tell a funny joke? Or speak grammatically? Obviously, when we aim to grasp a cup of coffee we somehow "tell" our arm what to do. And then it obediently carries out our request. But when thinking about the execution of such an action, we seem to have little knowledge about which muscles we contract and relax during the intricate orchestrations of ostensibly simple and certainly of more complex movements and action sequences. We simply think of grasping a cup of coffee and action seems to follow.

But how does the mind perform this trick? How is it possible that thinking about grasping a cup produces the required movements even though we lack conscious knowledge or awareness of the details of their execution at the time we act? Research in various areas of psychology shows that information about actions is stored as representations that contain two components: a representation of its observable effect (grasping the cup), as well as the motor programs that contain information about the bodily movements that make it happen (Hommel, Muesseler, Aschersleben, & Prinz, 2001; Jeannerod, 1997). Because these two components are associated, thinking about an action's effect will lead to the preparation of the motor programs that will produce that effect, even though we cannot consciously reflect on those programs.

In humans, action–effect representations are largely learned (Hommel et al., 2001). Newborns try out their limbs by trial and error, sending commands to their muscles and observing the effects (e.g., hitting themselves in the head with their arm, kicking a toy). When certain random commands are consistently followed by specific effects (e.g., kicking with the left foot), they become associated with them.

As a result, thinking about an effect (e.g., picking up a cup of coffee) prepares the corresponding motor programs that are required to produce the action. This powerful and basic mechanism enables humans to execute simple as well as complex motor programs to produce specific effects and thus to act in a goal-directed manner.

One consequence of this mechanism is that the mere observation of an action effect may activate the corresponding effect representation and hence the motor program associated with it, which could potentially lead to execution of the action itself. Such a link between perception and action is apparent in imitation. Brass, Bekkering, and Prinz (2001) demonstrated this link by instructing participants to lift the same specific (e.g., index) finger in response to a finger movement of a hand presented on a computer screen. Participants' responses were faster when the finger was the same, as opposed to a different (e.g., ring) finger than the participant was instructed to lift. This demonstrates that when an action is perceived in others it gives the corresponding action a head start because it activates the corresponding motor programs, preparing the execution of the action (Hommel et al., 2001).

What is copied, though, is often not the exact action itself, but its perceived effect. In a typical imitation study demonstrating this (Bekkering, Wohlschläger, & Gattis, 2000), children observed an adult who touched her ears with her hands. On some occasions she touched the left ear with her left hand, but on other occasions with the opposite (right) hand. When the children were asked to copy the behavior, they almost always touched the correct ear, but more often did so by using the hand on the same side of the body as the ear, even when the adult used the opposite hand. This illustrates that people perceive and produce actions by means of their effects, and, hence, to a certain extent, most human behavior is goal directed in the sense that we do not have access to the lowest levels in the hierarchy of actions, but have to rely on effect representations at a more abstract level that trigger the motor program that is most strongly linked to the effect (Aarts et al., 2004; Wohlschläger, Gattis, & Bekkering, 2003).

Effect representations can be activated in many ways to prepare behavior. They can, for instance, be primed by objects that are associated with an action's effect. This corresponds with the notion that humans (and other organisms) perceive the world in terms of the action effects it affords (Gibson, 1979). Perceiving a hammer, for instance, activates action effects related to functional properties of that object that prepare a goal-directed action (e.g., grabbing, hitting) and associated lower motor programs (Zwaan & Taylor, 2006). Hence, action effects do not have to be directly perceived, but can lead to the preparation of action programs because they are brought to mind by other objects in our direct environment.

Because people represent actions on a more abstract level, areas related to action in the human brain can also be activated by modalities other than visual perception of behavior, such as thinking, hearing, or reading about them. When we think of, for instance, kicking a ball, it is hard to think of it in another way than the actual sensation (the movement of the leg, the foot hitting the ball). Furthermore, merely reading words that are similar in word structure, but totally different in terms of meaning (e.g., "lick" or "pick"), activates distinct areas in

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the sensorimotor and premotor cortex (related to mouth or finger movements), which are involved in the observation and preparation of these specific actions (Pulvermüller, 2005).

It is important to note, though, that action preparation does not directly lead to actual action. There are clues that motivation may play a key role here. For example, activation in areas in the brain related to action preparation are activated more strongly in response to video clips of other people reaching for food when viewed by people who are hungry versus people who are satiated (Cheng, Meltzoff, & Decety, 2007). And presenting words related to drinking below the threshold of conscious awareness increases fluid consumption, but only when people are fluid deprived (Veltkamp, Aarts, & Custers, 2008a). Hence, the translation of action preparation to overt behavior seems to be gated by the desirability of the higher order goal (see also Eitam & Higgins, 2010).

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Unconscious Assessments of Desirability

The idea that the positive reward signal associated with a particular behavior or outcome motivates behavior is evident in incentive theory. Incentive theory (see Berridge, 2001) proposes that stimuli or states are associated with an internally rewarding signal for which organisms will work. Although initially this reward signal has become tightly associated with stimuli that have biological importance, such as water and food, various learning process can lead to its association with practically any mental representation. These theories grew out of several remarkable effects obtained in research on operant conditioning called "misbehaviors." One such behavior is auto-shaping (Brown & Jenkins, 1968). For example, it has been observed that pigeons, for which free presentation of food was repeatedly paired with a light signal, started to vigorously pick at the light bulb, even though this behavior was not explicitly reinforced. This phenomenon has been explained by assuming that the reward signal associated with the food becomes linked to the light bulb, which therefore serves as an incentive for which the animal is motivated to work.

Classic experiments by Olds and Milner (1954, 1956) have revealed that such a positive reward signal can be a powerful motivator. They devised an apparatus by which rats could electrically stimulate so-called pleasure centers in their own brain by means of pressing a lever. The rats were found to push the lever so vigorously that some literally collapsed after several thousands of presses. Moreover, hungry rats even neglected the opportunity to eat and others crossed electrified shock grids in order to engage in pressing the lever. This demonstrates the crucial role of the internal reward signal in motivation.

Unconscious Reward Processing

Neuroimaging research has discovered that the rewarding properties of stimuli are processed by limbic structures such as the nucleus accumbens and the ventral striatum (Schultz, 2006). These subcortical areas play a central role in determining the reward value of behaviors and outcomes and are connected to cortical frontal areas that facilitate goal pursuit (Pessiglione et al., 2007). These reward centers in the brain respond to biologically relevant rewards such as food and sexual stimuli, but also to learned rewards (e.g., money, status) or words (e.g., good, nice) that are associated with

praise or rewards (Schultz, 2006). This demonstrates that regardless of their shape or form, such motivationally positive stimuli induce an internal reward signal (Shizgal, 1997).

A recent study by Pessiglione et al. (2007) demonstrated that reward information, even when it is presented below the threshold of awareness, is processed and subsequently increases the effort invested in a task. Participants engaged in a task in which they could earn money by squeezing a hand grip. Before each trial, a picture of the maximal reward that could be earned—either that of a one pound or a one penny coin—was presented on the screen. It was found that even when this picture was presented subliminally participants invested more physical effort after a high reward cue, squeezing more forcefully than when they were exposed to a lower reward cue. These effects were accompanied by activation in the limbic structures associated with reward processing and motivation.

Similar findings were obtained by Bijleveld, Custers, and Aarts (2009) for a task that required mental rather than physical effort. In order to measure the effort that was invested in retaining a series of digits, the participants' pupil size was measured using an eye tracker. Changes in pupil size (under constant lighting conditions) are related to shifts in the balance of activity of the sympathetic nervous system and the parasympathetic nervous system. Whereas the parasympathetic nervous system is more active during rest and facilitates physical recovery and digestion, the sympathetic system is more active during tasks that require physical or mental effort. Switching between these two systems can occur quite rapidly, with more pupil dilation reflecting more effort, even on cognitive tasks (Kahneman, 1973).

On each trial, a sequence of numbers was presented over a headphone and the task of the participants was to retain this sequence in memory and to report it back at the end of the trial. Before each trial, a coin of either 50 or 1 euro cents was presented, either consciously visible or subliminally. After each trial, participants received feedback about whether they had been correct and how much money they had earned. Results show that pupil size increased more on trials with high rewards (50 cents) than with low rewards (1 cent), regardless of whether they were aware of the identity of the coin presented. Importantly, this effect only occurred on difficult trials, when people had to retain five digits, and not on easy trials, when they had to retain only three digits. Apparently, unconscious reward cues are used strategically in that, just like conscious rewards, they only lead to the recruitment of more mental resources on difficult tasks when they are required, and not on easy tasks when they are not. Hence, conscious and unconscious reward cues seem to motivate people in the same way.

Because of these similar effects of conscious and unconscious reward cues, one could argue that participants may have become aware of what was at stake, even though the reward primes could not be consciously perceived. That is, on trials with high rewards they may have had a hunch of what was at stake and may therefore have been motivated in the same manner as participants who were aware of what could be earned. To rule out this explanation, one would have to look for instances in which conscious reward cues would produce different effects on motivational behavior than unconscious reward cues.

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Such evidence comes from two recent lines of research. First, Bijleveld, Custers, and Aarts (2010) explored differences in speed–accuracy tradeoffs after conscious and unconscious reward cues. For each trial, participants had to solve an arithmetic problem. They were told that the presented coins indicated the maximum reward that could be earned. They also learned that for accurate responses they would receive a percentage of this reward but that this percentage would rapidly decrease with time. Hence, in order to obtain the highest percentage of the cued reward, they would have to be both fast and accurate. Results showed that for supraliminal reward cues, participants were slower on high than on low reward trials, taking more time (and hence sacrificing a part of the reward) in order to be accurate. The results for subliminal reward cues, however, revealed a different pattern: participants were faster on high rather than on low reward cues, and accuracy was equally high in both cases. Together, the results suggest that although both unconscious and conscious reward cues boosted the mental resources that people employed in the task, conscious reward cues on top of that changed speed–accuracy tradeoffs. Indeed, when such tradeoffs were made impossible by instructing people to obtain a minimal accuracy of 90%, subliminal and supraliminal reward cues were found to increase speed to the same extent.

Another study demonstrated that conscious, but not unconscious, reward cues can make people "choke," deteriorating instead of improving performance (Zedelius, Veling, & Aarts, 2011). Participants again had the task to retain numbers in memory in order to report them back later after a short time interval. When reward cues were presented before participants saw the numbers, both conscious and unconscious high rewards improved performance. However, when reward cues were presented just after the presentation of the numbers, only unconscious high reward cues improved performance, whereas conscious high reward cues caused performance to deteriorate. This pattern is consistent with the idea that unconscious reward cues boost the resources that are invested in a task, motivating people to do well, without information about the rewards reaching consciousness. When it does, conscious concerns may interfere with the task, causing people to perform worse, instead of better.

Positive Affect as Implicit Motivator

In line with the work on unconscious reward processing, researchers have started to test the idea that an internal reward signal is somehow integrated with mental representations of goal-directed action. Using implicit measures, which are assumed to echo the internal reward value of words describing potential goals, they were able to test whether this internal reward signal moderates goal-priming effects on behavior.

In one of their experiments, Custers and Aarts (2007b) subliminally primed participants with the concept of socializing and going out (presumably a goal for most of the students who participated) in an alleged letter-detection task and measured the effort they expended in order to realize that activity. They did so by telling participants after the letter-detection task that they would engage in a mouse-click task in which they would have to click with their mouse along several paths on the screen, supposedly to study people's mouse skills. Crucially, participants were told

that they might be participating in a second task in which they could win tickets for a popular student party in the city center. The reasoning behind this was that participants who were motivated to attain the goal would speed up their clicking behavior on the mouse-click task in order to be able to get a chance to win the tickets. Finally, after an extensive filler task, participants engaged in the extrinsic affective Simon task (EAST; De Houwer, 2003), in which the internal reward signal of the potential goal of socializing and going out was assessed.

It was found that participants expended more effort in order to engage in socializing and going out when the goal was primed but only when the EAST score indicated that socializing was positive. This suggests that the reward signal evoked by the representation of socializing and going out (as measured by the EAST) was activated by priming motivated participants to work harder on the task. Importantly, this demonstrates that priming in itself does not create goals (Sherman, 1987). Priming merely activates the representation of the behavior, which increases the chance that this representation is used to guide behavior. In this case, the internal reward signal that is elicited by activated behavior representation determines whether effort is invested in order to engage in that behavior.

Comparable findings have been reported by Ferguson (2007). She measured implicit attitudes toward the word "equal" using an affective priming task. Subsequently, participants were exposed to words they had to evaluate explicitly. Hidden among them for all participants was the word "equal." This procedure allowed the experimenter to measure the extent to which equality was seen as something desirable, but it also effectively primed the concept of equality. A subsequent task tested how people reacted to unequal government policies. It was found that the more positive their evaluation of the concept "equal" was, the less they were inclined to support these policies.

Linking Neutral Behavioral Options to Positive Affect: Creating Goals Although the evidence presented above is consistent with the idea that reward signals associated with a behavioral option motivate the realization of that behavior, manipulating this reward signal would provide more solid evidence for the role of reward signals in motivating behavior. For this reason, Custers and Aarts (2005) resorted to techniques from evaluative conditioning research to activate representations of behavioral options together with positive affective words (De Houwer, Thomas, & Baeyens, 2001). It was reasoned that this coactivation process would simulate the simultaneous activation of behavior representation and reward signal, which should lead people to pursue the behavioral options and could create an association between the behavior representation and the reward signal.

In a first experiment, effects of the affective valence of potential behavioral goals on participants' reported motivation to engage in those activities was examined (Custers & Aarts, 2005). In order to ensure that participants did not become aware of the manipulation, the behavioral options (e.g., doing puzzles, going for a walk—which could all be expressed in one word in Dutch) were presented subliminally in an alleged dot-detection task, in which they were

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immediately followed by consciously visible positive or neutral words. After this manipulation, participants' motivation to engage in the behaviors was assessed by having them respond to the potential behavioral goals that appeared on the screen, indicating quickly whether they wanted to engage in those behaviors or not. Results showed that participants' motivation to engage in the behaviors was higher when potential goals were subliminally flashed together with positive words, as opposed to when options were paired with neutral words or when nonwords were presented with positive or neutral words. These findings demonstrate that coactivation of a behavioral representation with a positive reward signal increases the desire of people to engage in that behavior. When asked to consciously reflect on whether they wanted to engage in the behavior or not, they were more likely to indicate that they did, even though they were not aware of the actual source of their desire.

In order to assess the motivational effects of this manipulation on actual behavior, Custers and Aarts (2005) compared them to those of conscious goals. That is, they rendered the potential goal to do puzzles more positive and compared this effect to a condition in which people only received the conscious goal to pursue this activity and to a third control condition in which people received no goal. First, participants in the unconscious goal condition completed the manipulation in which words related to doing "number sequence puzzles" were presented subliminally together with positive words. People in the other conditions perceived the positive words, but were not primed with the activity of "doing puzzles." Subsequently, participants were informed that they would engage in the mouse-click task, explained earlier, and a number-sequence-puzzle task, but that the latter task would only be given if there was sufficient time left. Additionally, participants in the conscious goal condition were told that the experimenter would appreciate it if they would get to the puzzle task (i.e., it was explicitly communicated that this activity was desirable).

It was expected that participants in both (conscious and nonconscious) goal conditions would work harder (i.e., faster) on the mouse-click task, which was in this setting a means to get to the puzzle task. In both the conscious and nonconscious goal condition, goal relevant representations were coactivated with a reward signal, either by the explicit instructions or the conditioning procedure. It turned out that in both cases motivation was increased compared to the control condition: Participants were faster on the mouse-click task in both goal conditions compared to the control condition. Thus, unobtrusively manipulating the positive reward signal that accompanies the activation of goal relevant representations increases motivated behavior (i.e., the intensity and persistence of one's action) in the same way that assigning a conscious goal through instructions does.

A recent study aimed to investigate the effects of coactivating goal-relevant behavioral representations and positive reward signals on the preparation and motivation of behavior in more detail. In this study, participants were given the task to squeeze into a hand grip in response to a start sign while the timing and the effort invested in the behavior were measured (Aarts, Custers, & Marien, 2008). Prior to this task, words pertaining to the goal of physical exertion were subliminally presented (or not) together with positive words (e.g., good, nice) or

not. It was found that subliminally priming the concept of exertion prepared the squeezing behavior, causing participants to start squeezing earlier (following a cue to squeeze), regardless of whether primes were presented together with positive words. However, only participants for whom the goal was coactivated with a positive reward signal (i.e., positive words) showed more forceful and persistent squeezing. Moreover, self-reported motivation did not show any relation with the subliminal goal-priming manipulation. Hence, activating a goal representation gives behavior a head start, whereas the accompanying reward signal motivates behavior outside awareness.

Similar findings were recently obtained in a study by Capa, Cleeremans, Bustin, Bouquet, and Hansenne (in press) in which effects on cardiovascular measures related to resource recruitment were measured. Using the same technique as Aarts, Custers, and Marien (2008), words related to the concept of studying were subliminally paired with words referring to rewards. Subsequently, participants were given the opportunity to read sentences and to memorize the last word of each sentence. Over time, participants for whom study words were presented together with reward-related words showed stronger cardiovascular responses that are associated with effort recruitment (larger decrease in the midfrequency band of heart rate variability and larger pulse transit time) compared to the control groups in which study words were primed, but not together with reward-related words, or not at all.

The research addressed above suggests that although behavior can be prepared when behavior-related representations are activated, a reward signal is needed for the step from behavior preparation to the actual enactment of action. Most notably, a reward signal that is coactivated with representations of behavioral outcomes motivates people to realize that outcome. Together, this suggests that this reward signal helps people to select between potential goals, as the option with the strongest reward signal is the most likely to dominate behavior. Furthermore, as most of the tasks reported above measured persistence, goals seem to affect behavior for an extended period of time. It seems that goals do not only instigate behavioral responses, but to some extent sustain behavior. Such persistence suggests that the observed effects on behavior are not merely ballistic in nature, but that behaviors are flexibly guided by the goal representation itself.

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Flexibility in Goal Pursuit

For goal-directed behavior to succeed, it needs to be flexible. As each situation in which we conduct an action is always slightly different from the situations in which we have conducted the action before, behavior needs to be tuned to attain the desired outcome. Such tuning requires the representation of this outcome to be activated. By comparing the current situation with this representation, behavior can be adjusted in order to secure attainment of the outcome. Such tuning requires the extraction of the proper information from the environment, biasing perception toward the information that is relevant for attainment of the goal. Such biasing of perception may not only facilitate the tuning of ongoing behavior but also the acquisition of knowledge that is related to the goal and can be used to guide and

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tune behavior in the long run. Finally, tuning may take place by biasing the reward value of goal-related objects. In the next section, we will focus on the conscious and unconscious processes that render goal pursuit flexible.

Tuning of Behavior

Flexibility is most clearly manifested when the actions that are initiated to attain a goal do not directly produce the effects with which they are associated. To obtain the goal, ongoing behaviors have to be "tuned" based on their effects in the direction of the desired outcome. Even though we are not aware of it, this is practically always the case. Apart from a few ballistic reflexes, our actions are continuously modified based on incoming feedback about their effects (Custers & Veling, 2009). When we grab a cup, the path of our hand is gently adjusted on its way to the handle, and when we want to be understood in class, we start explaining our point more elaborately if someone on the first row continues to frown. Without such feedback, our goal pursuits would be less successful, or even impossible. Although giving a good talk is difficult if the audience is poorly visible, trying to grab a hot cup of coffee with your eyes closed can simply be disastrous.

This process of adjusting action based on perceived effects can be modeled as a closed-loop process, in which the output of an action (the actual effect) is compared to the input of the action (the effect in mind) and behavior is adjusted to reduce the discrepancy between the two (Powers, 1973; Wiener, 1948). Sometimes, when adjustments are not enough, new means may even have to be selected in order to attain the goal. Being flexible, then, requires adjusting actions based on a comparison between input and output, as well as abandoning unsuccessful means and selecting or embracing new ones. Other than eventually obtaining the goal, a beneficial derivative of this process is an increasingly accurate model of the cause and effect relationships in the environment that one is operating in. Such knowledge will make future goal-directed action more effective because mental representations of instrumental actions will be adjusted, too.

Unconscious Tuning of Behavior in the Service of Goals

We are often unconscious of the tuning of our behavior. Try to imagine the movements you make with the steering wheel of the car when you switch from the right to the left lane. Most people start out with their hands on equal heights, turn the imaginary wheel to the left, and then return to the starting position. What they forget is that after turning the wheel to the left, it needs to be turned to the right to the same extent to straighten out the path of the car. Although we may consciously decide to switch lanes, keeping the car on the road after the switch is initiated is the tuning process that operates largely unconsciously. That is, we may consciously initiate the switch, but after that we simply keep the car in the new lane, a continuous process we are able to run without conscious awareness.

Fourneret and Jeannerod (1998) demonstrated this lack of conscious awareness of tuning in an elegant experiment. Participants were asked to draw a straight line on a piece of paper. However, through a clever setup with mirrors, they saw a hand of a confederate rather than their own. During the drawing of the line, the hand, which they thought was their own, moved along a slightly curved path. Participants

compensated for this by drawing a curve in the opposite direction. As it turned out, participants were not aware of this tuning and even claimed to have drawn straight lines.

Unconscious Tuning of Behavior in the Service of Unconscious Goals The more abstract a goal is the more tuning is needed to attain it in a specific situation. This may not seem that functional, but it would be extremely inefficient, and actually impossible, for the mind to store each and every response to accommodate any possible configuration of the environment. One interesting case is when one's goal pursuits are thwarted. Consider the goal of looking well groomed. While serving the same goal, one's behavior would differ widely if one had just been splashed on by a car or received a comment about one's outdated selection of clothes. In such cases one may expect awareness to be necessary to take the proper action. But is this indeed the case?

Unconscious tuning of behavior in the service of more abstract goals was demonstrated in an experiment by Custers and Aarts (2007a). In the context of a probe-recognition task participants were presented with various sentences, some describing situations that were discrepant with the goal to look well groomed and others irrelevant to this goal. This task has been successfully used to assess the automatic emergence of concept-accessibility effects during text comprehension (Hassin, Aarts, & Ferguson, 2005; McKoon & Ratcliff, 1986). In the probe-recognition task, participants read sentences that appeared on the screen, which were immediately followed by the presentation of a probe word. Their task was to indicate as quickly as possible whether this probe word was part of the preceding sentence or not. For any word that was rendered more accessible during reading of the sentence (but was not part of it), longer reaction times were expected because the increased accessibility of the concept makes it more difficult to indicate that the word was not part of the sentence. For half of the participants, the critical sentences were goal discrepant (e.g., "The shoes you put on look dirty"), whereas for the other half the sentences described a similar state that was not discrepant (e.g., "The shoes you put on have laces"). Both sentence types were followed by a word that represented an action that was instrumental in reducing the specific discrepancy (e.g., "polish"). After this task, participants were asked to indicate how frequently they pursued the goal.

It was established that for people who frequently pursued the goal to look well groomed, reactions to words representing instrumental actions were significantly slower when they were preceded by a goal-discrepant sentence than when preceded by the corresponding nondiscrepant sentence. This effect was not present for people who did not frequently pursue the goal. These results are in line with the idea that for people who frequently pursue the goal, its representation should be more accessible, which allows them to react automatically to discrepancies with that goal when they are perceived. If accessibility of the goal representation is indeed the crucial factor here, participants who do not frequently pursue the goal should also automatically react to the discrepancies with the activation of representations of the proper instrumental action if the goal is rendered accessible by primes.

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Hence, in a subsequent experiment, the goal to look well groomed was subliminally primed just before the onset of goal-discrepant sentences. It was found that after priming all participants responded to the discrepant situation by activating the representations of the proper instrumental actions. Apparently, faced with a situation that is in contrast with a desired state, the means that help restore that state are automatically selected when the representation of the desired state is activated, either as a result of frequent pursuit or as a result of priming. Hence, tuning of behavior, which requires reacting to discrepancies with the goal state, seems to require the representation of the goal state to be activated.

Active Maintenance of Goal Representations

As the activation of goal representations is crucial for flexible goal pursuit, these representations have to be kept active during goal pursuit. Such active maintenance of goals is commonly assumed to require holding the goal active in working memory (Baddeley, 2003; Miyake et al., 2000), for instance, by active rehearsal. When we need to maintain a phone number in working memory, for instance, we repeat it over and over again. As the content of working memory is often regarded to be synonymous to the content of consciousness, this implies that the activation of unconscious goals would rapidly decay.

Yet some information does not appear to require conscious rehearsal in order to be kept active. Classic studies by Zeigarnik (1927) have shown that information related to uncompleted goals has a tendency to remain active in memory until the goal is completed. In a similar way, current concerns (e.g., an exam we are facing) keep popping up in our minds, even though we might not want to think about them (Klinger, 1996). This suggests that goals are indeed actively maintained, but not necessarily through conscious rehearsal. It seems to be the motivational qualities of a representation that cause representations to remain active. Studies by Förster, Liberman, and Higgins (2005) have indeed demonstrated that when people have to detect a certain combination of objects on a computer screen, accessibility of information related to those objects is maintained over time as a function of expectancy and value.

An increasing number of studies have demonstrated sustained activation of goal representations after priming. In a study by Bargh et al. (2001), it was found that the activation of goals that were primed did not decrease within a 5-minute period, but even increased over time. This lack of decay has also been observed for unconsciously activated goals in various studies (Aarts, Custers, & Holland, 2007; Aarts, Custers, & Marien, 2009; Aarts, Custers, & Veltkamp, 2008; Van Den Bos & Stapel, 2009), using different priming manipulations and different dependent variables.

Such sustained activation is hard to explain without assuming that working memory somehow actively maintains the activation of the representation. Aarts, Custers, and Veltkamp (2008) directly tested the role of working memory in maintenance of unconscious goals. In this experiment, the goal of doing puzzles was subliminally presented, or not, together with positive words that served as a reward signal. After this task, participants engaged in a 3-minute filler task that

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was easy for some, but not for others, as in this condition participants had to retain a five-digit number in memory (i.e., were subjected to mental load). Thus, participants were assigned to three conditions: a control condition, a positive goal condition, and a positive goal plus mental load condition. After the filler task, participants were asked to estimate the height of puzzle-related objects, a measure of motivation that is dependent on activation of the goal representation (Veltkamp, Aarts, & Custers, 2008b).

It was found that compared to the control condition, objects in the positive goal condition were perceived to be higher. In the positive goal plus mental load condition, however, this effect disappeared. This pattern of results suggests that active maintenance of goals does indeed rely on working memory, as effects of the goal manipulation were still obtained after 3 minutes, but not when working memory was taxed. Hence, unconscious goal maintenance seems to involve working memory resources, even though the goal does not reach awareness (Hassin, Aarts, Eitam, Custers, & Kleiman, 2009; Hassin, Bargh, Engell, & McCulloch, 2009).

The findings reported above suggest that goal representations remain active in working memory over time, in order to guide behavior. The precise mechanism by which working memory works together with other processes is, however, not entirely clear. On the one hand, the reward signal associated with the goal representation could keep this representation accessible over time, keeping the goal available for the tuning of behavior. On the other hand, goal representations could be continuously reactivated as effects in the world are tested against this representation (Carver & Scheier, 1998; Miller, Galanter, & Pribram, 1960), a process that may also depend on working memory.

Another account has been proposed by Eitam and Higgins (2010). In their "relevance of a representation" (ROAR) framework, they suggest that goals and other goal-relevant representations are not necessarily actively maintained, but that it is the motivational relevance of this information to the person that determines whether the representation *is used* in a particular situation. Relevance is determined by intensity of value (is it desired or harmful), but also by other motivations, such as truth (establishing what is real) and control (managing what happens). Importantly, ROAR predicts that negative information would also produce effects on perception and behavior over a longer period of time. Although this framework is largely in line with the analysis of the processes that are assumed to underlie goal pursuit in this chapter, its diverging predictions on a more detailed level—about which stimulated representations will exercise their influence over a prolonged period of time and why they would do so—may help us to understand this important process in goal pursuit in the future.

Biasing Perception and Detection

As flexible goal pursuit and the tuning of behavior require adjusting to the current situation, it is important to detect goal-relevant information in the environment when it occurs. It has been suggested that various processes that bias perception and detection work together to create a state of perceptual readiness

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(Bruner, 1957). Bruner (1957) and Lewin (1951) argued that stimuli in the environment related to goals or needs pop out relative to other stimuli and direct behavior toward them.

Based on this notion, Bruner and Goodman (1947) argued that objects related to goals or needs would be perceived as bigger, reflecting the perceptual bias for these objects. Although the empirical support provided by Bruner and Goodman (1947) for this idea was heavily criticized (see, for example, Tajfel, 1959), the concept has been whole heartedly adopted and has recently resurfaced in studies that circumvent the issues of these earlier studies using new techniques (see Veltkamp, Aarts, & Custers, 2009).

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Biasing Perception and Detection by Conscious Goals An elegant study that illustrates such perceptual biases as a function of goals was recently conducted by Balcetis and Dunning (2010). They separated participants into two groups and had them engage in a throwing contest. All participants learned that they could win a gift certificate that was lying on the floor 13 feet away from them by being the one to land a beanbag closest to the certificate. Because of earlier inspection of the certificate, participants in one group knew that the certificate was worth $25, whereas the other group learned that it was worth nothing. Participants for whom the certificate was worth $25 underthrew more than the other group, which was more accurate. This demonstrates that in the condition in which the certificate was related to the goal to make money, the certificate was perceived to be closer or bigger.

Biasing Perception and Detection by Unconscious Goals Veltkamp et al. (2008b) explored similar effects, but as a function of goals that were manipulated outside participants' awareness. They asked participants to estimate the height of stimuli (e.g., a piece of a puzzle) representing objects that were functional in attaining (initially neutral) potential behavioral options (e.g., doing puzzles). Using the same techniques used by Custers and Aarts (2005), these behavioral options were either linked to negative, neutral, or positive affective words in a within-participants design. It was found that compared to objects related to the neutral behavioral options, objects related to options linked to positive words were estimated to be higher, whereas no effect was found for objects related to behavioral options linked to negative words. Hence, linking the representation of a behavioral option to reward signals biases the perceptual system, making it more sensitive to goal-related stimuli in the service of goal pursuit.

Implicit Learning

Biased perception and detection of goal-relevant stimuli may also indirectly facilitate goal pursuit by determining which information is available for learning. The ability to attend selectively (Johnston & Dark, 1986) to goal-relevant information is a powerful process entailing flexibility in goal pursuit. Although attending to information and being conscious of it are often seen as one and the same thing, it has been argued that awareness and selection of information

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can be dissociated, and that information processing can be biased toward certain information without this incoming information necessarily reaching conscious awareness (Dijksterhuis & Aarts, 2010; Koch & Tsuchiya, 2007; Wyart & Tallon-Baudry, 2008). Importantly, it has recently been demonstrated that such biasing may affect various unintentional learning processes, generically called "implicit learning."

Implicit Learning Directed by Conscious Goals People can learn to use structures and patterns in stimuli without being able to consciously report what is learned (Nissen & Bullemer, 1987; Reber, 1967). One of the classic paradigms used in this research is the artificial grammar learning task (Reber, 1967), in which participants are exposed to sequences of stimuli that are generated according to fairly complex rules and subsequently asked to judge novel sequences on their well formedness (i.e., whether or not they follow the structure of the grammar).

In recent research, Eitam, Schul, and Hassin (2009) have demonstrated that even though people have no intention to learn the structure and are often not conscious of what is learned, learning is still dependent on goals. Participants were exposed to sequences of colored letters in a learning phase. The sequences of the colors and the letters were independent and were generated according to different grammars. Goal relevance of the dimension was manipulated by having participants memorize either the letter or the color sequences. It was found that learning occurred only for the dimension that was deemed goal relevant. Hence, even though the representations of both dimensions (letter and color) were clearly stimulated, only goal-relevant information was used by the processes that underlie implicit learning (see also Eitam, Glicksohn, Cohen, Hassin, & Schul, 2010; Jiménez & Méndez, 1999).

Implicit Learning Directed by Unconscious Goals In a different set of experiments Eitam, Hassin, and Schul (2008) investigated the effects of unconscious goals on implicit learning. Participants were primed with achievement (or not) using a word search task in which a number of achievement-related words were embedded (cf., Bargh et al., 2001). After this priming task, participants were introduced to the sugar factory paradigm (Berry & Broadbent, 1984), in which participants have to set parameters in order to maximize the output of a simulated factory. Although participants were not aware of the rules that governed the production, the primed goal improved learning, probably by increasing the relevance of goal-relevant representations (cf., Custers & Aarts, 2011; Eitam & Higgins, 2010).

Together, these findings demonstrate that the perception and detection not only allow people to adjust their ongoing behavior to new opportunities or requirements but may also facilitate (and even determine) learning of rules and regularities in the environment, even though people are not aware of these rules, the fact that they are learning, or the goals that facilitate this. Such learning not only tunes online goal-directed action to the current contingencies of the environment but also facilitates future goal-directed action. Importantly, many of these processes can seemingly operate without one's awareness.

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Biasing Reward Value

Another mechanism by which goals flexibly steer behavior is by changing the reward value of goal-relevant stimuli. It has been argued that in the same way the hierarchical structure in which goals and means are associated cause means to be activated when the associated goal is primed, means and related stimuli evoke a stronger affective signal as a function of the desirability of the goal they are associated with (Kruglanski et al., 2002; Veltkamp et al., 2009). For instance, when someone is in a hurry and searching for his or her keys, the sight of the keys may evoke a positive reward signal. Importantly, this process seemingly operates out of awareness and regardless of one's awareness of the goal that is being pursued.

Biased reward value may facilitate goal pursuit in several ways. On a basic level, it may promote approach reactions toward goal-related stimuli in a fairly automatic fashion (Chen & Bargh, 1999). Second, it may facilitate detection of such objects (Lang, Bradley, & Cuthbert, 1997). Finally, biasing of reward value may create new goals lower in the hierarchy (i.e., turn means into goals), which allow the higher order goal to be completed. That is, when thirsty, one may not only approach a bottle of water, but one may behave in a goal-directed manner to obtain it (i.e., finding the necessary coins to get the bottle out of the machine).

Biasing of Reward Value by Conscious Goals Support for changes in reward value as a function of goals was obtained by Ferguson and Bargh (2004), who manipulated participants' need to drink. All participants were instructed to refrain from drinking for 3 hours before the experiment. In the control group, participants were presented with an alleged taste test upon arrival in the lab, in which they had to compare various drinks and were invited to drink as much as possible. In the experimental group, participants had to taste different brands of pretzels, which should exacerbate their thirst. In the next phase of the experiment, all participants were asked to reflect on their level of thirst and subsequently their implicit evaluations of goal-related objects and actions were measured. Even though these evaluations were measured implicitly, it was found that goal-relevant objects that could be used to quench their thirst evoked more positivity (reflecting a stronger reward signal) in thirsty than in nonthirsty participants (see also Seibt, Häfner, & Deutsch, 2007).

Biasing of Reward Value by Unconscious Goals Huang and Bargh (2008) investigated similar effects using evolutionarily relevant motives that often operate outside of awareness. They primed mating goals and then implicitly measured people's evaluations of objects. They reasoned that activated mating goals should create a general "sensitivity to the peak," in that people not only evaluate those in their prime more positively, but also other organic objects, such as bananas. Mating goals were activated by having people read a short passage about a romantic date.

It was indeed found that people in their prime were rated as more attractive as a result of the priming than teens or older adults, and that in a similar way a tight,

yellow banana was preferred over a brown or green one. Interestingly, this effect was not obtained for inorganic objects, such as cars. Even though reading the story about the romantic date could in principle have activated conscious thoughts or even conscious goals related to dating, it is highly unlikely that participants were aware of the relation between the story and the ratings of, let's say, the bananas. Hence, the influence of the primed goal on the evaluations was likely to be unconscious. Other evidence for nonconscious activation of goals was obtained by Ferguson (2008) who subliminally primed words related to the goal of being thin and found that as a consequence goal-related words elicited a stronger signal of reward compared to goal irrelevant ones.

In sum, goal pursuit is not a matter of merely executing actions patterns that are stored in the brain. It requires flexibility to attain the desired outcome in the situation at hand. This flexibility stems from processes that operate largely out of awareness, which are instigated by conscious or unconscious goals. Behavior is tuned to the situation based on a goal representation that is actively maintained. This goal biases perception and detection in the service of pursuit and learning as well as the reward value of goal-related objects in the environment.

CONCLUSIONS AND FUTURE DIRECTIONS

In this chapter we considered the role of conscious and unconscious processes in goal pursuit. Although setting and pursuing goals were regarded, until recently, to be largely conscious events, it is clear that even when people do sit down to deliberate what to do, unconscious processes play a big role. Even the most crucial steps in goal setting—determining the desirability and feasibility of goals—can be achieved without awareness. Because goals involve hierarchical structures of mental representations that include instrumental actions, activation of a goal-relevant representation, regardless of the source of activation, can prepare the feasible instrumental actions if available (cf., Higgins, 1996). In turn, the positive reward signal that accompanies the activation of a goal recruits resources for the goal's enactment to the extent that the goal is desired (Custers & Aarts, 2010). Regardless of the specific underlying mechanism, which is yet to be determined, instrumental actions are tuned, and perception is biased to respond flexibly to challenges of our unpredictable environment. Taken together, goals need not be consciously selected and assessed. Once activated, given that they are desired by the person, goals "select themselves" and can run to completion through many different processes, regardless of whether the host of the goal is conscious or not (Bargh et al., 2008; Eitam & Higgins, 2010).

This conclusion has to be taken with a little caution. Although subliminal priming techniques do allow researchers to make the claim that participants are not conscious of the primes that are presented, it is much harder to determine whether the primed goal does or does not pop up in conscious awareness along the way. Whereas the absence of effects of goal priming on debriefings may not provide conclusive evidence for the idea that participants were not aware of the goal during its pursuit, the presence of such effects would not necessarily provide evidence for the idea that they were aware, as the debriefing may have caused participants

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to become conscious of an until-then unconscious goal. However, until better ways are found to determine whether people are conscious of a goal during its pursuit, careful funneled debriefings (Bargh & Chartrand, 2000) seem to be the only way out.

In this respect, it is worth considering in more detail the role of conscious processes in research on unconscious goal pursuit. For almost each process considered here, research could be cited that found that unconscious processes played a role, too. Given the image of goal pursuit as a conscious affair, such a biased approach seemed warranted, but the other side should be considered, too. In each study on unconscious goals, it is fairly easy to point out some conscious processes. Indeed, it has been noted that in studies on unconscious process, conscious processes are used to set the stage for the small part that is unconscious. In a recent review, for instance, Baumeister, Masicampo, and Vohs (2011) argued that consciousness plays a role in the communication of goals, as is evident from the explicit instructions that are used in research on unconscious processes.

Although we do not totally disagree with this view, it is important not to confuse the methods that are used in the lab with the thing they enable us to study. Just because conscious instructions are a handy tool to optimize the conditions to find effects of unconscious processes where we want them does not mean that they are always required in daily life. To draw an analogy: Physicists do not build huge particle colliders to observe process that never happen in the real world. Most of these processes occur in the real world, but they can only be studied by carefully controlling when and where they occur.

A fruitful approach to solve some of the questions above would be to investigate more specifically those instances in which conscious and unconscious goals would yield different, instead of similar, effects. In the domain of unconscious reward processing, a number of studies have already obtained such data. As discussed earlier, Bijleveld et al. (2010) demonstrated that people make different speed–accuracy tradeoffs for conscious low and high rewards, whereas such tradeoffs are not present when rewards cues are presented subliminally. Other processes that are typical for conscious but not for unconscious processes, such as choking under pressure (Zedelius et al., 2011), are ideal for comparing conscious and unconscious effects, as becoming conscious of unconscious primes would radically change behavior. Hence, although previous research has established that conscious and unconscious goals produce identical effects under many circumstances, looking for the rare situations in which they may differ could provide important evidence for the unconscious nature of the operation of primed goals.

To conclude, although the evidence for unconscious processes is significant, we are not even close to understanding the precise role of consciousness in human goal pursuit. We are not suggesting that consciousness is unimportant or necessarily an epiphenomenon. The truth is that a lot more research is needed to find out what consciousness actually contributes in goal pursuit. So, whereas research in the past decades has focused on establishing that many processes involved in goal pursuit can also occur without awareness, the next decades should be devoted to the question of if and when conscious makes a difference.

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REFERENCES

Aarts, H., Chartrand, T. L., Custers, R., Danner, U., Dik, G., Jefferis, V. E., & Cheng, C. M. (2005). Social stereotypes and automatic goal pursuit. *Social Cognition, 23*, 464–489.

Aarts, H., Custers, R., & Holland, R. W. (2007). The nonconscious cessation of goal pursuit: When goals and negative affect are coactivated. *Journal of Personality and Social Psychology, 92*, 165–178.

Aarts, H., Custers, R., & Marien, H. (2008). Preparing and motivating behavior outside of awareness. *Science, 319*, 1639.

Aarts, H., Custers, R., & Marien, H. (2009). Priming and authorship ascription: When nonconscious goals turn into conscious experiences of self-agency. *Journal of Personality and Social Psychology, 95*, 967–979.

Aarts, H., Custers, R., & Veltkamp, M. (2008). Goal priming and the affective-motivational route to nonconscious goal pursuit. *Social Cognition, 26*, 555.

Aarts, H., & Dijksterhuis, A. (2000). Habits as knowledge structures: Automaticity in goal-directed behavior. *Journal of Personality and Social Psychology, 78*, 53–63.

Aarts, H., & Dijksterhuis, A. (2003). The silence of the library: Environment, situational norm, and social behavior. *Journal of Personality and Social Psychology, 84*, 18–28.

Aarts, H., Gollwitzer, P., & Hassin, R. (2004). Goal contagion: Perceiving is for pursuing. *Journal of Personality and Social Psychology, 87*, 23–37.

Abrams, R. L., & Greenwald, A. G. (2000). Parts outweigh the whole (word) in unconscious analysis of meaning. *Psychological Science, 11*, 118–124.

Baddeley, A. (2003). Working memory: looking back and looking forward. *Nature Reviews Neuroscience, 4*, 829–839.

Balcetis, E., & Dunning, D. (2010). Wishful seeing: More desired objects are seen as closer. *Psychological Science, 21*, 147–152.

Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory.* Englewood Cliffs, NJ: Prentice-Hall.

Bargh, J. A. (1990). Auto-motives: Preconscious determinants of social interaction. In E. T. Higgins & R. M. Sorrentino (Eds.), *Handbook of motivation and cognition* (pp. 93–130). New York: Guilford.

Bargh, J. A. (1997). The automaticity of everyday life. In R. S. Wyer (Ed.), *Advances in social cognition* (pp. 1–61). Mahwah, NJ: Erlbaum.

Bargh, J. A., & Chartrand, T. L. (1999). The unbearable automaticity of being. *American Psychologist, 54*, 462–479.

Bargh, J. A., & Chartrand, T. L. (2000). The mind in the middle: A practical guide to priming and automaticity research. In H. T. Reis & C. M. Judd (Eds.), *Handbook of research methods in social and personality psychology* (pp. 253–285). New York: Cambridge University Press.

Bargh, J. A., & Gollwitzer, P. M. (1994). Environmental control of goal-directed action: Automatic and strategic contingencies between situations and behavior. In W. D. Spaulding (Ed.), *Integrative views of motivation, cognition, and emotion. Nebraska symposium on motivation* (pp. 71–124). Lincoln, NE: University of Nebraska Press.

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Bargh, J. A., Gollwitzer, P. M., Lee-Chai, A., Barndollar, K., & Trötschel, R. (2001). The automated will: Nonconscious activation and pursuit of behavioral goals. *Journal of Personality and Social Psychology, 81*, 1014–1027.

Bargh, J. A., Gollwitzer, P. M., & Oettingen, G. (2010). Motivation. In S. T. Fiske, D. T. Gilbert, & G. Lindze (Eds.), *Handbook of social psychology* (5th ed., pp. 268–316). Hoboken, NJ: Wiley.

Bargh, J. A., Green, M., & Fitzsimons, G. M. (2008). The selfish goal: Unintended consequences of intended goal pursuits. *Social Cognition, 26*, 534.

Bargh, J. A., & Pietromonaco, P. (1982). Automatic information processing and social perception: The influence of trait information presented outside of conscious awareness on impression formation. *Journal of Personality and Social Psychology, 43*, 437–449.

Bargh, J. A., Raymond, P., Pryor, J. B., & Strack, F. (1995). Attractiveness of the underling: An automatic power → sex association and its consequences for sexual harassment and aggression. *Journal of Personality and Social Psychology, 68*, 768–781.

Baumeister, R., Masicampo, E., & Vohs, K. (2011). Do conscious thoughts cause behavior? *Annual Review of Psychology, 62*, 331–361.

Bekkering, H., Wohlschläger, A., & Gattis, M. (2000). Imitation of gestures in children is goal-directed. *Quarterly Journal of Experimental Psychology. A, Human Experimental Psychology, 53*, 153–164.

Berridge, K. C. (2001). Reward learning: Reinforcement, incentives, and expectations. In D. L. Medin (Ed.), *The psychology of learning and motivation: Advances in research and theory* (pp. 223–278). San Diego, CA: Academic Press.

Berry, D. C., & Broadbent, D. E. (1984). On the relationship between task performance and associated verbalizable knowledge. *Quarterly Journal of Experimental Psychology Section A: Human Experimental Psychology, 36*, 209–231.

Bijleveld, E., Custers, R., & Aarts, H. (2009). The unconscious eye opener: Pupil dilation reveals strategic recruitment of resources upon presentation of subliminal reward cues. *Psychological Science, 20*, 1313–1315.

Bijleveld, E., Custers, R., & Aarts, H. (2010). Unconscious reward cues increase invested effort, but do not change speed-accuracy tradeoffs. *Cognition, 115*, 330–335.

Bos, M. W., Dijksterhuis, A., & Van Baaren, R. (2008). On the goal-dependency of unconscious thought. *Journal of Experimental Social Psychology, 44*, 1114–1120.

Brass, M., Bekkering, H., & Prinz, W. (2001). Movement observation affects movement execution in a simple response task. *Acta Psychologica, 106*, 3–22.

Brown, P. L., & Jenkins, H. M. (1968). Auto-shaping of the pigeon's key-peck. *Journal of the Experimental Analysis of Behavior, 11*, 1–8.

Bruner, J. (1957). On perceptual readiness. *Psychological Review*, *64*, 123–152.

Bruner, J., & Goodman, C. C. (1947). Value and need as organizing factors in perception. *Journal of Abnormal Social Psychology*, *42*, 33–44.

Capa, R. L., Cleeremans, A., Bustin, G. M., Bouquet, C., & Hansenne, M. (in press). Effects of subliminal priming on nonconscious goal pursuit and effort-related cardiovascular response. *Social Cognition*.

Carver, C. S., & Scheier, M. F. (1998). *On the self-regulation of behavior*. New York: Cambridge University Press.

Chartrand, T. L., & Bargh, J. A. (1996). Automatic activation of impression formation and memorization goals: Nonconscious goal priming reproduces effects of explicit task instructions. *Journal of Personality and Social Psychology, 71*, 464–478.

Chen, M., & Bargh, J. A. (1999). Consequences of automatic evaluation: Immediate behavioral predispositions to approach or avoid the stimulus. *Personality and Social Psychology Bulletin, 25*, 215–224.

Cheng, Y., Meltzoff, A. N., & Decety, J. (2007). Motivation modulates the activity of the human mirror-neuron system. *Cerebral Cortex, 17*, 1979.

Custers, R., & Aarts, H. (2005). Positive affect as implicit motivator: On the nonconscious operation of behavioral goals. *Journal of Personality and Social Psychology, 89*, 129–142.

Custers, R., & Aarts, H. (2007a). Goal-discrepant situations prime goal-directed actions if goals are temporarily or chronically accessible. *Personality and Social Psychology Bulletin, 33*, 623–633.

Custers, R., & Aarts, H. (2007b). In search of the nonconscious sources of goal pursuit: Accessibility and positive affective valence of the goal state. *Journal of Experimental Social Psychology, 43*, 312–318.

Custers, R., & Aarts, H. (2010). The unconscious will: How the pursuit of goals operates outside of conscious awareness. *Science, 329*, 47–50.

Custers, R., & Aarts, H. (2011). Learning of predictive relations between events depends on attention, not on awareness. *Consciousness and Cognition, 20,* 368–378.

Custers, R., Maas, M., Wildenbeest, M., & Aarts, H. (2008). Nonconscious goal pursuit and the surmounting of physical and social obstacles. *European Journal of Social Psychology, 38*, 1013–1022.

Custers, R., & Veling, H. (2009). Memory: Procedural memory, skill, perceptual-motor learning and awareness. In *Encyclopedia of consciousness* (Vol. 1, pp. 13–18). Oxford: Elsevier.

Deci, E. L., & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behavior*. New York: Plenum.

De Houwer, J. (2003). The extrinsic affective Simon task. *Experimental Psychology, 50*, 77–85.

De Houwer, J., Thomas, S., & Baeyens, F. (2001). Association learning of likes and dislikes: A review of 25 years of research on human evaluative conditioning. *Psychological Bulletin, 127*, 853–869.

de Liver, Y., van der Pligt, J., & Wigboldus, D. (2007). Positive and negative associations underlying ambivalent attitudes. *Journal of Experimental Social Psychology, 43*, 319.

Dennett, D. C. (1991). *Consciousness explained*. New York: Little, Brown.

Dijksterhuis, A. (2004). Think different: The merits of unconscious thought in preference development and decision making. *Journal of Personality and Social Psychology, 87*, 586–598.

Dijksterhuis, A., & Aarts, H. (2010). Goals, attention, and (un)consciousness. *Annual Review of Psychology, 61*, 467–490.

Dijksterhuis, A., Bos, M. W., Nordgren, L. F., & Van Baaren, R. (2006). On making the right choice: The deliberation-without-attention effect. *Science, 311*, 1005–1007.

Dijksterhuis, A., & Nordgren, L. F. (2006). A theory of unconscious thought. *Perspectives on Psychological Science, 1*, 95–109.

Eitam, B., Glicksohn, A., Cohen, A., Hassin, R. R., & Schul, Y. (2010). *Spatial relevance and artificial grammar learning: Selectivity within the 'spotlight'*. Unpublished manuscript.

Eitam, B., Hassin, R. R., & Schul, Y. (2008). Nonconscious goal pursuit in novel environments: The case of implicit learning. *Psychological Science, 19*, 261–267.

Eitam, B., & Higgins, E. T. (2010). Motivation in mental accessibility: Relevance of a representation (ROAR) as a new framework. *Social and Personality Psychology Compass, 4*, 951–967.

Eitam, B., Schul, Y., & Hassin, R. R. (2009). Goal relevance and artificial grammar learning. *Quarterly Journal of Experimental Psychology, 62*, 228–238.

Ferguson, M. J. (2007). On the automatic evaluation of end-states. *Journal of Personality and Social Psychology, 92*, 596–611.

Ferguson, M. J. (2008). On becoming ready to pursue a goal you don't know you have: Effects of nonconscious goals on evaluative readiness. *Journal of Personality and Social Psychology, 95*, 1268.

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Ferguson, M. J., & Bargh, J. A. (2004). Liking is for doing: The effects of goal pursuit on automatic evaluation. *Journal of Personality and Social Psychology, 87*, 557–572.

Fishbach, A., & Ferguson, M. J. (2007). The goal construct in social psychology. In A. W. Kruglanski & E. T. Higgins (Eds.), *Social psychology: Handbook of basic principles* (Vol. 2, pp. 490–515). New York: Guilford.

Fishbein, M., & Ajzen, I. (1975). *Belief, attitude, intention, and behavior: An introduction to theory and research*. Reading, MA: Addison-Wesley.

Fitzsimons, G. M., & Bargh, J. A. (2003). Thinking of you: Nonconscious pursuit of interpersonal goals associated with relationship partners. *Journal of Personality and Social Psychology, 84*, 148–163.

Förster, J., Liberman, N., & Higgins, E. T. (2005). Accessibility from active and fulfilled goals. *Journal of Experimental Social Psychology, 41*, 220–239.

Fourneret, P., & Jeannerod, M. (1998). Limited conscious monitoring of motor performance in normal subjects. *Neuropsychologia, 36*, 1133–1140.

Gibson, J. J. (1979). *The ecological approach to visual perception*. Boston, MA: Houghton Mifflin.

Gollwitzer, P. M. (1990). Action phases and mind-sets. In E. T. Higgins & R. M. Sorrentino (Eds.), *Handbook of motivation and cognition* (pp. 53–92). New York: Guilford.

Hart, W., & Albarracín, D. (2009). The effects of chronic achievement motivation and achievement primes on the activation of achievement and fun goals. *Journal of Personality and Social Psychology, 97*, 1129–1141.

Hassin, R. R., Aarts, H., Eitam, B., Custers, R., & Kleiman, T. (2009). Non-conscious goal pursuit and the effortful control of behavior. In E. Morsella & J. A. Bargh (Eds.), *Oxford handbook of human action* (pp. 549–566). New York: Oxford University Press.

Hassin, R. R., Aarts, H., & Ferguson, M. J. (2005). Automatic goal inferences. *Journal of Experimental Social Psychology, 41*, 129–140.

Hassin, R. R., Bargh, J. A., Engell, A. D., & McCulloch, K. C. (2009). Implicit working memory. *Consciousness and Cognition, 18*, 665–678.

Higgins, E. T. (1996). Knowledge activation: Accessibility, applicability, and salience. In E. T. Higgins & A. W. Kruglanski (Eds.), *Social psychology: Handbook of basic principles* (pp. 133–168). New York: Guilford.

Higgins, E. T., Rholes, W. S., & Jones, C. R. (1977). Category accessibility and impression formation. *Journal of Experimental Social Psychology, 13*, 141–154.

Holland, R. W., Hendriks, M., & Aarts, H. (2005). Smells like clean spirit: Nonconscious effects of scent on cognition and behavior. *Psychological Science, 16*, 689–693.

Hommel, B., Muesseler, J., Aschersleben, G., & Prinz, W. (2001). The theory of event coding (TEC): A framework for perception and action planning. *Behavioral and Brain Sciences, 24*, 849–937.

Huang, J. Y., & Bargh, J. A. (2008). Peak of desire: Activating the mating goal changes life-stage preferences across living kinds. *Psychological Science, 19*, 573–578.

Jeannerod, M. (1997). *The cognitive neuroscience of action*. Oxford: Blackwell.

Jiménez, L., & Méndez, C. (1999). Which attention is needed for implicit sequence learning? *Journal of Experimental Psychology: Learning, Memory, and Cognition, 25*, 236–259.

Johnston, W. A., & Dark, V. J. (1986). Selective attention. *Annual Review of Psychology, 37*, 43–75.

Kahneman, D. (1973). *Attention and effort*. Englewood Cliffs, NJ: Prentice-Hall.

Kay, A. C., & Ross, L. (2003). The perceptual push: The interplay of implicit cues and explicit situational construals on behavioral intentions in the prisoner's dilemma. *Journal of Experimental Social Psychology, 39*, 634–643.

Kay, A. C., Wheeler, S. C., Bargh, J. A., & Ross, L. (2004). Material priming: The influence of mundane physical objects on situational construal and competitive behavioral choice. *Organizational Behavior and Human Decision Processes, 95*, 83–96.

Downloaded by [Karen Hudson] at 03:29 22 March 2015

Keeney, R., & Raiffa, H. (1976). *Decisions with multiple objectives: Preferences and value tradeoffs.* New York: Wiley.

Klinger, E. (1996). Emotional influences on cognitive processing, with implications for theories of both. In P. M. Gollwitzer & J. A. Bargh (Eds.), *The psychology of action: Linking cognition and motivation to behavior* (pp. 168–189). New York: Guilford.

Koch, C., & Tsuchiya, N. (2007). Attention and consciousness: two distinct brain processes. *Trends in Cognitive Sciences, 11*, 16–22.

Kruglanski, A. W., Shah, J. Y., Fishbach, A., Friedman, R., Chun, W. Y., & Sleeth-Keppler, D. (2002). A theory of goal-systems. In M. P. Zanna (Ed.), *Advances in experimental social psychology* (pp. 331–378). San Diego, CA: Academic Press.

Lang, P. J., Bradley, M. M., & Cuthbert, B. N. (1997). Motivated attention: Affect, activation, and action. In P. J. Lang, R. F. Simons, & M. T. Balaban (Eds.), *Attention and orienting: Sensory and motivational processes* (pp. 97–135). Mahwah, NJ: Erlbaum.

Lau, H. C., & Passingham, R. E. (2007). Unconscious activation of the cognitive control system in the human prefrontal cortex. *Journal of Neuroscience, 27*, 5805–5811.

Lewin, K. (1951). *Field theory in social science*. New York: Harper & Row.

Libet, B., Gleason, C. A., Wright, E. W., & Pearl, D. K. (1983). Time of conscious intention to act in relation to onset of cerebral activity (readiness-potential): The unconscious initiation of a freely voluntary act. *Brain, 106*, 623–642.

Locke, E. A., & Latham, G. P. (2002). Building a practically useful theory of goal setting and task motivation: A 35-year odyssey. *American Psychologist, 57*, 705–717.

McKoon, G., & Ratcliff, R. (1986). Inferences about predictable events. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 12*, 82–91.

Miller, G. A., Galanter, E., & Pribram, K. H. (1960). *Plans and the structure of behavior*. London: Holt, Rinehart and Winston.

Miyake, A., Friedman, N. P., Emerson, M. J., Witzki, A. H., Howerter, A., & Wager, T. D. (2000). The unity and diversity of executive functions and their contributions to complex "frontal lobe" tasks: A latent variable analysis. *Cognitive Psychology, 41*, 49.

Naccache, L., & Dehaene, S. (2001). Unconscious semantic priming extends to novel unseen stimuli. *Cognition, 80*, 215–229.

Nisbett, R. E., & Wilson, T. D. (1977). Telling more than we can know: Verbal reports on mental processes. *Psychological Review, 84*, 231.

Nissen, M. J., & Bullemer, P. (1987). Attentional requirements of learning: Evidence from performance measures. *Cognitive Psychology, 19*, 1–32.

Nørretranders, T. (1991). *The user illusion: Cutting consciousness down to size*. New York: Penguin.

Olds, J., & Milner, P. (1954). Positive reinforcement produced by electrical stimulation of septal area and other regions of rat brain. *Journal of Comparative and Physiological Psychology, 47*, 419–427.

Olds, J., & Milner, P. (1956). Pleasure centers in the brain. *Scientific American, 195*, 105–116.

Pessiglione, M., Schmidt, L., Draganski, B., Kalisch, R., Lau, H. C., Dolan, R. J., & Frith, C. D. (2007). How the brain translates money into force: A neuroimaging study of subliminal motivation. *Science, 316*, 904–906.

Powers, W. T. (1973). Feedback: Beyond behaviorism. *Science, 179*, 351–356.

Pulvermüller, F. (2005). Brain mechanisms linking language and action. *Nature Reviews: Neuroscience, 6*, 576–582.

Reber, A. S. (1967). Implicit learning of artificial grammars. *Journal of Verbal Learning and Verbal Behavior, 6*, 855–863.

Schlaghecken, F., & Eimer, M. (2004). Masked prime stimuli can bias quot;freequot; choices between response alternatives. *Psychonomic Bulletin and Review, 11*, 463–468.

Schultz, W. (2006). Behavioral theories and the neurophysiology of reward. *Annual Review of Psychology, 57*, 87–115.

Downloaded by [Karen Hudson] at 03:29 22 March 2015

Seibt, B., Häfner, M., & Deutsch, R. (2007). Prepared to eat: How immediate affective and motivational responses to food cues are influenced by food deprivation. *European Journal of Social Psychology, 37*, 359–379.

Shah, J. Y. (2003). Automatic for the people: How representations of significant others implicitly affect goal pursuit. *Journal of Personality and Social Psychology, 84*, 661–681.

Shantz, A., & Latham, G. P. (2011). The effect of primed goals on employee performance: Implications for human resource management. *Human Resource Management, 50,* 289–299.

Sheeran, P., Aarts, H., Custers, R., Rivis, A., Webb, T., & Cooke, R. (2005). The goal-dependent automaticity of drinking habits. *British Journal of Social Psychology, 44*, 47–63.

Sherman, S. (1987). Cognitive processes in the formation, change, and expression of attitudes. In *Social influence: The Ontario symposium* (Vol. 5, pp. 75–106). Hillsdale, NJ: Earlbaum.

Shizgal, P. (1997). Neural basis of utility estimation. *Current Opinion in Neurobiology, 7*, 198–208.

Skinner, B. F. (1938). *The behavior of organisms: an experimental analysis*. Oxford, Engl.: Appleton-Century.

Soon, C. S., Brass, M., Heinze, H. J., & Haynes, J. D. (2008). Unconscious determinants of free decisions in the human brain. *Nature Neuroscience, 11*, 543–545.

Strahan, E. J., Spencer, S. J., & Zanna, M. P. (2002). Subliminal priming and persuasion: Striking while the iron is hot. *Journal of Experimental Social Psychology, 38*, 556–568.

Tajfel, H. (1959). The anchoring effects of value in a scale of judgments. *British Journal of Psychology*, 50, 294–304.

Thaler, R. H., & Sunstein, C. R. (2009). *Nudge: Improving decisions about health, wealth, and happiness*. London: Penguin.

Tolman, E. C. (1932). *Purposive behavior in animals and man.* New York: Appleton.

Van Den Bos, A., & Stapel, D. A. (2009). Why people stereotype affects how they stereotype: The differential influence of comprehension goals and self-enhancement goals on stereotyping. *Personality and Social Psychology Bulletin, 35*, 101–113.

Veltkamp, M., Aarts, H., & Custers, R. (2008a). On the emergence of deprivation-reducing behaviors: Subliminal priming of behavior representations turns deprivation into motivation. *Journal of Experimental Social Psychology, 44*, 866–873.

Veltkamp, M., Aarts, H., & Custers, R. (2008b). Perception in the service of goal pursuit: Motivation to attain goals enhances the perceived size of goal-instrumental objects. *Social Cognition, 26*, 720–736.

Veltkamp, M., Aarts, H., & Custers, R. (2009). Unravelling the motivational yarn: A framework for understanding the instigation of implicitly motivated behaviour resulting from deprivation and positive affect. *European Review of Social Psychology, 20*, 345–381.

Verplanken, B., & Holland, R. W. (2002). Motivated decision making: Effects of activation and self-centrality of values on choices and behavior. *Journal of Personality and Social Psychology, 82*, 434–447.

Watson, J. B. (1925). *Behaviorism*. New York: Norton.

Wiener, N. (1948). *Cybernetics: or control and communication in the animal and the machine*. Cambridge, MA: MIT Press.

Wohlschläger, A., Gattis, M., & Bekkering, H. (2003). Action generation and action perception in imitation: An instance of the ideomotor principle. *Philosophical Transactions of the Royal Society of London. Series B: Biological Sciences, 358*, 501–515.

Wyart, V., & Tallon-Baudry, C. (2008). Neural dissociation between visual awareness and spatial attention. *Journal of Neuroscience, 28*, 2667–2679.

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Wyer, R. S., & Srull, T. K. (1986). Human cognition in its social context. *Psychological Review, 93*, 322–359.

Zedelius, C. M., Veling, H., & Aarts, H. (2011). Boosting or choking—How conscious and unconscious reward processing modulate the active maintenance of goal-relevant information. *Consciousness and Cognition, 20,* 355–362.

Zeigarnik, B. (1927). Das Behalten erledigter und unerledigter Handlungen. *Psychologische Forschung, 9*, 1–85.

Zwaan, R. A., & Taylor, L. J. (2006). Seeing, acting, understanding: Motor resonance in language comprehension. *Journal of Experimental Psychology: General, 135*, 1–11.

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9

Goal Competition, Conflict, Coordination, and Completion
How Intergoal Dynamics Affect Self-Regulation

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On any given day, people have to negotiate the regulatory demands of multiple goals. Should they wake up early and eat a leisurely breakfast or sleep in and be more rested for the day? Do they stop to put gas in their car before work or attempt to stay ahead of morning traffic? Should they work on long-term projects or instead focus their time on more pressing tasks? Do they eat a nutritious salad for lunch or eat the cheeseburger they have been craving? Should they take a trip to a sunny resort on their upcoming vacation time or instead stay home and complete some unfinished house repairs? Should they make plans to see friends this evening or catch up with Mom and Dad on the phone? If one were to take a snapshot of a person's motivational state at any one moment, it would reveal the presence of numerous diverse goals forming a complex, interconnected network that drives behavior.

Historically, however, research into fundamental self-regulatory processes has examined individual goals. For example, much is known about how goals become activated with and without conscious awareness (e.g., Bargh, 1996) and about the factors that sustain goal engagement and commitment (see Fishbach and Finkelstein, Chapter 7, this volume). The knowledge gleaned from these and other investigations has provided critical insight into self-regulation, and this necessary focus on individual goals continues to underlie the majority of current research in the area. However, as the examples in the opening paragraph illustrate, goals do not tend to be pursued as they have commonly been studied—in isolation. People

generally do not have the luxury of being able to pursue goals sequentially, seeing each regulatory effort through to its desired outcome before proceeding to the next. Instead, people must balance and juggle numerous goals that are related to one another in various ways.

Although some goals have complementary relationships and facilitate one another, much of intergoal dynamics is defined by goals that cannot be pursued concurrently. In many contexts, for example, the presence of multiple goals presents people with a fundamental approach–approach conflict (Lewin, 1935, 1951). In such situations, two appealing goals may compete with each other for valuable regulatory resources (both psychological and tangible). These goals may also conflict to the extent that progress toward one goal undermines progress on an equally desired alternative goal, such as when pursuit of social goals threatens to impede career goals and vice versa. Still other goals relate to one another in ways that pose a basic approach–avoidance conflict (Lewin, 1935, 1951). Often, a goal to pursue a specific positive outcome runs counter to a motivation to avoid a negative outcome, such as when the goal to pursue interpersonal closeness opposes the goal to avoid rejection (Murray, Holmes, & Collins, 2006), and thereby requires one to resolve this regulatory tension. Though specific goal content may vary, these elementary goal relationships comprise the vast majority of intergoal dynamics. In this chapter, we review work demonstrating that regulating the pursuit of several goals at once is a pervasive experience that governs a great deal of thought and action across various domains.

Though multiple goal pursuit is a ubiquitous part of life, social psychological research exploring how intergoal dynamics affect self-regulation is in its relative infancy. However, research within the past several years has made tremendous strides in illuminating the dynamics of multiple goal pursuit. Scholars have taken an increasingly broad approach to studying self-regulation that has led to substantial advancements in theory and knowledge about how goals affect one another and how the varied relationships between them affect regulatory outcomes. In discussing research, we first explore the basic processes underlying pursuit of multiple goals, and then turn to examine certain content domains in which multiple goal pursuit plays a significant role in determining regulatory outcomes.

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THE STRUCTURE AND PROCESSES OF INTERGOAL DYNAMICS

In this first section, we describe research on the basic social cognitive processes underlying multiple goal pursuit, such as the cognitive structure and representation of multiple goals, and the processes and mechanisms that allow individuals to manage regulatory challenges involving multiple goals. To best present this material, we use specific relationships between goals—the titular "dynamics" of this chapter—as an organizational framework.

Though goals that are held simultaneously often differ in a number of chronic and contextual properties, it is the nature of the association between

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goals that seems to govern self-regulation. The regulatory demands placed on an individual by given combinations of specific goals often afford the use of particular cognitive mechanisms to negotiate goal pursuit. In this section, we examine the regulatory consequences for four particular intergoal relationships. First, we examine competing goals, which we define loosely as goals that compete with one another for limited regulatory resources. That is, multiple goals often vie for motivational or attentional resources, and in such cases, pursuing one goal impedes the ability to subsequently pursue alternative goals until regulatory resources are replenished. We contrast this particular goal relationship with the dynamic that exists when goals conflict with one another. Certain goals are interrelated in ways that draw people in motivationally opposing directions. In these contexts, the behaviors and actions that foster completion of one goal necessarily *hinder* progress toward the alternative goal and, therefore, require people to prioritize focal goals and guard them from the influence of alternative goals.

We then describe how people balance ongoing goals. People hold many simultaneous goals, and effective self-regulation requires people to dedicate and divest regulatory efforts to and from goals that are in various stages of completion. They utilize several cues to determine when to shift motivation from one ongoing goal to another in order to complete them successfully. We then examine related processes, in which we explore how people shift motivation from *completed* goals to novel ones. When goals have been fulfilled or abandoned, people must disengage from them and direct regulatory efforts toward new goals. This process is facilitated by a variety of strategies, many of which occur automatically. Each of these unique goal relationships provides important insights into the structure and processes of intergoal dynamics, and together, they highlight how influential multiple goal pursuit is to self-regulatory outcomes.

COMPETING GOALS

Perhaps the most well-established finding in intergoal research is that goals mutually influence one another by competing for limited regulatory resources. In some cases, these resources may be physical or tangible. For example, an individual may have a physical fitness goal that he or she pursues by biking every Sunday. However, if one Saturday afternoon that person decides to undertake the arduous task of rearranging the living room furniture, he or she may be too exhausted or sore the next day to head out on the bike. In this case, competition for physical resources lessens the likelihood of completing one or both goals. Similarly, a person may have a goal to drive a new luxury sedan. If the economic climate spurs that person to adopt the goal of saving for a comfortable retirement, the ensuing competition for limited financial resources might bring about the disappointing realization that focusing on one goal inhibits his or her ability to complete the other. Competition for substantive resources, such as physical energy, time, and money, is common among multiple goals, and successful completion of individual goals can be significantly impaired by the presence of other goals. A large body of work has demonstrated that goals compete for psychological resources in similar

fashion and that the psychological costs of pursuing one goal can make it difficult to progress on others.

These psychological resources may be either cognitive or motivational in nature. Though we refer to them interchangeably in the current section, it is important to note that both types of resources play an important role in intergoal dynamics. Pursuing multiple goals is demanding of basic cognitive resources and places particular burden on attention. Attending to several goals simultaneously is difficult, and attempting to do so generally impedes performance on both goals (for a review, see Pashler, 1994). When pursuing several goals, an individual must give one goal attentional priority to increase the likelihood of completing it. Extensive research has also demonstrated that goals vie for limited motivational resources in a similar fashion. As we explore in the following section, people's self-regulatory strength is thought to be a finite resource that is taxed by multiple goals. People have limited cognitive and motivational capacity to pursuing multiple ongoing goals, and though we generally use the encompassing term *regulatory resources*, research on intergoal dynamics has often distinguished between them to provide the important insights that we summarize below.

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Resource-Depletion Approach to Competing Goals

Self-control—a necessary element of most successful goal pursuits—appears to be a limited resource that restricts one's ability to complete concurrent goals and can pose a major obstacle to self-regulation (Muraven & Baumeister, 2000). In the initial empirical investigation of this phenomenon, Baumeister, Bratslavsky, Muraven, and Tice (1998) asserted that all acts of self-control draw on a common regulatory resource that is depleted when utilized and thereby undermine one's ability to complete subsequent acts of self-control. That is, pursuing goals can often hamper the completion of others (even if they are unrelated) by limiting the amount of regulatory "strength" available. In a classic experiment, Baumeister et al. (1998) invited participants to partake in a study on taste perception. Upon arrival at the laboratory, which was filled with the smell of freshly baked chocolate chip cookies, they were seated before two bowls—one filled with the cookies and the other with radishes. Participants were randomly assigned to taste only one of the two foods and were subsequently asked to complete a (unsolvable) puzzle task. Results revealed that those who were required to eat the radishes and forgo the delicious cookies gave up on the unsolvable task more readily than did those who were instructed to eat the cookies and participants in a no-food control condition. By exerting impulse control and eating unappealing radishes over tempting cookies, participants in this condition had depleted their regulatory strength and were less able or willing to persist on the puzzle task.

These effects have been replicated numerous times with varied methodologies across a variety of domains. Acts of self-control such as regulating emotional states and suppressing thoughts have been shown to impair regulatory efforts at tasks such as exerting physical strength, inhibiting aggression after a provocation, and managing impressions (DeWall, Baumeister, Stillman, & Gailliot,

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2007; Muraven & Baumeister, 2000; Muraven, Tice, & Baumeister, 1998; Vohs, Baumeister, & Ciarocco, 2005). Together, these data suggest that regulatory depletion is an inherent component of simultaneous goal pursuit. Goals compete for limited regulatory resources and, thus, devoting resources to any one goal may facilitate progress toward completion of the focal goal at the expense of other (even unrelated) peripheral goals.

If pursuing goal X limits one's ability to pursue goal Y, how do people manage simultaneous demands on mental regulatory resources? Similar to the manner in which one might increase physical strength via a training regimen, research has suggested that regulatory strength can be bolstered by repeated acts of self-control (Muraven & Baumeister, 2000). Over time, repeated self-control efforts strengthen the regulatory "muscle" and thereby reduce decrements in performance on subsequent self-regulation efforts (Muraven, 2010; Muraven, Baumeister, & Tice, 1999; Oaten & Cheng, 2006a, 2006b). People who are more frequently presented with situations that afford the opportunity to exert self-control may become quite adept at pursuing multiple goals concurrently due to a greater capacity for self-regulation. Although the mechanism by which prior acts of self-control heighten self-regulatory ability is currently unclear, the observed effects do not appear to be produced by heightened self-efficacy or other shifts in self-beliefs, but instead due to processes that occur without conscious awareness (Muraven, 2010).

Recent attempts at understanding the biologic basis of regulatory strength have suggested an additional means by which people may overcome the demands that concurrent goal pursuit places on self-regulatory ability. Deliberative self-regulatory efforts such as those inherent in impulse control and inhibition appear to rely on glucose as a source of energy (Gailliot et al., 2007). In a series of studies, participants who exerted self-control by suppressing emotional reactions to distressing video clips or by controlling attention during a distracting task not only performed worse on subsequent self-regulation tasks relative to control participants, but also exhibited lower blood glucose levels. Importantly, however, the researchers were able to counteract these effects by restoring glucose levels after initial regulatory efforts. That is, after an initial task in which participants were required to control their attention, half of the participants consumed a glass of lemonade sweetened with sugar that would increase glucose levels, whereas the other half of the participants consumed lemonade sweetened with a sugar substitute that would not affect glucose levels. Those who consumed the glucose-laden drink made fewer errors on a subsequent Stroop task relative to those in the placebo condition, indicating that restoring glucose in between taxing regulatory efforts offset the normally deleterious effect of prior self-regulation.

Bolstering the energy available for self-regulation attempts may increase the likelihood of successfully completing multiple goals by ensuring goals are completed efficiently and by increasing the likelihood that simultaneous activation of more than one goal will not impede the ability to complete them. The precise mechanism through which glucose restores individuals' ability to pursue self-regulation is still unclear, as are the full implications of these findings for the understanding of the neurological basis of self-control.

Goal Systems Approach to Competing Goals

The notion that goals compete for limited regulatory resources has engendered broader theorizing on the cognitive structure of goal systems and has informed research that demonstrates how people manage currently prioritized or "focal" goals with peripheral or "background" goals that continuously vie for these valuable regulatory reserves. In their delineation of goal systems theory, Kruglanski et al. (2002) also proposed that goals compete for a "constant sum" of limited psychological resources and that as people heighten engagement in a particular goal, less resources are available for alternative goals. Conversely, as the cognitive accessibility (Higgins, 1996) of a particular alternative goal increases, resources are drawn away from the focal goal, and progress toward the focal goal is impeded. In an empirical demonstration of this effect, Shah and Kruglanski (2002) provided participants with the focal goal of completing an anagram task. Following this, an alternative goal was subliminally primed and activated among half of the participants, whereas the remaining participants received a control prime. Participants who were primed with the alternative goal devoted fewer resources to the focal goal, as reflected in less persistence and poorer performance on the anagram task. Even when participants did not consciously exert self-control, the mere accessibility of an alternative goal disrupted goal engagement by appropriating limited regulatory resources.

It is worth emphasizing that one need not be consciously aware of the presence of alternate goals for them to undermine self-regulatory ability. In fact, such awareness may actually be detrimental to self-regulation in some cases. Being cognizant of goal competition may trigger maladaptive attempts to resolve it by ignoring competing goals and reducing their cognitive accessibility. However, as the aforementioned work of Baumeister et al. (1998) suggested, such an act of self-control may ironically undermine performance on the focal goal by taxing regulatory strength. Goal competition, whether consciously realized or implicitly activated by features of the environment, places heavy demands on limited psychological resources. However, this is not the only way that concurrently active goals may come into discord with one another. Some goals not only contend for resources but also diverge in motivational direction. The experience of goal conflict presents a unique self-regulatory challenge with important consequences for regulatory outcomes.

CONFLICTING GOALS

Though competition for resources is highly prevalent in intergoal dynamics, multiple goals may conflict with one another in additional ways that have arguably greater implications for understanding self-regulation. Certain goals may be motivationally oppositional and directly conflict with one another's progress when pursuing one goal requires behaving in ways that are incompatible with the alternate goal. For example, if a woman is running late after work, the goal to mail her nephew's birthday card before the post office closes might compete for the resource of time with an alternative goal of not being late for her dinner reservations at the new Italian restaurant in town. Though completing one goal

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might impair her ability to complete the other, these goals are relatively unrelated and both goals could easily be accomplished given enough time. That is, progress toward one goal does not imply movement away from the other goal. However, a different type of motivational competition may occur when she realizes that the goal of enjoying her large serving of delicious fettuccine alfredo directly opposes her goal of losing weight. Progress on one goal comes at the direct and inevitable cost of progress on the other. When interrelated goals come into conflict with one another, a person is usually required to resolve this tension into one regulatory response. The basic processes that underlie such resolutions have been the focus of much research on this type of motivational dilemma. In particular, this area has explored how people maintain engagement in high-priority and long-term focal goals while resisting influence from equally appealing, short-term alternative goals that would undermine progress. Despite this, it is likely many of the processes outlined below would generalize to conflicts between goals similar in priority and temporal focus.

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Goal Shielding

As might be expected, conflicting goals likely draw cognitive resources away from one another in the same manner that competing goals do. However, this may serve an adaptive function for some interrelated goals. Reducing the regulatory resources available for oppositional goals sustains pursuit of focal goals and allows people to remain engaged in and committed to them. In line with this, Shah, Friedman, and Kruglanski (2002) argued that under certain conditions goals "shield" themselves by inhibiting the activation of alternative goals, thereby ensuring that regulatory resources are devoted entirely to focal goals. This process ultimately strengthens goal engagement and heightens the likelihood that the goal will be attained. Because such goal conflicts are repeatedly encountered in a wide variety of self-regulatory pursuits, ignoring alternative goals and maintaining focal goals are well practiced and become automated (Bargh, 1996). Thus, the mere activation of certain goals may prevent the activation of alternative goals nonconsciously.

In an illustrative study, Shah et al. (2002) asked participants to list three attributes they had the goal to possess. Participants were then subliminally primed with one of the attributes (vs. control words) and completed a lexical decision task measuring the cognitive accessibility of the others. Results revealed that when one attribute was primed, the other two attributes became less cognitively accessible. That is, when the goals of attaining a desired attribute were nonconsciously activated, the alternative goals of attaining the other desired attribute were inhibited. Importantly, the strength of this inhibition varied as a function of individual differences and goal properties: Participants who were generally tenacious about achieving goals (and thus more likely to have automated intergoal inhibition strategies) exhibited goal shielding that was moderated by several properties of the focal goals themselves. Those high in goal tenacity showed greater inhibition of alternatives for goals to which they were highly committed (and were thus likely higher in motivational priority). More pertinently for the current discussion, participants high in goal tenacity also shielded goals more when the alternative goals

were highly substitutable. When the alternative goals represented a greater threat to completion of focal goals (i.e., they were equally as appealing as the primed goal), tenacious participants inhibited these alternatives more readily. Goal shielding was shown to have a positive effect on task performance and persistence, demonstrating the functionality of this process for sustaining successful self-regulation (Shah & Kruglanski, 2002).

Shielding goals against the disruptive influence of appealing alternative goals by inhibiting activation of these alternatives is likely prevalent and may be particularly important to negotiate regulatory conflict among goals with equivalent motivational priority. However, it is often the case that goals with diverging motivational importance come into discord with one another and threaten people's self-regulatory efforts. For example, the goal of preparing a lecture for an upcoming class can be temporarily derailed by a primetime drama or a baseball game, efforts to shed 10 pounds can be foiled by a batch of freshly baked cupcakes, and attempts at attending a morning church service are occasionally thwarted by the desire for another hour of sleep. How do people maintain emphasis on high-priority goals and resist the intrusion of alluring temptations? Researchers have devoted considerable attention to examine how the cognitive properties of goal systems influence this important self-regulatory phenomenon.

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Resisting Temptation

Temptations can be characterized as lower-priority goals that pose a threat to higher-priority goals. This threat arises because pursuing tempting goals leads one to behave in ways that compromise the likelihood of obtaining these higher-importance goals. Yet, resisting temptation is difficult. It requires people to prioritize long-term goals, whose outcomes may be less salient and further away, over goals that offer salient and relatively immediate outcomes and thus exert a strong motivational pull (Fishbach, Friedman, & Kruglanski, 2003). Successful self-regulation is highly dependent on the ability to overcome temptation, and research has highlighted several cognitive mechanisms that facilitate this process and allow people to remain engaged in important goal pursuits without relentlessly succumbing to temptation.

Perhaps the earliest empirical demonstration of this type of goal conflict involved children's ability to delay gratification. In a series of seminal studies, Mischel and his colleagues presented preschool children with both a large reward and a smaller reward, explaining that if they could resist the smaller reward while the experimenter left the room, they would be given the larger reward upon his return (Mischel, 1974; see Mischel & Ayduk, 2004, for a review). The time that children spent waiting for the experimenter was operationalized as a child's ability to delay gratification, suggesting a maintained focus on the long-term goal and more resistance from the influence of the appealing short-term temptation. Longitudinal analyses of these studies have revealed that children's ability to delay gratification is highly associated with a host of outcomes later in life, most notably later social and emotional competence (Mischel, Shoda, & Peake, 1988) and Scholastic Aptitude Test scores (Shoda, Mischel, & Peake, 1990).

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Why were some children successful in resisting the appealing short-term goal to fulfill a more distant but more rewarding goal whereas others were not? Investigation of the underlying processes revealed that children engage in relatively effortful cognitive strategies to do so. Those who were most successful in delaying gratification appeared to minimize the impetus to pursue the short-term goal by reducing their attention to it, by distracting themselves, or even by covering their eyes to avoid looking at the tempting object (Mischel, Shoda, & Rodriguez, 1989). The importance of this regulatory strategy is emphasized by experimental studies demonstrating that minimizing attention to the stimulus by distraction or reducing its allure and focusing on the informational "cool" features of the object rather than the appetitive "hot" features engendered greater ability to resist temptations that threatened higher-priority goals (Mischel & Baker, 1975; Mischel, Ebbesen, & Zeiss, 1972).

These and other similar findings led Metcalfe and Mischel (1999) to postulate that delay of gratification is driven by two related processes. When temptation arises, a "hot" emotional system spurs behavior toward that goal, whereas a "cool" and more specialized cognitive system directs self-regulatory efforts toward broader goals. Delay of gratification is most effective when people are able to minimize the impact of the hot system and allow the cool system to govern goal pursuit. The authors suggested several situational factors that facilitate this, as well as several psychological mechanisms that make resisting temptation more likely. In addition to diverting attention from the tempting goal object and reconstruing it on the basis of cool features instead of hot features, people may even focus on other temptations that are irrelevant to the current goal context. For example, when the smell of pizza threatens to thwart diet goals, thinking of ice cream instead may actually increase the ability to resist temptation (e.g., Mischel et al., 1972). This latter finding suggests the intentional formation of cognitive associations between temptations and the overarching goals that they threaten, an idea that is developed further in the following section. Taken together, research on delay of gratification has revealed that people engage in conscious strategies to resolve tension between long-term goals and short-term goals that may hinder their completion. As well, the link between early delay of gratification and later outcomes indicates that such strategies remain an important part of self-regulation throughout the lifespan and across several domains.

Recent research has explored additional processes—some of them nonconscious—that contribute to the ability to resist temptation. People appear to be (perhaps surprisingly) adept at maintaining priority of focal goals when gratifying alternatives are salient, at least in part because of cognitive associations that develop between the two types of regulatory pursuits. Fishbach et al. (2003) proposed the existence of associative links between alluring temptations and the overarching goals whose progress would be threatened by them. These associations are theorized to develop from repeated successful activation of the higher-order goal in response to the temptation. For example, when dieters intentionally remind themselves of their dieting goals whenever they see tempting treats, over time they form automatic cognitive associations between those temptations and the higher-order dieting goals. Thus, exposure to temptations automatically activates

higher-order dieting goals. In general, when tempting goals are salient, successful self-regulators are thought to nonconsciously activate the higher-order goals, allowing people to remain committed to these important goals. That is, people seem to bring to mind their corresponding long-term goals when faced with short-term temptations. Importantly, because this process occurs automatically, it is not theorized to limit controlled resources in the same way that an intentional struggle to overcome temptation can. By automatically bringing to mind higher-order goals, people can likely more easily behave in line with those goals.

Support for the existence of automatic temptation-goal links was gathered in a series of studies. Participants in one study were instructed to list an important goal and a corresponding goal that might tempt them to stray from it. Participants were then subliminally primed with this temptation (or a control temptation) while completing a lexical decision task, with the goal word as the target of interest. Results revealed that when primed with a relevant temptation goal, participants exhibited faster reaction times to words that represented their overarching goals. This reflected a greater accessibility of target goals that was not demonstrated when participants were primed with nonrelevant temptations (Fishbach et al., 2003). In a second study, the authors also found that priming high-priority goals inhibited activation of temptation goals, reflecting goal-shielding processes similar to that seen in the study by Shah et al. (2002). Thus, the temptation–goal links are not bidirectional: Although temptations activated goals, findings showed that goals *inhibited* temptations.

Thus, it appears that the presence of temptations automatically activates associated higher-priority goals and improves the likelihood of self-regulatory success. Importantly, though, not everyone has the tendency to respond to temptations in this functional manner. Research has shown that this tendency is moderated in logical ways by individual differences and goal-specific properties. One study saw participants evaluate their own perceived academic self-regulatory success (e.g., how difficult they found it to complete coursework and attain good grades). When the temptations such as "procrastinate" and "television" were subliminally primed before target words related to important academic goals such as "study" and "grades," only those who reported greater regulatory self-efficacy demonstrated heightened accessibility of these overarching goals. Those who were lower in perceived self-regulatory success did not inhibit temptations, suggesting that heightened focus on higher-priority goals is a strategy that characterizes (and likely contributes to) self-regulatory success (Fishbach et al., 2003).

This latter point—that people who are not successful at their goal pursuits do not show this tendency—was recently supported by researchers studying the role of hedonic experiences in dieting behavior. In a number of studies, dieters who scored high on individual-difference measures of dietary restraint appeared to react to tempting food cues by "forgetting" about their diets and exhibiting what is known as "disinhibited" eating (Fedoroff, Polivy, & Herman, 1997). Recently, Stroebe and colleagues advanced a goal conflict model to account for this pattern of disinhibited eating in response to desirable food cues (Stroebe, 2008; Stroebe, Mensink, Aarts, Schut, & Kruglanski, 2008). According to this model, many dieters not only fail to activate their higher-order goals in response

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to temptation, but actually actively *inhibit* their higher-order dieting goals in response to temptation. By inhibiting the dieting goal, these dieters then can simply pursue the opposing hedonic goal (to enjoy the attractive food). According to this model, then, it seems that dieters are unable to engage in this proactive automatic activation of goals in the face of temptations, tending instead to focus on the hedonic motivation to enjoy the temptation (Papies, Stroebe, & Aarts, 2009a; Stroebe et al., 2008). In a recent paper, the two sets of predictions were reconciled (Papies, Stroebe, & Aarts, 2009b): The pattern shown by Fishbach et al. (2003) was replicated for dieters who reported they were successful at dieting, but the pattern shown by Stroebe et al. (2008) was replicated for dieters who reported they were unsuccessful.

Thus, the link between temptations and activation of overarching goals is higher for individuals who perceive themselves to be successful at a given goal. Similarly, the link has been shown to be stronger for goals that were more subjectively important to participants, indicating that temptations are more likely to spur pursuit of strongly held or valued goals that they may seriously threaten (Fishbach et al., 2003).

Taken together, these findings suggest that some people are more skilled at guarding goals from temptations than others are. It is likely that those who exhibit greater higher-order goal activation in the presence of a threat become particularly adept at ignoring temptations and pursuing their critical goals and, as a result, experience greater self-regulatory success. Over time, such experiences may facilitate the development of personality dispositions that further aid in resolving conflict between motivationally oppositional goals. People who continually prioritize focal goals over background goals may develop implicit dispositions that guide them toward important goals and away from less important goals, even when both regulatory alternatives are cognitively accessible. For example, those who repeatedly prioritize career goals may effortlessly and nonconsciously pursue these goals when tempting alternative goals, such as staying up late watching television or going out drinking with friends, threaten to derail goal progress. This hypothesis was explored in several studies by Fishbach and Shah (2006), who proposed that such implicit dispositions serve to resolve goal conflicts and are related to more successful goal pursuit.

Chronic dieters who placed importance on the goal of staying fit responded differently than nondieters did to stimuli that represented this goal and its relevant temptation experiences. In one study, participants were seated before a joystick and presented with a series of words related to fitness (i.e., the important goal) and fattening foods (i.e., the appealing alternative target). Participants in one condition were instructed to pull the joystick toward themselves—a response characteristic of approach motivation (Chen & Bargh, 1999)—as quickly as possible when a fitness-related word was presented and to push the joystick away from themselves—a response characteristic of avoidance motivation—when a food word was presented. Participants in a comparison condition were given opposite instructions. Consistent with their hypothesis, Fishbach and Shah found that overall, dieters showed an implicit disposition to approach important goals and avoid alternative goals by pushing the joystick away more quickly when food-related

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words were presented than when fitness-related words were shown. As well, when fitness words were shown, those who were instructed to pull the joystick toward themselves responded more quickly than did those who were instructed to push it away from themselves. Nondieters, in contrast, did not display these effects and, in fact, were quicker to pull the joystick toward themselves when food words were presented than when fitness words were displayed. Together, these results revealed that people develop automatic tendencies to approach desired goals and avoid alternative goals when goal conflict arises. Those who hold important goals psychologically distance themselves from these alternatives, functionally pushing them "out of sight" and ultimately "out of mind."

This has important consequences for self-regulation. Further studies found that when these implicit dispositions were manipulated, the degree to which participants readily approached goals and avoided alternatives (vs. approaching alternatives and avoiding goals) predicted academic success in one study, and in another, predicted behavioral efforts to pursue the overarching goal (Fishbach & Shah, 2006). Thus, it appears that successful management of conflicting goals is self-perpetuating. Those who are able to ignore alternative goals and pursue focal goals automate these processes over time and engage in them without conscious awareness. These implicit dispositions, in turn, engender future positive self-regulation experiences and increase the likelihood of goal attainment.

The work described above outlines a number of effective nonconscious strategies that allow people to maintain focus on important self-regulatory objectives and resolve conflict between motivationally oppositional goals. Self-regulators who employ these strategies likely experience greater self-regulatory success as a result. Understanding the experience of goal conflict is of prime importance to intergoal dynamics, as it can have important implications for a variety of domains ranging from health behaviors (Stroebe et al., 2008) to interpersonal relationships (Murray et al., 2006). However, prioritizing one goal over another is not the only way in which tension between interrelated goals can be resolved. Because many goals are pursued over a prolonged period of time, people's engagement in each of these goals fluctuates as people cope with several regulatory pursuits at once. Under some conditions, individuals may attempt to actively "balance" goals, shifting regulatory resources between them as circumstances dictate. The mechanisms that facilitate goal balancing and the ensuing consequences for self-regulation have received considerable research attention in the past decade, and we now turn our attention to exploring some of the most relevant findings.

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BALANCING GOALS

As we have discussed, possessing multiple goals makes it difficult to pursue each of those goals in isolation, particularly when goals compete with one another. At the same time, shifting from active goals to alternative goals is fundamental to human life and is highly functional. People often hold multiple goals, each in various stages of completion. To heighten the likelihood of fulfilling all of these goals, people must readily divert their regulatory efforts between ongoing goals. For example, although one may be highly committed to advancing a career, he

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or she must also make efforts to spend quality time with friends and family to satiate important social goals and later must disengage from social goals and go back to work.

It must be noted that while we have thus far examined goals that compete or conflict with one another, many goals have facilitative relationships, and shifting motivation among these goals may *heighten* not only the likelihood of achieving one's goals (Shah & Kruglanski, 2002) but also one's subjective well-being (Riediger & Freund, 2004). For example, when writing a manuscript, one may find oneself struggling with a particularly difficult passage and experience an acute episode of writer's block. In such a situation, one may persist on the goal and continue working, perhaps by writing a different section of the paper or proofreading earlier portions. However, this may ultimately be counterproductive if one is careless due to fatigue or preoccupied with thoughts about the initial section. Instead, one may decide to break from the writing task and pursue a different goal, maybe fulfilling leisure goals by watching television or satisfying fitness goals by going for a jog. In situations where people are unable or unwilling to remain engaged in an initial goal, diverting self-regulatory efforts to alternative goals may ultimately enhance the likelihood that each goal can be completed successfully. Clearly, the effort to balance multiple goals is a key component of intergoal dynamics, and shifting motivation among numerous goals in various stages of completion is integral to successful self-regulation. Understanding when and why people shift from focal goals to alternative goals has been the target of much investigation in the recent psychological literature. We briefly review some of this work, which has identified several factors that are important to the current understanding of how people self-regulate in intergoal contexts. For a more comprehensive examination of goal balancing, see Fishbach and Finkelstein (Chapter 7, this volume).

Progress-Induced Goal Balancing

The extent to which people believe they have made sufficient progress toward their currently active goal is a primary determinant of regulatory shifts. When pursuing a given goal, people naturally monitor their performance and form evaluations of goal progress (Carver & Scheier, 1982) by attending both to actions they have already undertaken to complete the goal (i.e., "to date" information) and to the distance that remains between their current state and their desired objective (i.e., "to do" information). Differential focus on these two sources of information interacts with goal commitment to determine whether people maintain current goals, or instead, switch to an alternative goal they may have neglected (Fishbach & Dhar, 2005; Fishbach, Zhang, & Koo, 2009; Koo & Fishbach, 2008).

For goals to which one is highly committed, an evaluative focus on what has already been accomplished serves to hinder goal engagement. This "to date" information indicates that sufficient progress has been made on the goal and thereby prompts one to divert self-regulatory efforts to other goals. In contrast, evaluating important goals based on "to do" information can fuel perceptions that there

has been a lack of progress on this goal and thus motivates continued attempts to move toward one's objectives. For goals to which one's commitment is relatively low, the manner in which progress is evaluated has contrasting effects. Focusing on what has already been accomplished affirms one's commitment and thereby strengthens motivation to complete that goal. Ironically, focusing on what has not yet been accomplished undermines goal engagement when commitment is low. Emphasizing what is still left to do signifies a lack of commitment and heightens the likelihood that people will move on to alternate goals.

Koo and Fishbach (2008) found that participants were more motivated to study for an important exam when they were presented with information about the material that remained to be studied than when they were presented with information about the material they had already reviewed. For this highly important goal, a perceived lack of progress sustained goal engagement, whereas focusing on previous accomplishments lessened motivation to continue studying for this exam. When participants considered studying for a less important exam, information about goal progress had opposite motivational consequences. They were more motivated to study for this exam when "to date" information was salient than when "to go" information was salient (Koo & Fishbach, 2008). Considering previous accomplishments toward this relatively low-importance goal served to signify commitment and thereby strengthened goal engagement, whereas considering what remained to be done led participants to question the importance of this goal and lessened their motivation to study.

Further support for the idea that perceived goal progress facilitates goal balancing can be found in studies that have more directly examined how pursuit of one goal directs regulatory efforts toward an alternative goal (Fishbach & Dhar, 2005; Fitzsimons & Fishbach, 2010). Prior research has demonstrated that people feel more positively toward others who are instrumental (i.e., helpful) for an active goal. People also approach instrumental others more quickly, which serves to build a goal-promoting environment (Fitzsimons & Shah, 2008). In a series of studies based on that initial finding, perceived goal progress was shown to erase the effect of instrumentality on evaluations of others (Fitzsimons & Fishbach, 2010). That is, when participants perceived they had made progress on a given goal, they no longer reported feeling closer to instrumental others than to noninstrumental others for that goal. The authors assumed that perceived goal progress led participants to switch goals, causing participants to stop evaluating others on the basis of their helpfulness for the focal goal (which was progressing well) and instead to start evaluating others on the basis of their helpfulness for alternative goals (which were progressing less well). In an experimental test of this assumption, participants who temporarily felt good about their progress on an academic achievement goal sought to draw closer to others who were instrumental for a health and recreation goal (the "alternative" goal), implicitly approaching them more readily and avoiding them more slowly. These data reiterate the importance of perceived goal progress on goal balancing.

Similarly, a separate investigation of the effects of progress on goal switching manipulated goal progress by having participants compare the amount of time they spent on coursework to someone who had spent very little time on their

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coursework or to someone who had devoted a relatively large amount of time (Fishbach & Dhar, 2005). The researchers assumed that when participants made downward social comparisons, they would intuit their own progress to be higher than when they made upward social comparisons. Those who felt they had made more progress (i.e., those who compared themselves to the low-standard person) subsequently reported greater interest in nonacademic activities such as watching television and socializing with friends than did participants who had compared themselves against a relatively high standard and thus felt less progress (Fishbach & Dhar, 2005).

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Affect-Induced Goal Balancing

Expanding on the work of Fishbach and Dhar (2005), Louro, Pieters, and Zeelenberg (2007) suggested an affective component to goal-balancing processes. They proposed that evaluations of goal progress induce positive or negative affective states that interact with goal proximity to determine whether people continue efforts to pursue a goal or instead disengage and pursue alternative goals. When goal progress is perceived to be satisfactory, people experience positive emotions that positively bias expectancies about goal attainment. For goals that are near completion, these positive expectancies encourage people to divert efforts to alternative goals. For goals that are far from being fulfilled, however, positive expectancies foster sustained regulatory efforts to complete the focal goal and thus minimize goal balancing. In contrast, goal progress that is perceived as unsatisfactory elicits negative affective states that lower expectations about goal completion. For goals that are relatively close to being attained, these expectancies signal that additional effort should be invested in the focal goal to ensure it is fulfilled, whereas for goals whose objectives are still remote, negative expectations indicate the goal should be abandoned and regulatory efforts allocated to alternative goals.

For example, when investigators manipulated perceptions of goal progress and goal proximity in an experimental setting, female participants who felt they had made progress toward important dieting goals experienced greater positive affect. They were more likely to continue pursuing that goal over an alternative goal when they thought they were further from that goal than when they believed they were close to completing it. In contrast, those in the low progress condition experienced negative affect and spent more time pursuing alternative goals when they believed their goal was farther away than when they thought they were near completion (Louro et al., 2007). Thus, not only do perceptions of goal progress influence goal balancing on a cognitive level, but they also produce affective reactions that interact with goal proximity to determine whether people continue to invest effort in a focal goal or, instead, disengage from those goals and undertake new regulatory pursuits.

Construal-Induced Goal Balancing

It is clear that perceptions of goal progress provide important cues that spur people to sustain engagement in their current goal or divert regulatory efforts to

alternative goals. However, recent evidence suggests that motivational shifts can occur in a relatively top-down fashion as well. That is, the decision to "highlight" a certain goal and ignore alternatives or to "balance" a goal by pursuing other goals is sometimes contingent on how those goals are cognitively represented (Fishbach et al., 2009). Fishbach and Zhang (2008) proposed that when alternative goals are construed as being in competition with one another, the motivational strength of focal goals increases and there is a corresponding decrease in the motivational strength of alternative goals. However, people may also construe multiple goals as complementary, and such perceptions motivate attempts to shift between goals and balance regulatory efforts between them.

Fishbach and Zhang (2008) manipulated the extent to which participants construed goals as competitive or complementary by altering the way in which goal-relevant objects were visually presented. In one study, participants with strong health goals were seated before a number of chocolate bars and bags of carrots, representing health goals and alternative temptation goals, respectively. In one condition, these piles were distinctly separate, whereas in another condition, they were interspersed. Results revealed that when the goals were presented separately, participants preferred the carrots to the chocolate, a choice that was consistent with their fitness goals. However, when these objects were presented together, participants preferred the chocolate bar and carrots equally. Because participants in the latter condition saw health and pleasure goals as complementary (as opposed to competing), they were more likely to direct goal pursuit from their primary goal to an alternative goal.

The research described above, and indeed, virtually all of the research that has been conducted to date, has examined regulatory shifts among incomplete goals. This focus is understandable given that pursuing goals that have not yet been fulfilled underlies the very definition of self-regulation. However, people must not only balance goals, they must also occasionally shift regulatory efforts from goals that are fulfilled or abandoned to other goals still in progress. A large part of inter-goal dynamics encompasses moving on from goals that have been satiated to goals still in progress. Research in this area has again demonstrated the existence of a number of self-regulatory strategies that underlie these processes. We explore some of these findings in the next section.

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SHIFTING GOALS

Although the bulk of self-regulatory experience is composed of negotiating the regulatory demands of goals that are still under way, the mechanisms that allow people to cease pursuing some goals altogether and adopt new goals have an equally profound effect on multiple goal pursuit. Of course, many goals have a concrete end point (e.g., repairing a leaky faucet) and when they are fulfilled, self-regulatory efforts can be easily diverted to other pursuits. However, many long-term goals have no definitive end state, and people must be able to temporarily move from these goals to other goals rather than pursue them relentlessly. For example, people who have career goals must regularly make time to spend with their children and partners. Still other goals are notoriously difficult

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to sustain after they have been satisfied. Dieters regularly find it difficult to maintain their eating regimen after they have lost a few pounds (Mann et al., 2007), and those who are motivated to pay down debt may find it difficult to continue judicious use of their credit cards after they have done so. The cognitive processes that allow people to disengage from fulfilled goals may be the same processes that make sustained pursuit of some goals so difficult. When people feel their goals have been fulfilled, those goals are inhibited so that new goals can be undertaken.

Recent empirical contributions inspired by classic social psychological theorizing (e.g., Lewin, 1951; Zeigarnik, 1927) have demonstrated that goal fulfillment results in an inhibition of goal-related constructs that prevents people from persisting on goals that have been completed (Cesario, Plaks, & Higgins, 2006; Liberman, Förster, & Higgins, 2007). After a given goal has been satisfied, either symbolically or in actuality, the accessibility of the goal decreases and the accessibility of alternative goals increases, making their pursuit more likely. In an illustration of this phenomenon, Förster, Liberman, and Higgins (2005) had participants view a series of images. Half of the participants were given the goal of informing the experimenter when they saw a picture of eyeglasses that immediately followed a picture of scissors, whereas participants in a control condition received no such instructions. Following this, participants completed a lexical decision task containing some words that were semantically related to "eyeglasses." Reaction times to these words served as the operationalization of focal goal accessibility. Results revealed that in the goal condition, participants exhibited slower responses to target words after the goal had been fulfilled (i.e., after they had seen the scissors–eyeglasses sequence) than did participants in the no-goal condition. Once the goal of finding the target sequence had been completed, participants inhibited goal-related constructs, thus freeing regulatory resources for shifts to novel goals. This effect has been replicated even when goals are completed symbolically by imagining goal completion (Denzler, Förster, & Liberman, 2009), suggesting that postfulfillment inhibition occurs readily and flexibly to facilitate goal shifting.

Disengaging from one goal to pursue another is important when goals have been fulfilled. However, these processes are also important when people deliberatively choose to abandon a goal or when situational contexts make completing a certain goal unlikely. For example, a teenager with a goal of becoming a professional musician may abandon this goal if he or she is rejected from Julliard, or may decide to abandon this goal when he or she develops a passion for biology in college. In their motivational theory of lifespan development, Heckhausen, Wrosch, and Schulz (2010) argued that disengagement processes are important to development because opportunities to pursue many goals (e.g., having a child, graduating from school) emerge and subsequently disappear within a limited time period. To ensure effective self-regulation throughout the lifespan, one must disengage rapidly from these goals when the opportunity to pursue them has passed and divert regulatory resources to goals that are still capable of being attained.

To facilitate this, Heckhausen et al. (2010) proposed that when people disengage in goals, they simultaneously "protect" their motivational resources by

engaging in compensatory strategies that serve to offset the demotivating psychological effects of not achieving a goal. They do this in several ways, such as by making external attributions for failure, engaging in downward social comparisons, and highlighting successful goal attempts in other domains. For example, one study demonstrated that making downward social comparisons led older adults to experience less regret about life events and, presumably, greater disengagement from goals that were no longer achievable (Bauer, Wrosch, & Jobin, 2008). A similar study demonstrated that adults who exhibited less self-blame about a life regret were less motivated to undo that regret, again indicating a lack of goal engagement that frees up regulatory resources for novel goals (Wrosch & Heckhausen, 2002). Use of such self-protective strategies provides another means by which people are able to leave behind goals that they no longer need or wish to pursue and instead to engage in other goals that have a greater likelihood of completion.

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SUMMARY

Despite the relatively recent interest in studying intergoal dynamics, the research described above has played a key role in elucidating the cognitive mechanisms that help people navigate the pursuit of multiple goals. It is clear that when more than one goal is currently active, the relationship between goals plays a critical role in determining the self-regulatory mechanism employed. Differences in motivational strength, motivational direction, goal progress, and goal priority may all present unique regulatory challenges that are best overcome with the use of specific conscious and nonconscious strategies. Investigations into basic processes have been extremely valuable in understanding intergoal dynamics and self-regulation more broadly and will serve as the foundation for future research in this area.

This research has been supplemented by other work that has investigated how intergoal dynamics play out in specific contexts. Recent interest in this topic has spurred many researchers to investigate how the interplay between multiple goals influences self-regulatory behavior and outcomes within specific domains. Though findings are varied, together they reveal how attempting to pursue several goals is a pervasive phenomenon, and how examining existing phenomena from this perspective can generate novel theoretical developments. The remainder of this chapter is devoted to exploring how specific goal content of intergoal dynamics influences a variety of personal and interpersonal processes and outcomes.

GOAL CONTENT: INTERGOAL DYNAMICS IN SPECIFIC CONTEXTS

As outlined in the first section of this chapter, the past decade or so has seen great advances in both theory and evidence on intergoal dynamics (Fishbach et al., 2009). In this section of the chapter, we turn to other literature and programs of research that have studied particular domains of goal conflicts, with the aim of providing illustrative examples of how goals interact to affect important behavior. The research we will describe has demonstrated the existence of unique

intergoal dynamics in a number of domains and has highlighted the importance of self-regulation to several diverse contexts. Foremost among these is interpersonal relationships. Because interpersonal contexts afford opportunity to pursue a diverse number of goals, they have provided a fertile ground for studying intergoal dynamics. Relationship goals often interact with one another, such as when people strive to develop intimacy with new friends while avoiding potential rejection. As well, relationship goals such as maintaining a healthy marriage often interact with individual goals, such as moving across the country to pursue a job opportunity. Developing and maintaining close relationships are heavily dependent on navigating several goals at once. We explore some of the implications of this in the following section by exploring how the interplay between goals in interpersonal contexts influences domain-specific self-regulation.

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Self-Protection and Connectedness

Intergoal dynamics plays a key role in all interpersonal relationships, but may be particularly influential in shaping outcomes for romantic relationships. Romantic relationships present an inherent motivational dilemma (Murray et al., 2006). On the one hand, they offer virtually unparalleled opportunity to satisfy fundamental connectedness goals (Baumeister & Leary, 1995). That is, people's sense of connectedness to others is perhaps best satisfied by romantic relationships, with their intense emotionality and deep intimacy. However, on the other hand, the very behaviors that facilitate closeness with romantic partners can quite often run counter to the goal of avoiding rejection and the social pain that accompanies it (MacDonald & Leary, 2005). For example, revealing one's innermost feelings to another person often fosters intimacy in close relationships (Reis & Shaver, 1988) but can also lead to a painful rejection experience if a relationship partner responds negatively or is unresponsive. The tension between self-protection and connectedness goals permeates many relationship contexts, but it is most impactful under situations of acute relationship threat. When relationship events cast doubt on the future of the relationship or call a partner's continued acceptance into question, people have two possible goals to pursue. They may pursue connectedness goals and affirm their relationships in the face of threat by approaching their partners. Alternatively, they may prioritize self-protection goals and distance themselves from their partners psychologically and behaviorally to avoid anticipated rejection (Murray et al., 2006).

Recent research has demonstrated that relationship threat nonconsciously activates both a goal to connect with romantic partners (Murray, Derrick, Leder, & Holmes, 2008) and also a goal to avoid the pain of rejection (Cavallo, Fitzsimons, & Holmes, 2010). When these competing goals are activated, they must be reconciled into one self-regulatory response—that is, the individual must decide how to act toward his or her partner. How the goal conflict is resolved (i.e., which goals are prioritized) seems to depend on chronic perceptions of a romantic partner's regard (Murray et al., 2006, 2008). Those who feel chronically valued (e.g., those with high self-esteem or a secure attachment style) regulate goal conflict by prioritizing connectedness goals, seeking intimacy with

their partners despite the threat of rejection. In contrast, those who chronically doubt their partners' acceptance (e.g., those with low self-esteem or an insecure attachment style) prioritize self-protection goals and forgo connectedness. These divergent motivational responses to threat have been observed repeatedly in both laboratory and naturalistic contexts and have profound implications for personal and relational outcomes.

In one direct illustration of this phenomenon, Murray, Rose, Bellavia, Holmes, and Kusche (2002) activated relationship threat by leading participants to believe their partners perceived a number of faults in them. In one study, for example, participants completed a questionnaire asking them to list aspects of their partners' personalities that they disliked. They were led to believe that their partners were filling out the same questionnaire when in fact their partners were tasked with listing the contents of their living space in detail. Participants inferred that their partners perceived a substantial number of faults in them, thereby threatening the stability of their relationships. After this manipulation, they evaluated the quality of their relationships on a series of measures. Results revealed that these evaluations diverged as a function of self-esteem, which was measured as a proxy for chronic feelings about a partner's regard. Relative to control participants, low self-esteem participants (LSEs) under relationship threat prioritized self-protection goals and pursued these goals by evaluating their relationships and partners more negatively. By psychologically distancing themselves from their partners, LSEs sought to minimize the importance of the relationship and shelter themselves from the pain of anticipated rejection. High self-esteem participants (HSEs), however, responded to rejection concerns by prioritizing connectedness goals. They enacted these goals by making more *positive* relationship evaluations relative to control participants. Confidence in their partners' continued acceptance allowed them to override self-protective concerns and approach their partners in the face of a threat.

The conflict between self-protection goals and intimacy goals not only affects relationship evaluations but also everyday relationship behavior. A daily diary study of married couples revealed that the goals people prioritized in response to actual relationship stressors again hinged on chronic perceived regard (Murray, Bellavia, Rose, & Griffin, 2003). Following days in which they felt hurt by their partners, LSE participants prioritized self-protective goals and behaved accordingly. They reported distancing themselves from their partners by treating them in more critical and cold ways. In contrast, HSE participants reacted to perceived hurts by prioritizing connectedness goals on the following day. They reported feeling closer and being warmer and more positive toward their partners. Thus, they compensated for feelings of vulnerability by drawing closer to their partners and by responding in a constructive manner.

As might be expected, the interplay between self-protection and connectedness goals has a profound influence on relationship outcomes. Prioritizing and pursuing self-protection goals often undermines relationship quality and has the ironic impact of eliciting the rejection experiences that people aim to avoid. Relationship devaluation that is driven by self-protection goals is often exacerbated over time (Murray, Holmes, & Griffin, 2000). Behavioral attempts to protect

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oneself from rejection can also erode romantic partners' satisfaction over time and greatly heighten the likelihood of relationship dissolution (Murray et al., 2003). These effects contrast with those that arise from the pursuit of connectedness goals. Though prioritizing these goals in the face of threat is risky, doing so often heightens satisfaction and commitment over time and thereby increases the likelihood that romantic partners will stay together (Murray et al., 2000; Wieselquist, Rusbult, Foster, & Agnew, 1999).

The experience of goal conflict that arises between the motivation to seek closeness with relationship partners and the motivation to avoid rejection experiences is highly influential in interpersonal relationships. However, it is merely one example of how people regulate multiple goals in interpersonal contexts. Motivational dilemmas are common in close relationships, though the specific goal content and the consequences for relationship functioning often differ.

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Other Intergoal Dynamics in Romantic Relationships

In addition to balancing connectedness with self-protection, romantic relationships also present people with other approach–avoidance goal conflicts. Perhaps the most commonly researched example of this occurs in situations where one's romantic partner commits a transgression. Interdependent partners inevitably behave badly toward each other and, though common, responses to such behaviors require the partners to enact one of two potential goals. They may respond in kind and treat their partner negatively in an avoidance-driven attempt to hurt their partner or terminate the relationship. Alternatively, they may accommodate their partner's poor behavior and forgive their transgressions in an approach-directed effort to repair the relationship. The extent to which people respond constructively to a partner's transgressions is highly linked to relationship well-being, as a greater tendency to accommodate is associated with more positive relationship outcomes (Gottman, 1998; Rusbult, Bissonnette, Arriaga, & Cox, 1998; Rusbult, Verette, Whitney, Slovik, & Lipkus, 1991).

What determines whether people remain benevolent in the face of their partner's transgressions or lash out and reciprocate bad behavior? Research has shown that people who hold strong relationship maintenance goals, such as those who are highly committed to their relationships (Rusbult et al., 1991) and those who readily engage in perspective taking (Arriaga & Rusbult, 1998), are more likely to engage in accommodative behavior. Recent work has begun to shed light on the processes underlying this phenomenon. Finkel and Campbell (2001) demonstrated that inhibiting the goal to respond destructively to a partner's bad behavior requires self-control. They found that participants whose regulatory resources had been depleted by an earlier emotion-suppression task reported less willingness to respond to their partners' transgressions constructively relative to participants who had not been depleted. These effects remained even when the authors controlled for relationship commitment, suggesting that pursuing relationship maintenance goals in such situations is a relatively effortful process even for those with relatively strong relationship goals. More recently, it has been suggested that those who repeatedly engage in prosocial behavior (e.g., highly agreeable people)

accommodate bad behavior less effortfully (Perunovic & Holmes, 2008) and that for such people the inhibition of destructive responses may be relatively automatic.

In addition to negotiating approach-directed goals with avoidance-directed goals, it is common for romantically involved people to experience competition between two approach-motivated goals. One prevalent instance of this that has seen considerable research attention occurs when conflict arises between a desire to maintaining one's current relationship and the temptation to pursue available alternative partners. Although close relationships offer opportunities for intimacy and closeness, the availability of attractive alternative partners can often be an alluring incentive that may spur people to direct regulatory efforts away from the goal to maintain their current relationship and toward the goal of pursuing a novel romantic encounter (Johnson & Rusbult, 1989; Lydon, Meana, Sepinwall, Richards, & Mayman, 1999).

Prior research has suggested that relationship commitment plays a critical role in determining how people negotiate these competing goals. Those who are highly committed to their relationships (and presumably hold stronger relationship-maintenance goals) engage in a variety of strategies to minimize the appeal of attractive alternatives and thus are less likely to pursue them. In a variety of experimental investigations, those who are highly committed to their current relationships derogate alternative partners by evaluating them more negatively relative to those who are less committed to their current relationships or those not in relationships at all (Johnson & Rusbult, 1989; Lydon et al., 1999; Ritter, Karremans, & van Schie, 2010; Simpson, Gangestad, & Lerma, 1990). Interestingly, people intensify such efforts according to the relative strength of the alternative goal. That is, highly committed people engage in the most derogation of alternative partners when those partners strongly threaten relationship-maintenance goals, for example, when they believe the attractive alternatives are attracted to *them* (e.g., Lydon et al., 1999) or when they believe the alternative partners are not romantically attached (Lydon, Fitzsimons, & Naidoo, 2003). Less-committed people, who hold relatively weak relationship maintenance goals, are much less likely to shield these goals from alternative opportunities and thus are more apt to direct their regulatory efforts toward these opportunities and away from their current relationship.

Much of the work to date has implied that resisting the temptation to pursue alternative partners results from relatively controlled processes. That is, many of the studies examining derogation of alternatives have used explicit self-report measures to determine participants' judgments of alternative targets and their attraction to them. As well, Ritter et al. (2010) recently demonstrated that romantically involved participants were less likely to derogate alternatives when regulatory resources were depleted, suggesting that this process requires people to exert self-control in order to protect their relationships from threat. However, there is growing evidence to suggest that people with strong relationship maintenance goals can also shield these goals automatically. For example, participants whose relationship goals were active demonstrated less visual attention to photographs of opposite-gender people relative to those in a control condition when those people were highly attractive (Maner, Rouby, & Gonzaga, 2008). As well, participants with

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strong maintenance goals exhibit less behavioral mimicry of attractive opposite-gender others (Karremans & Verwijmeren, 2008), a relatively nonconscious process that likely reflects a lack of motivation to facilitate social interaction (Cheng & Chartrand, 2003).

The pursuit of multiple interpersonal goals is a relatively common phenomenon. However, interpersonal goals not only interact with one another, but also influence (and are influenced by) noninterpersonal goals as well. Specifically, people must often balance the pursuit of relational goals with the pursuit of self-goals. Goal content plays a particularly important role in how people cope with simultaneous self-regulatory demands inherent in these types of intergoal relationships. One such example of this can be seen in an emerging body of work exploring how individual goals and relationship goals interact with each other to affect outcomes in both domains.

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Personal and Interpersonal Goals

Conflict between personal goals (i.e., career, financial, and self-improvement goals) and interpersonal goals (i.e., family, romantic, and friendship goals) is particularly common in everyday life (Kumashiro, Rusbult, & Finkel, 2008). For example, an individual may frequently feel torn about whether to work late (advancing career goals) or return home early to spend time with her family (advancing social goals). According to the model of *personal–relational equilibrium* presented by Kumashiro et al., maintaining an optimal balance between personal and relational concerns is a regular but important self-regulatory task.

The model distinguishes between two forms of self-regulation. The first category is *personal concerns*, defined as actions taken for the self, including those driven by such personal or self-oriented needs as autonomy or mastery, and those driven by personal or self-oriented goals, such as those for individual growth or self-improvement. This category would include things like career goals, health or appearance goals, financial goals, recreational goals, and academic achievement goals. The second category is *relational concerns*, defined as actions taken for relationships, including those driven by such interpersonal needs as connectedness and belonging, and those driven by interpersonal or relationship goals such as increased intimacy or support. This latter category of goals includes goals to protect the relationship and be a good partner, such as by providing good social support.

This argument parallels one outlined in optimal distinctiveness theory, which suggests that individuals are motivated to seek a perfect balance in their social identities, between the goal to assimilate, to fit in to important social groups, and the goal to differentiate, to feel like a distinct individual with unique characteristics (Brewer, 1991). Like optimal distinctiveness, the personal-relational equilibrium model predicts that individuals are motivated to preserve a balance between two opposing motives. Thus, the model predicts that when individuals stray too far from the ideal balance of personal and relational success (the ideal balance itself can vary from person to person), they will feel a strong drive to move back toward balance.

Several studies provided support for the need to restore equilibrium between personal and relational goals (Kumashiro et al., 2008). In one experiment, participants received false feedback indicating that they were likely to experience future equilibrium between personal and relational goals or that one of these goals would dominate future self-regulation. When participants anticipated future overweighting of personal concerns (personal disequilibrium), they showed greater commitment and motivation toward the relational domain and lower commitment and motivation toward the personal domain. The complementary pattern emerged for participants who were led to anticipate future overweighting of relational concerns. In a longitudinal study, participants who reported the greatest imbalance between personal and relational goals at the first time period ultimately reported lower well-being and physical and mental health.

Recent experimental findings may offer insight into one potential mechanism by which individuals may be reminded of goal imbalances, which may prompt individuals to seek to restore balance (Chua, Fitzsimons, & Holmes, 2010). Several studies tested the hypothesis that when individuals have to make a choice between personal and interpersonal goals, they feel a lingering negative affect toward the chosen goal, which serves to remind them of the neglected goal. In several experimental studies (Chua et al., 2010), participants who were reminded of the fact that you "can't have it all"—for example, that relationship goals and academic achievement goals compete for resources like time and energy—responded by moving closer to their higher priority goal, as would be predicted by basic goal theories (Lewin, 1951). However, importantly, they also felt lingering negativity and ambivalence toward the chosen goal. A follow-up study showed that this feeling of negativity predicted subsequent goal balancing—that is, when faced with the same choice on a subsequent occasion, lingering negative affect toward the higher-priority goal predicted a choice that was consistent with the lower-priority goal. Thus, it seems that affect may play a role in guiding individuals back toward a balance of their personal and interpersonal goals.

When Social Goals Impair Individual Goals

People's attempts to maintain equilibrium between relational and personal goals may be disrupted when the demands of social goals impede subsequent self-regulation of individual goal pursuits. In most interpersonal interactions, people likely adopt goals that facilitate positive social experiences. When on a first date with an attractive potential romantic partner, a person may engage in a variety of impression management goals to ingratiate him- or herself to that person. Or perhaps interacting with an overbearing boss encourages one effortfully to inhibit contrary opinions to avoid conflict. Though such goals may serve to facilitate successful social interactions, they also compete for regulatory resources and thereby impede one's ability to pursue other goals during and immediately following such experiences. Evidence of this can be seen in many domains. However, it is particularly common in interracial interactions, which appear to motivate people to engage in impression management strategies that tax self-regulatory ability.

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For many individuals (at least in the United States, where the majority of this research has been conducted), interracial interactions elicit concerns about inadvertently appearing prejudiced. These concerns drive individuals to monitor thoughts and behaviors continually to reduce the likelihood that their interaction partners will (mis)perceive racial bias (Devine, Plant, Amodio, Harmon-Jones, & Vance, 2002; Monteith, 1993). However, such efforts at behavioral inhibition consume resources and thus impair later attempts at self-regulation (Richeson & Shelton, 2003; Richeson & Trawalter, 2005; Richeson, Trawalter, & Shelton, 2005).

For example, Richeson and Trawalter (2005) demonstrated that increases in motivation to appear unbiased during an interaction with a Black confederate impaired White participants' performance on a subsequent self-regulation task. In one study, participants who completed an implicit measure of racial bias were given false feedback indicating that they exhibited prejudicial tendencies. Following this, participants encountered a Black confederate or a White (same-race) confederate before completing a Stroop task. Consistent with the authors' hypothesis, participants who interacted with a Black confederate displayed impaired self-regulatory ability as operationalized by performance on the Stroop task relative to participants who interacted with a White confederate. Moreover, this effect was exacerbated among participants whose motivation to appear unbiased in the interaction was heightened by prejudice concerns brought about by earlier false feedback. Additional studies further revealed that subsequent impairment was attenuated when regulatory demands during the interaction were reduced, for example, by providing participants with a script to follow (Richeson & Trawalter, 2005).

Though regulatory efforts to avoid appearing prejudiced are designed to facilitate social interactions, the depletion of regulatory resources can actually lead to *poorer* social experiences. For example, one study found that participants in interracial interactions rated the interactions more positively when their ability to self-regulate had been depleted by an earlier task. When participants were able to regulate their behavior, they exhibited more controlled responses that thwarted their ability to enjoy their interaction. Ironically, these people were also rated as being *more* prejudiced by an independent group of Black raters who viewed videotapes of participants' behavior (Apfelbaum & Sommers, 2009). Thus, the goal to present a certain self-view—in this case, of a nonracist—can ironically lead to more negative social interactions, a finding that echoes the classic self-completion studies (Gollwitzer & Wicklund, 1985) in their demonstration that individuals who felt "incomplete" in a certain domain of their self-concept would ignore others' perspectives in their drive to feel like themselves again.

The detrimental impact of social goals on subsequent self-regulation is not limited to interracial interactions. Vohs et al. (2005) found that attempts to regulate behavior in other relational situations also impair later regulatory ability. For example, participants who were randomly assigned to interact with a same-gender friend or a confederate were instructed to respond to questions about themselves in either a modest or self-enhancing manner. The authors hypothesized that regulating impression management in these contexts would produce different

regulatory demands for participants. They predicted that participants who interacted with friends would exert greater effort in controlling their responses in the self-enhancing condition, as it would require them to override the familiar tendency to not be overly boastful with close others. However, participants who interacted with strangers would regulate themselves more when attempting to respond modestly because it would require them to counteract the well-practiced behavior of attempting to make a favorable impression with a new acquaintance. Results bore out these predictions as participants persisted longer on a complicated math task when under less regulatory pressure (i.e., when self-enhancing with strangers and being modest with friends).

The research described above has demonstrated how goals that are adopted explicitly to engender positive social experiences can impede later self-regulatory ability. One implication of these studies is that some interactions require greater regulatory expenditure than others and may preclude people from completing goals that they might otherwise handle with ease. The hypothesis that high-maintenance interactions are more taxing than low-maintenance interactions has received recent empirical support (Finkel et al., 2006). In a series of studies, Finkel and colleagues manipulated the amount of regulatory effort required to fulfill social coordination goals and examined subsequent self-regulatory ability in a number of domains. For example, one experiment had participants paired with a confederate to complete a maze task. In this task, participants were blindfolded and used a computer joystick to navigate the maze while relying on the confederate's verbal assistance. In one condition, confederates were deliberately instructed to make a series of errors, thus frustrating social coordination efforts. Following this, participants completed a number of analytical problems that required regulatory efforts. Results revealed that participants solved fewer problems when regulatory resources had been previously depleted by a difficult social coordination experience than when they had a low-maintenance interaction. A similar pattern of results was observed when examining other measures of self-regulation such as fine motor control and persistence on a physically demanding task (Finkel et al., 2006).

Taken together, the research described above provides ample evidence that goals that serve to facilitate positive interactions with others, such as impression management and social coordination, can impede subsequent self-regulation. Although managing individual goals and social goals is a common and essential part of daily life, intergoal dynamics often plays a role in determining the progress that is made toward each goal. To be sure, interpersonal relationships offer a host of benefits for psychological and physical well-being, and coordinating goal efforts with others often serves to accomplish goals that could not be achieved alone. However, to the extent that social interactions are difficult, they can present a serious obstacle to successful individual self-regulation by drawing regulatory resources away from other goals.

SUMMARY

Overall, the above research highlights the importance of goal content to intergoal dynamics. Just as research into basic processes of multiple goal pursuit

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plays an important role in progressing research in all domains, investigation of domain-specific self-regulation may contribute to a more thorough understanding of how people navigate among multiple goals. Regulatory strategies that are designed to address domain-specific regulatory challenges may generalize to other contexts and thus inform novel insights into basic intergoal processes. In particular, examining concurrent goal pursuit within interpersonal relationships may continue to be particularly useful, as these contexts often afford the opportunity to pursue several goals. Just as relationship threat induces prioritization of self-protection goals over connectedness goals (Murray et al., 2006), further research may serve to highlight additional situational variables that influence how people coordinate goals or prioritize conflicting goals in a number of diverse interpersonal situations.

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THE FUTURE OF INTERGOAL RESEARCH

In examining the research summarized above, it is clear that work conducted in the past decade has contributed a great deal to the field's theoretical understanding of intergoal dynamics. Recent research has provided evidence for several self-regulatory mechanisms that allows people to manage pursuit of multiple goals and has also informed the development of new perspectives in several subdomains of social psychology. Whereas discussion of simultaneous pursuit of multiple goals was virtually nonexistent until recently, it is now considered by many to be a fundamental part of personal and interpersonal life. Continuation of this work may help not only to identify other areas in which intergoal dynamics are highly influential, but also to address some of the unresolved issues inherent in the literature.

It is important that researchers continue to examine the implications of intergoal dynamics to specific domains. Adopting an intergoal perspective to research may yield several important insights for a variety of important behaviors. Many health-related behaviors such as smoking or unsafe sex are characterized by goal conflict and may be better understood when framed in this way. One recent example of this approach can be found in the goal-conflict model of eating (Stroebe et al., 2008), which adopts a regulatory perspective to examine the problem of dieting failure. This model asserts that dieters' behavior is characterized by the competing goals of maintaining their weight and enjoying food. When food primes are salient, the enjoyment goal takes priority and inhibits the weight control goal (Shah & Kruglanski, 2002), resulting in disinhibited eating in the moment and unsuccessful dieting over time. It is likely that the regulatory processes outlined in this conceptualization of dieting behavior are influential in explaining other health-related behavior as well, and further investigation is warranted to examine how intergoal dynamics influence outcomes in these domains.

The progress that has been made toward understanding intergoal dynamics in recent years is remarkable. Yet there are still many areas in which research is necessary to expand our knowledge of this pervasive phenomenon. One major limitation of existing research is that most investigations into multiple goals have usually examined only two goals. That is, many of the studies we have referred to in this chapter have investigated how self-regulatory efforts on a single goal

influence or are influenced by the presence of a second goal. Although a large part of self-regulation is characterized by conflict between two specific goals, examining intergoal dynamics in this manner somewhat oversimplifies the true nature of self-regulation, as people are often required to pursue several goals at once. Fitness goals, career goals, financial goals, and relationship goals among others all vie for regulatory attention, yet little is currently known about the relationships that exist between these superordinate goals and their various subgoals. Although laypeople are fascinated with the idea of multitasking and devote a considerable amount of money to consumer goods that offer the promise of greater progress toward an ever-growing number of goals, the processes that contribute to successful management of several regulatory pursuits are still relatively unknown. Increased attention by social psychologists to intergoal dynamics may contribute to the development of novel theoretical perspectives on self-regulation and may have several important practical applications as well.

Another important avenue for future research is to examine the extent to which processes underlying intergoal dynamics result from automatic or controlled processes. The research described in this chapter has varied in its characterization of intergoal processes as being either automatic and relatively nonconscious or controlled and requiring executive control. Understanding of these processes would benefit from more rigorous investigations into the cognitive mechanisms underlying them. It is apparent that multiple goals can be activated nonsconsciously, yet the degree to which people are aware of or can control the strategies used to regulate them is less clear and has rarely been the direct focus of empirical study. Future research into how the regulatory processes that are used to manage the pursuit of multiple goals may be affected by the availability or absence of executive control and may prove particularly fruitful, possibly enhancing the understanding of intergoal dynamics greatly.

Broadening the scope of self-regulatory investigations would also inform the development of a framework for studying multiple goal pursuit. There is currently no unifying theoretical model that deals with the pursuit of multiple goals, and this likely restricts the development of novel and empirically testable hypotheses. However, there are several theories that may provide the foundation for a more comprehensive model of intergoal dynamics. By advocating a cognitive approach to the study of motivation, goal-systems theory (Kruglanski et al., 2002) has greatly advanced self-regulation research and has provided the broadest characterization of multiple goal pursuit to date. Indeed, a significant portion of the research presented here is rooted in goal-systems theory and suggests that further work to test, refine, and expand the theory may make it even more influential. Similarly, work on the interpersonal risk regulation model (Murray et al., 2006, 2008; Murray & Holmes, 2009) has generated many insights into how people manage relationship-specific goal conflict. Although much of the work supporting this model has been conducted in a specific domain, there is evidence to suggest that risk-regulation processes may influence self-regulation in more general ways (Cavallo, Fitzsimons, & Holmes, 2009, 2010). Some of the theoretical advances in the risk-regulation model may serve to inform the development of a more global theory of intergoal dynamics.

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Finally, further analysis into the contexts and situations that shift relationships between multiple goals is necessary to understand fully the implications of self-regulation. Though some researchers (e.g., Fishbach & Zhang, 2008) have begun to explore how situational constraints moderate the relationship between goals, current discussions have centered largely on demonstrating how goals facilitate or impede one another. Little is currently known about other types of interactive effects. Perhaps certain goals have multiplicative effects, or maybe certain goals, once activated, supersede all others. We speculate that goals not only differ in characteristics such as motivational strength, priority, and commitment, but they also have qualitative differences that are heretofore unexplored.

Though more work is needed to explore intergoal dynamics fully, the burgeoning interest in this topic is promising. Further investigations not only have the opportunity to generate a great deal of exciting insight into self-regulation but may also contribute to development of many subfields in which motivation is of growing interest. Goal pursuit underlies all of human activity, and a more thorough understanding of how goals conflict with, compete with, help, and hinder one another will prove invaluable in efforts to predict and understand behavior.

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REFERENCES

Apfelbaum, E. P., & Sommers, S. R. (2009). Liberating effects of losing executive control: When regulatory strategies turn maladaptive. *Psychological Science, 20*, 139–143.

Arriaga, X. B., & Rusbult, C. E. (1998). Standing in my partner's shoes: Partner perspective taking and reactions to accommodative dilemmas. *Personality and Social Psychology Bulletin, 24*, 927–948.

Bargh, J. A. (1996). Automaticity in social psychology. In E. T. Higgins & A. W. Kruglanski (Eds.), *Social psychology: Handbook of basic principles* (pp. 169–183). New York: Guilford.

Bauer, I., Wrosch, C., & Jobin, J. (2008). I'm better off than most other people: The role of social comparisons for coping with regret in young adulthood and old age. *Psychology and Aging, 23*, 800–811.

Baumeister, R. F., Bratslavsky, E., Muraven, M., & Tice, D. M. (1998). Ego depletion: Is the active self a limited resource? *Journal of Personality and Social Psychology, 74*, 1252–1265.

Baumeister, R. F., & Leary, M. R. (1995). The need to belong: Desire for interpersonal attachments as a fundamental human motivation. *Psychological Bulletin, 117*, 497–529.

Brewer, M. B. (1991). The social self: On being the same and different at the same time. *Personality and Social Psychology Bulletin, 17*, 475–482.

Carver, C. S., & Scheier, M. F. (1982). Control theory: A useful conceptual framework for personality—social, clinical, and health psychology. *Psychological Bulletin, 92*, 111–135.

Cavallo, J. V., Fitzsimons, G. M., & Holmes, J. G. (2009). Taking chances in the face of threat: Romantic risk regulation and approach motivation. *Personality and Social Psychology Bulletin, 35*, 737–751.

Cavallo, J. V., Fitzsimons, G. M., & Holmes, J. G. (2010). When self-protection overreaches: Relationship-specific threat activates domain-general avoidance motivation. *Journal of Experimental Social Psychology, 46*, 1–8.

Cesario, J., Plaks, J. E., & Higgins, E. T. (2006). Automatic social behavior as motivated preparation to interact. *Journal of Personality and Social Psychology, 90*, 893–910.

Chen, M., & Bargh, J. A. (1999). Consequences of automatic evaluation: Immediate behavioral predispositions to approach or avoid the stimulus. *Personality and Social Psychology Bulletin, 25*, 215–224.

Cheng, C. M., & Chartrand, T. L. (2003). Self-monitoring without awareness: Using mimicry as a nonconscious affiliation strategy. *Journal of Personality and Social Psychology, 85*, 1170–1179.

Chua, S. N., Fitzsimons, G. M., & Holmes, J. G. (2010). *The role of affect in goal conflict*. Unpublished manuscript, University of Waterloo.

Denzler, M., Förster, J., & Liberman, N. (2009). How goal-fulfillment decreases aggression. *Journal of Experimental Social Psychology, 45*, 90–100.

Devine, P. G., Plant, E. A., Amodio, D. M., Harmon-Jones, E., & Vance, S. L. (2002). The regulation of explicit and implicit race bias: The role of motivations to respond without prejudice. *Journal of Personality and Social Psychology, 82*, 835–848.

DeWall, C. N., Baumeister, R. F., Stillman, T. F., & Gailliot, M. T. (2007). Violence restrained: Effects of self-regulation and its depletion on aggression. *Journal of Experimental Social Psychology, 43*, 62–76.

Fedoroff, I. C., Polivy, J., & Herman, C. P. (1997). The effect of pre-exposure to food cues on the eating behavior of restrained and unrestrained eaters. *Appetite, 28*, 33–47.

Finkel, E. J., & Campbell, W. K. (2001). Self-control and accommodation in close relationships: An interdependence analysis. *Journal of Personality and Social Psychology, 81*, 263–277.

Finkel, E. J., Campbell, W. K., Brunell, A. B., Dalton, A. N., Scarbeck, S. J., & Chartrand, T. L. (2006). High-maintenance interaction: Inefficient social coordination impairs self-regulation. *Journal of Personality and Social Psychology, 91*, 456–475.

Fishbach, A., & Dhar, R. (2005). Goals as excuses or guides: The liberating effect of perceived goal progress on choice. *Journal of Consumer Research, 32*, 370–377.

Fishbach, A., Friedman, R. S., & Kruglanski, A. W. (2003). Leading us not into temptation: Momentary allurements elicit overriding goal activation. *Journal of Personality and Social Psychology, 84*, 296–309.

Fishbach, A., & Shah, J. Y. (2006). Self-control in action: Implicit dispositions toward goals and away from temptations. *Journal of Personality and Social Psychology, 90*, 820–832.

Fishbach, A., & Zhang, Y. (2008). Together or apart: When goals and temptations complement versus compete. *Journal of Personality and Social Psychology, 94*, 547–559.

Fishbach, A. Zhang, Y., & Koo, M. (2009). The dynamics of self-regulation. *European Review of Social Psychology, 20*, 315–344.

Fitzsimons, G. M., & Fishbach, A. (2010). Shifting closeness: Interpersonal effects of personal goal progress. *Journal of Personality and Social Psychology, 98*, 535–549.

Fitzsimons, G. M., & Shah, J. Y. (2008). How goal instrumentality shapes relationship evaluations. *Journal of Personality and Social Psychology, 95*, 319–337.

Förster, J., Liberman, N., & Higgins, E. (2005). Accessibility from active and fulfilled goals. *Journal of Experimental Social Psychology, 41*, 220–239.

Gailliot, M. T., Baumeister, R. F., DeWall, C. N., Maner, J. K., Plant, E. A., Tice, D. M., Brewer, L. E., & Schmeichel, B. J. (2007). Self-control relies on glucose as a limited energy source: Willpower is more than a metaphor. *Journal of Personality and Social Psychology, 92*, 325–336.

Gollwitzer, P. M., & Wicklund, R. A. (1985). Self-symbolizing and the neglect of others' perspectives. *Journal of Personality and Social Psychology, 48*, 702–715.

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Gottman, J. M. (1998). Psychology and the study of the marital processes. *Annual Review of Psychology, 49*, 169–197.

Heckhausen, J., Wrosch, C., & Schulz, R. (2010). A motivational theory of life-span development. *Psychological Review, 117*, 32–60.

Higgins, E. T. (1996). Knowledge activation: Accessibility, applicability, and salience. In E. T. Higgins & A. W. Kruglanski (Eds.), *Social psychology: Handbook of basic principles* (pp. 133–168). New York: Guilford.

Johnson, D. J., & Rusbult, C. E. (1989). Resisting temptation: Devaluation of alternative partners as a means of maintaining commitment in close relationships. *Journal of Personality and Social Psychology, 57*, 967–980.

Karremans, J. C., & Verwijmeren, T. (2008). Mimicking attractive opposite-sex others: The role of romantic relationship status. *Personality and Social Psychology Bulletin, 34*, 939–950.

Koo, M., & Fishbach, A. (2008). Dynamics of self-regulation: How (un)accomplished goal actions affect motivation. *Journal of Personality and Social Psychology, 94*, 183–195.

Kruglanski, A. W, Shah, J. Y., Fishbach, A., Friedman, R., Chun, W. Y., & Sleeth-Keppler, D. (2002). A theory of goal systems. In M. P. Zanna (Ed.), *Advances in experimental social psychology* (Vol. 34, pp. 331–378), San Diego, CA: Academic Press.

Kumashiro, M., Rusbult, C. E., & Finkel, E. J. (2008). Navigating personal and relational concerns: The quest for equilibrium. *Journal of Personality and Social Psychology, 95*, 94–110.

Lewin, K. (1935). *A dynamic theory of personality*. New York: McGraw-Hill.

Lewin, K. (1951). *Field theory in social science.* New York: Harper.

Liberman, N., Förster, J., & Higgins, E. T. (2007). Completed vs. interrupted priming: Reduced accessibility from post-fulfillment inhibition. *Journal of Experimental Social Psychology, 43*, 258–264.

Louro, M. J., Pieters, R., & Zeelenberg, M. (2007). Dynamics of multiple-goal pursuit. *Journal of Personality and Social Psychology, 93*, 174–193.

Lydon, J. E., Fitzsimons, G. M., & Naidoo, L. (2003). Devaluation versus enhancement of attractive alternatives: A critical test using the calibration paradigm. *Personality and Social Psychology Bulletin, 29*, 349–359.

Lydon, J. E., Meana, M., Sepinwall, D., Richards, N., & Mayman, S. (1999). The commitment calibration hypothesis: When do people devalue attractive alternatives? *Personality and Social Psychology Bulletin, 25*, 152–161.

MacDonald, G., & Leary, M. R. (2005). Why does social exclusion hurt? The relationship between social and physical pain. *Psychological Bulletin, 131*, 202–223.

Maner, J. K., Rouby, D. A., & Gonzaga, G. C. (2008). Automatic inattention to attractive alternatives: The evolved psychology of relationship maintenance. *Evolution and Human Behavior, 29*, 343–349.

Mann, T., Tomiyama, A. J., Westling, E., Lew, A., Samuels, B., & Chatman, J. (2007). Medicare's search for effective obesity treatments: Diets are not the answer. *American Psychologist, 62*, 220–233.

Metcalfe, J., & Mischel, W. (1999). A hot/cool-system analysis of delay of gratification: Dynamics of willpower. *Psychological Review, 106*, 3–19.

Mischel, W. (1974). Processes in delay of gratification. In L. Berkowitz (Ed.), *Advances in experimental social psychology* (Vol. 7, pp. 249–292). San Diego, CA: Academic Press.

Mischel, W., & Ayduk, O. (2004). Willpower in a cognitive-affective processing system: The dynamics of delay of gratification. In R. F. Baumeister & K. D. Vohs (Eds.), *Handbook of self-regulation: Research, theory, and applications* (pp. 99–129). New York: Guilford.

Mischel, W., & Baker, N. (1975). Cognitive appraisals and transformations in delay behavior. *Journal of Personality and Social Psychology, 31*, 254–261.

Downloaded by [Karen Hudson] at 03:29 22 March 2015

Mischel, W., Ebbesen, E. B., & Zeiss, A. (1972). Cognitive and attentional mechanisms in delay of gratification. *Journal of Personality and Social Psychology, 21*, 204–218.

Mischel, W., Shoda, Y., & Peake, P. K. (1988). The nature of adolescent competencies predicted by preschool delay of gratification. *Journal of Personality and Social Psychology, 54*, 687–696.

Mischel, W., Shoda, Y., & Rodriguez, M. L. (1989). Delay of gratification in children. *Science, 244*, 933–938.

Monteith, M. J. (1993). Self-regulation of prejudiced responses: Implications for progress in prejudice-reduction efforts. *Journal of Personality and Social Psychology, 65*, 469–485.

Muraven, M. (2010). Building self-control strength: Practicing self-control leads to improved self-control performance. *Journal of Experimental Social Psychology, 46*, 465–468.

Muraven, M., & Baumeister, R. F. (2000). Self-regulation and depletion of limited resources: Does self-control resemble a muscle? *Psychological Bulletin, 126*, 247–259.

Muraven, M., Baumeister, R. F., & Tice, D. M. (1999). Longitudinal improvement of self-regulation through practice: Building self-control strength through repeated exercise. *Journal of Social Psychology, 139*, 446–457.

Muraven, M., Tice, D. M., & Baumeister, R. F. (1998). Self-control as limited resource: Regulatory depletion patterns. *Journal of Personality and Social Psychology, 74*, 774–789.

Murray, S. L., Bellavia, G. M., Rose, P., & Griffin, D. W. (2003). Once hurt, twice hurtful: How perceived regard regulates daily marital interactions. *Journal of Personality and Social Psychology, 84*, 126–147.

Murray, S. L., Derrick, J. L., Leder, S., & Holmes, J. G. (2008). Balancing connectedness and self-protection goals in close relationships: A levels-of-processing perspective on risk regulation. *Journal of Personality and Social Psychology, 94*, 429–459.

Murray, S. L., & Holmes, J. G. (2009). The architecture of interdependent minds: A motivation-management theory of mutual responsiveness. *Psychological Review, 116*, 908–928.

Murray, S. L., Holmes, J. G., & Collins, N. L. (2006). Optimizing assurance: The risk regulation system in relationships. *Psychological Bulletin, 132*, 641–666.

Murray, S. L., Holmes, J. G., & Griffin, D. W. (2000). Self-esteem and the quest for felt security: How perceived regard regulates attachment processes. *Journal of Personality and Social Psychology, 78*, 478–498.

Murray, S. L., Rose, P., Bellavia, G. M., Holmes, J. G., & Kusche, A. G. (2002). When rejection stings: How self-esteem constrains relationship-enhancement processes. *Journal of Personality and Social Psychology, 83*, 556–573.

Oaten, M., & Cheng, K. (2006a). Improved self-control: The benefits of a regular program of academic study. *Basic and Applied Social Psychology, 28*, 1–16.

Oaten, M., & Cheng, K. (2006b). Longitudinal gains in self-control from regular physical exercise. *British Journal of Health Psychology, 11*, 717–733.

Papies, E. K., Stroebe, W., & Aarts, H. (2009a). Understanding dieting: A social cognitive analysis of hedonic processes in self-regulation. *European Review of Social Psychology, 20*, 339–383.

Papies, E. K., Stroebe, W., & Aarts, H. (2009b). Who likes it more? Restrained eaters' implicit attitudes towards food. *Appetite, 53*, 279–287.

Pashler, H. (1994). Dual-task interference in simple tasks: Data and theory. *Psychological Bulletin, 116*, 220–244.

Perunovic, M., & Holmes, J. G. (2008). Automatic accommodation: The role of personality. *Personal Relationships, 15*, 57–70.

Downloaded by [Karen Hudson] at 03:29 22 March 2015

Reis, H. T., & Shaver, P. (1988). Intimacy as an interpersonal process. In S. Duck, D. F. Hay, S. E. Hobfoll, W. Ickes, & B. M. Montgomery (Eds.), *Handbook of personal relationships: Theory, research and interventions* (pp. 367–389). Oxford, Engl.: Wiley.

Richeson, J. A., & Shelton, J. N. (2003). When prejudice does not pay: Effects of interracial contact on executive function. *Psychological Science, 14*, 287–290.

Richeson, J. A., & Trawalter, S. (2005). Why do interracial interactions impair executive function? A resource depletion account. *Journal of Personality and Social Psychology, 88*, 934–947.

Richeson, J. A., Trawalter, S., & Shelton, J. N. (2005). African Americans' implicit racial attitudes and the depletion of executive function after interracial interactions. *Social Cognition, 23*, 336–352.

Riediger, M., & Freund, A. M. (2004). Interference and facilitation among personal goals: Differential associations with subjective well-being and persistent goal pursuit. *Personality and Social Psychology Bulletin, 30*, 1511–1523.

Ritter, S. M., Karremans, J. C., & van Schie, H. T. (2010). The role of self-regulation in derogating attractive alternatives. *Journal of Experimental Social Psychology, 46*, 631–637.

Rusbult, C. E., Bissonnette, V. L., Arriaga, X. B., & Cox, C. L. (1998). Accommodation processes during the early years of marriage. In T. N. Bradbury (Ed.), *The developmental course of marital dysfunction* (pp. 74–113). New York: Cambridge University Press.

Rusbult, C. E., Verette, J., Whitney, G. A., Slovik, L. F., & Lipkus, I. (1991). Accommodation processes in close relationships: Theory and preliminary empirical evidence. *Journal of Personality and Social Psychology, 60*, 53–78.

Shah, J. Y., Friedman, R., & Kruglanski, A. W. (2002). Forgetting all else: On the antecedents and consequences of goal shielding. *Journal of Personality and Social Psychology, 83*, 1261–1280.

Shah, J. Y., & Kruglanski, A. W. (2002). Priming against your will: How accessible alternatives affect goal pursuit. *Journal of Experimental Social Psychology, 38*, 368–383.

Shoda, Y., Mischel, W., & Peake, P. K. (1990). Predicting adolescent cognitive and self-regulatory competencies from preschool delay of gratification: Identifying diagnostic conditions. *Developmental Psychology, 26*, 978–986.

Simpson, J. A., Gangestad, S. W., & Lerma, M. (1990). Perception of physical attractiveness: Mechanisms involved in the maintenance of romantic relationships. *Journal of Personality and Social Psychology, 59*, 1192–1201.

Stroebe, W. (2008). *Dieting, overweight, and obesity: Self-regulation in a food-rich environment*. Washington, DC: American Psychological Association.

Stroebe, W., Mensink, W., Aarts, H., Schut, H., & Kruglanski, A. W. (2008). Why dieters fail: Testing the goal conflict model of eating. *Journal of Experimental Social Psychology, 44*, 26–36.

Vohs, K. D., Baumeister, R. F., & Ciarocco, N. J. (2005). Self-regulation and self-presentation: Regulatory resource depletion impairs impression management and effortful self-presentation depletes regulatory resources. *Journal of Personality and Social Psychology, 88*, 632–657.

Wieselquist, J., Rusbult, C. E., Foster, C. A., & Agnew, C. R. (1999). Commitment, pro-relationship behavior, and trust in close relationships. *Journal of Personality and Social Psychology, 77*, 942–966.

Wrosch, C., & Heckhausen, J. (2002). Perceived control of life regrets: Good for young and bad for old adults. *Psychology and Aging, 17*, 340–350.

Zeigarnik, B. (1927). Das Behalten erledigter und unerledigter Handlungen [The memory of completed and uncompleted actions]. *Psychologische Forschung, 9*, 1–85.

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10

Control, Consciousness, and Agency

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If you find yourself in the local fast-food establishment, eating a juicy cheeseburger with fries just a day after you promised yourself that you would lose a few pounds, you are yet again confronted with the fact that behavior is not always easy to control. People have always done things against their better judgment, in fact, Plato and Socrates wrote about this reality (see Davidson, 1980; Myrseth & Fishbach, 2009). Socrates called the experience of acting against one's will *akrasia*, which can roughly be translated as "weakness of will."

Blatant instances of failures of self-control cause us to wonder why this happens so easily. Why did I smoke two (or was it even three?) cigarettes last night at my colleague's wedding, after I have managed not to touch any cigarettes for months? Why did I drive 115 mph on the interstate when I had decided to drive more slowly after receiving a few speeding tickets in the last week? It often feels as if we are perfectly in control—we do what we want to and should do, and avoid doing bad things—whereas on other occasions we find ourselves doing something so clearly unintelligent.

Early theorists who examined the role of the (weakness of the) will in human control proposed that people's behavior is often governed by impulses and automatized stimulus-response links (habits), and that such automatic responses to stimuli are uncontrollable unless an inner force could take a hold off them (Ach, 1910). This inner force that pertains to the will has also been labeled in several other ways, such as volition, self-determination, and commitment, and it forms the core aspect of modern views on the role of consciousness in self-control and the regulation of behavior. Irrespective of the exact labels, findings of many studies suggest

that the human ability to counteract habits and impulses by the will is not well developed; habits and impulses easily intrude and produce errors and action slips that go against the will (Heckhausen & Beckmann, 1990; Reason, 1979). This apparent weakness of the will makes the study on the control of human behavior important and intriguing.

In this chapter, we will explore what may be called the essence of control and the difference between two different but related psychological phenomena. The first is the *feeling of control*. This refers to the subjective experience of controlling an action, or the feeling of agency. The second is *actual control*, which pertains to these instances in which we actually start actions, or stop or change the course of ongoing actions. Recent insight from psychological and neuroscientific research shows that these two phenomena or processes are very different. The feelings of control, or more broadly, the feeling of conscious will (Wegner, 2002), relies on conscious experiences and its assumed relation with behavior. Because feelings of control rely on consciousness, people have long thought that actual behavioral control also relies on consciousness. However, as we will see later on, this is not the case.

After distinguishing actual control from feelings of control, this chapter will continue with recent developments that have illuminated our understanding of actual control and changed the way we should address and examine the mechanisms that enable people to control and regulate their own behavior. More precisely, we define control as a specific instance of a goal (Dijksterhuis, 2010; Moors & De Houwer, 2006), and use recent insights from the literature on goal-directed behavior to demonstrate that actual behavioral control relies on attention and not on consciousness per se. In the second part of this chapter, we examine the feeling of control in more detail. Recent developments in the literature on the feeling of control suggest that our sense of self-agency (the feeling of causing one's own actions and resulting outcomes) is largely the product of an inference process. That is, whereas most people share the experience and belief that they intentionally can and do control their own behavior—assessed by measures like perceived behavioral control (Ajzen, 1991) or self-efficacy (Bandura, 1986)—the feeling of control is a result rather than a cause of behavior.

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CONTROL VERSUS THE FEELING OF CONTROL

Ziehen (1899) published one of the first theories on the distinction between control and the feeling of control. He held that merely thinking about oneself before an action leads to the experience of agency, or the feeling of control. He stated:

> [W]e finally come to regard the ego-idea as the cause of our actions because of its very frequent appearance in the series of ideas preceding each action. It is almost always represented several times among the ideas preceding the final movement. But the idea of the relation of causality is an empirical element that always appears when two successive ideas are very closely associated. (Ziehen, 1899, p. 296; see also Dijksterhuis, Preston, Wegner, & Aarts, 2008; Wegner, 2002)

The notion that feelings of control derive from an assumed causal relation between thinking about an action and the action itself was further explored and investigated by Wegner (2002; see also Wegner & Wheatley, 1999). Wegner presented a theory on how (and even why) we experience conscious will. Both conscious thoughts about an action as well as actions themselves are produced by unconscious processes (Libet, Gleason, Wright, & Pearl, 1983). However, when a thought precedes a corresponding action, we may feel the action is "willed" and caused by the conscious thought. Wegner and colleagues also explored the parameters that moderate such feelings of control; for instance, a relevant thought a few seconds before an action leads to stronger feelings of will than a thought half a minute prior to an action. In addition, they studied feelings of lack of agency or control that may arise in the absence of prior conscious thoughts. People can instigate and control actions without realizing it. Wegner's work on agency will be discussed more thoroughly in the second part of this chapter. For now, it is important to realize that feelings of control are caused by corresponding conscious thoughts, but that these corresponding thoughts do not necessarily cause actual control.

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CONTROL IS A GOAL

Perhaps because consciousness is vital for the feelings of control, it has long been seen as vital for actual control. In the 1970s, the prevailing view on control was that it was the counterpart of automaticity (Posner & Snyder, 1975). Automatic action was *unintentional*, it did not need *attention*, it occurred outside of *conscious awareness*, and once started, it was *uncontrollable*. Conversely, controlled action was intentional, effortful, controllable, and dependent on conscious guidance. This dichotomy—at least in its strictest sense—was soon abandoned as it did not capture the full range of human behaviors very well. In fact, behavior is rarely controlled on all dimensions, and although behavior that is fully automatic does exist, such behaviors (e.g., reflexes) are not the ones psychologists are usually interested in. Later, the dominant view became that these four dimensions (or "the four horsemen," see Bargh, 1994) should be treated as being at least partly independent. Most behavior is automatic on some dimensions and controlled on others. For instance, driving a car is largely effortless (at least for a skilled driver) and many of the subactions required do not need any conscious guidance. However, it is clearly intentional and controllable. This taxonomy has been extremely helpful in understanding various social psychological phenomena, including key social psychological processes such as attitudinal processes as well as prejudice.

Later, the way we conceive of control changed as a result of new insights into the domain of goals (Dijksterhuis, 2010; Moors & De Houwer, 2006). A key psychological distinction is whether behavior is voluntary or not. Some behavior is goal dependent and, hence, only evoked when a specific goal is active. One could argue, as Moors and De Houwer did, that control does not warrant such a special status, as control is simply a specific goal. Control is the goal to start behavior, or to stop and change what one is currently doing.

Defining control as a specific goal has consequences for how we should understand control. After all, recent research shows that goals can be pursued

independently of conscious experience. That is, well-learned goals can be unconsciously triggered by the environment. Bargh, Gollwitzer, Lee-Chai, Barndollar, and Trotschel (2001) unobtrusively exposed experimental participants to terms such as "strive" and "succeed" to prime the goal to achieve (a goal held by most students). Participants were then given the opportunity to perform well on an anagram task. On this task, participants primed with an achievement goal outperformed those who had not been primed with the goal. This study also demonstrated that such goal priming leads to qualities associated with motivational states or "goal directedness," such as persistence and increased effort in working toward a goal. These and many other recent studies (e.g., Aarts, Custers, & Marien, 2008; Lakin & Chartrand, 2003; Oikawa, 2004; Shah, Friedman, & Kruglanski, 2002; Sheeran et al., 2005) have shown that the mere activation of a goal representation suffices to motivate people to work on the primed goal without any conscious thought (for a review, see Custers & Aarts, 2010).

In a recent experiment, Holland, Hendriks, and Aarts (2005) examined whether the mere perception of odor is capable of directly activating goals. They exposed some participants to the scent of an all-purpose cleaning product without participants' conscious awareness of the presence of the scent. Because the scent of all-purpose cleaner was assumed to activate the goal of cleaning, these authors hypothesized that participants exposed to the scent would spontaneously start to keep their environment cleaner. Participants were requested to eat a very crumbly cookie while sitting at a table in the lab, and indeed, participants—who were secretly videotaped—exposed to the scent spent more effort in keeping their direct environment clean and crumb-free. Specifically, participants who were unconsciously exposed to the scent of all-purpose cleaner more strongly attended to and monitored their direct environment in line with the primed goal of keeping the environment clean and wiped off the crumbs they accidentally dropped on the table in a swift and easy manner without being aware of acting on the goal. This shows that goals have their effects on overt behavior via the operation of an attention-control process that runs outside of conscious awareness (for another demonstration of such an unconscious attention-control process in the context of goal-directed eye and hand movement coordination behavior, see Fourneret & Jeannerod, 1998).

In sum, goals can guide our actions without conscious support. Instead, the vehicle with which goals affect our actions is attention. We need attention to pursue goals, but not necessarily consciousness. The fact that goals are the main determinants of the amount of attention taken up by different psychological processes (Aarts, 2007a; Badgaiyan, 2000; Dijksterhuis & Aarts, 2010; Hassin, Aarts, Eitam, Custers, & Kleiman, 2009) will be discussed in the next section, but first, we will briefly address the distinction between attention and consciousness. One may mistakenly equate attention with consciousness, and—given that goals guide attention—incorrectly assume that goals originate in consciousness. However, attention and consciousness are not the same. In fact, recent conceptualizations even treat attention and consciousness as orthogonal (Dehaene, Changeux, Naccache, Sackur, & Sergent, 2006; Koch & Tsuchiya, 2006; Lamme, 2003).

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Although it is true that a stimulus that one attends to is more likely to enter consciousness than a stimulus that one does not attend to, attention and consciousness are independent (e.g., Lamme, 2003). For instance, we know that subliminal priming of stimuli—unconscious by definition—only has an effect when attention is paid to the stimuli while they are presented (Koch & Tsuchiya, 2006). Rather than a cause for conscious awareness, attention is better understood as the extent to which the brain processes an incoming stimulus, or perhaps as the effort the brain puts into processing a stimulus to produce and control behavior.

It is extremely important to realize that there is no one-to-one relation between attention and consciousness. Some people find it difficult to appreciate that important psychological processes (such as goal pursuit) often do not require conscious awareness. However, as it currently stands, the crux is not consciousness but attention (Bargh et al., 2001; Bos, Dijksterhuis & van Baaren, 2008; Custers & Aarts, 2011; Eitam, Hassin, & Schul, 2008; Field & Moore, 2005).

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THE RELATION BETWEEN GOALS AND ATTENTION

As alluded to above, attention is the vehicle with which goals affect overt behavior (Monsell & Driver, 2000). Attention is a functional process that selects and biases the flow of incoming information and internal representations in the service of effective goal achievement. Thus, the content of attention represents the goals that are active at a specific moment in time. If a goal can always be executed directly in the very same environment, attention would merely reflect the translation of a perceived relevant stimulus into a response. However, because goals cannot always be enacted directly in the same situation, we often have to take temporal and spatial aspects into account. Moreover, the (social) environment often poses conflicts on our goals such that interfering information needs to be ignored or inhibited for effective goal pursuit to proceed. In short, attention does not only orient and alert the person to goal-relevant information, it also plays a supervisory role in translating goals into behavior (Posner & Fan, 2008).

Indeed, research has started to model goal-directed behavior in terms of executive control processes (Funahashi, 2001; Miller & Cohen, 2001; Miyake & Shah, 1999). An important aim of this research is to understand how people maintain and manipulate information in the service of goal pursuit and to provide a neurocognitive account for the ability to guide attention and action in accord with goals. A common framework proposed in this research is that the prefrontal cortex (PFC), anterior cingulate cortex (ACC), and posterior parietal cortex (PPC) are the main areas that take care of attentional and control processes, consistent with theories of PFC function and the involvement of these areas in the distributed working memory system (see also Chapter 2, this volume). Importantly, these cortical areas are believed to be part of a network for conscious processes and, hence, are implicated in volitional behavior (Baars & Franklin, 2003; Baddeley, 1993; Haggard, 2008; Smith & Jonides, 1999). Thus, the functionality and structure of executive control and working memory are examined by presenting participants with materials they explicitly have to work on. That is, participants are instructed to maintain goal information over time or to ignore irrelevant information to keep focused on

the goal task at hand, thereby (often unstated) assuming that these processes also occur during self-motivated performance. However, under this working assumption it is difficult to understand how attention and higher cognitive processes that make use of executive control structures support goal pursuit without the person being aware of it. That is, how can goal-directed attention to and transformation of relevant information occur outside of conscious awareness?

One way to approach this issue is to maintain that it is not possible to engage in goal-directed attention and information processing unconsciously and to design new experiments to further examine the cognitive mechanisms underlying goal-directed behavior by using task settings that ask people to process goal-relevant information consciously. Obviously, this approach will offer better insight into the functionality and structure of executive control and working memory supporting goal-directed behavior. However, it does not lead to a clear understanding of what the unconscious can do and what consciousness really does. Another, perhaps more objective, approach to the question of how goal-directed higher cognitive processes can occur outside of conscious awareness is to propose that, in principle, the operation of these processes happens whether or not the individual is consciously aware of the goal. In other words, conscious and unconscious goals (partly) rely on the same functional architecture of attention and information processing in which the same cognitive functions or hardware are recruited and shared to translate goals into behavior (Aarts, 2007a; Badgaiyan, 2000; Hassin et al., 2009). Thus, goals modulate attention processes, irrespective of the (conscious or unconscious) source of the activation of the goal. And there is accumulating evidence for this position.

The activation of semantic thoughts decays in short-term memory over very short periods of time, usually within a few seconds, unless some intervention or goal holds them active (Baddeley & Logie, 1999). Exploiting this notion, research has demonstrated that goals that are activated unconsciously can keep relevant information active as well. For instance, Aarts, Custers, and Holland (2007) examined how the accessibility of a desired goal after a short interval changes as a function of subliminally priming the goal. In one of their studies, participants were either primed with the goal to socialize or not, and after a delay of 2 min the accessibility of the goal was assessed in a lexical decision task by measuring the recognition speed of the words related to the goal. Results showed that the representation of the goal remained accessible when participants were primed to attain the goal, but that the sustained activation faded away quickly as soon as the desire to attain that goal was gone. In other words, the goal operated nonconsciously in short-term memory to keep goal-relevant information active (see Maljkovic & Nakayama, 2000; McKone, 1995; for evidence of nonconscious processes in short-term memory). Comparable persistent activation effects of unconsciously activated desired goal states on measures such as selective attention, size perception, and overt behavior have been obtained in other studies (Aarts, Custers, & Veltkamp, 2008; Aarts, Gollwitzer, & Hassin, 2004; Bargh et al., 2001; Moskowitz, 2002; Papies, Stroebe, & Aarts, 2008). These findings strongly suggest that some kind of focused attention or active maintenance process keeps goal-relevant information active unconsciously.

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Furthermore, recent work has started to explore whether humans can keep their eyes on their ongoing goal pursuit in an unconscious manner when competing goals or temptations conflict with these pursuits. For instance, if one wants to lose weight, one has to be able to resist the temptation to eat a late-night snack. People usually engage in this type of attention process when they have to deal with interference that stems from other goals or temptations that compete for attention and behavior, a process that is commonly conceived of as requiring conscious and intentional control (see the work on delay of gratification; Mischel, Shoda, & Rodriguez, 1989). However, there are studies that tell a somewhat different story. For instance, Shah et al. (2002) demonstrated that when participants were unconsciously instigated to pursue a given goal (by subliminal exposure to words representing the goal, e.g., of studying), they inhibited competing accessible goals (e.g., going out), and moreover, this inhibition facilitated the achievement of the unconsciously activated goal. These findings provide support for the existence of an unconscious attention–inhibition mechanism that shields goals from distracting thoughts (see also Aarts et al., 2007; Fishbach, Friedman, & Kruglanski, 2003; Papies et al., 2008).

Whereas the studies discussed above indicate that goals guide attention and behavior outside conscious awareness, the idea that consciousness does not mediate goal priming effects is still a matter of debate (Baumeister, Masicampo, & Vohs, 2011; Custers & Aarts, 2010). To offer compelling evidence that the effects of goal priming on attention and behavior can be truly unconscious, researchers have tried to do their best to conceal the purpose of their study to participants (in the so-call unrelated studies setup), or took pains to prime goals unconsciously by employing rigorous subliminal presentation techniques. Furthermore, a few studies compared subliminally primed goals with conscious goals (induced by explicit task instructions) and showed similar effects on tasks that rely on executive control (Bijleveld, Custers, & Aarts, 2009, 2010; Custers & Aarts, 2005; Zedelius, Veling, & Aarts, 2011). This suggests that consciousness is redundant in the pursuit of goals.

Finally, some studies asked participants in retrospect to indicate whether they were consciously aware of being influenced by the primes or motivated to pursue the primed goal. The general finding of such questions is that although reported motivation sometimes correlates with actual behavior (e.g., people who worked harder report to be more motivated), these reports are not influenced by the primes (see Aarts & Custers, in press). This suggests that subliminal priming of the goal does not affect attention and behavior because people become conscious of their motivation to pursue the goal after it is primed. In all likelihood, participants become conscious of their motivation once the behavior is performed and when they are explicitly probed to reflect on it.

In sum, several lines of research clearly demonstrate that goals affect overt behavior outside the person's awareness of the activation and operation of the goal. Furthermore, unconscious goal pursuit is supported by attention that operates on higher cognitive processes according to principles of executive control and working memory. And these processes (and the information on which they operate) seem to run below the threshold of consciousness.

CONTROL CAN BE AUTOMATIC!

As we have seen in the previous section, goals do not necessarily need conscious guidance, and, therefore, control should not necessarily need consciousness either. If we, as we have always done, classify unconscious actions as automatic, we come to the ironic conclusion that control is automatic (for a similar position, see Hassin et al., 2009).

This change of perspective is the consequence of experiments showing that actions that we have always associated with control, such as preventing stereotypes from biasing our social judgments, can be executed without conscious guidance. Most of the early relevant work was done by researchers interested in prejudice, and this has always been a highly useful topic for investigating the interplay between automatic and controlled processes. The major question in this field can be summarized as follows: Stereotype-activation is largely automatic (Bargh, Chen, & Burrows, 1996; Devine, 1989) but also undesirable, so how can we control it?

Moskowitz, Gollwitzer, Wasel, and Schaal (1999) conducted an interesting experiment demonstrating unconscious control of automatic stereotype activation. They recruited male participants with and without chronic (i.e., frequently pursued) egalitarian goals toward women. In the experiment, participants had to pronounce trait words as quickly as possible. Some of these traits were stereotypical for women and some were stereotypical for men. A photograph of either a male or a female preceded these trait words. Under normal circumstances, participants should display evidence of automatic stereotype activation: Female traits are pronounced more quickly when they follow display of a photograph of a woman as opposed to a photograph of a man. This was indeed found for those who did not have the goal to be egalitarian. However, for individuals who had the chronic goal to be egalitarian, no stereotype activation was apparent. In fact, they seemed to inhibit stereotype activation, thereby successfully engaging in preconscious controlled processes. In another study (Galinsky & Moskowitz, 2000), it was also found that preconscious control of stereotype activation was possible with temporary (i.e., contextually primed) goals (such as perspective taking) rather than chronic goals (for more recent examples, see Moskowitz & Ignarri, 2010; Moskowitz, Li, & Kirk, 2004).

In a test of the theory of unconscious thought (Dijksterhuis & Nordgren, 2006), Strick, Dijksterhuis, and van Baaren (2010) also found that unconscious goals can eliminate racial bias in a setting whereby participants actually had to choose between people. Undergraduate students were presented with information about four potential roommates with the goal to select one. Two roommates had Black facial features, whereas two others did not have such features. Participants who chose immediately after reading the information about the roommates showed the standard racial bias, whereas participants who were given some time to consciously think did not. Interestingly, participants who thought unconsciously did not show bias either, and in their case the degree of bias correlated strongly with people's motivation to control prejudice (Plant & Devine, 1998). In a second study, these results were replicated—that is, unconscious thinkers controlled racial bias—among participants for whom egalitarian goals were primed. It is important to

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realize that in these studies, the racial facial features were manipulated in a subtle way and skin color was not manipulated at all. Because of this, participants did not even realize the experiment was on racial bias. Hence, goals led to the unconscious control of unconscious racial bias.

However, such automatic control processes are not confined to the domain of prejudice. Fishbach and colleagues (Fishbach et al. 2003; Myrseth, Fishbach, & Trope, 2009; Trope & Fishbach, 2000) showed that people can unconsciously resist the effects of temptations. In a series of studies, Fishbach et al. (2003) selected participants for whom a particular goal, such as staying slim or getting high grades, was important and people for whom these goals were less important. Using a sequential lexical decision task, they found that goals activate temptations for people for whom the goal is not important. For instance, studying may automatically lead to activation of tempting alternative courses of action such as watching television. More important, people with strong goals demonstrated the opposite. For them, temptations activated the goal. That is, people with the goal to stay slim automatically activated this goal when confronted with a piece of chocolate, thereby increasing the chance on regulatory success. People do not need to be aware of the temptations for this powerful regulatory mechanism to be launched.

As demonstrated earlier in this chapter, efforts to control our own actions are not always successful. The automatized cognitive self-control mechanisms, as investigated by Fishbach et al. (2003), may break down when people are in a so-called hot state. That is, under normal circumstances (cold states), temptations indeed launch automatic self-control, at least among people with strong goals. However, when people are in a state of craving for a specific substance—fatty food, a cigarette—these self-control processes (unfortunately) do not take place. Nordgren, Chou, and Dijksterhuis (2010) designed a series of experiments in which different self-control domains were tested. They found that for satiated dieters, the presence of food temptation made weight-loss goals more accessible. However, food temptations made weight loss less accessible for hungry dieters; instead it prepared the response to eat the tempting food in order to satisfy their hunger. Likewise, heterosexual men in a relationship are automatically paying less attention to attractive women; however, when they are sexually aroused, they pay more attention to attractive "alternatives."

Still, control, defined as starting new or stopping and changing the course of current (unwanted) action, can be achieved without conscious awareness of the unwanted behavior. In fact, control can take place upon the mere perception of a stimulus that may lead to unwanted action, although it may fail under some circumstances.

SELF-AGENCY: THE EXPERIENCED CONTROL OF GOALS AND ATTENTION

Up to now we have argued that it is not consciousness but rather attention that controls goal-directed behavior. However, the idea that attention rather than consciousness controls goal pursuit is not without problems and may sound rather

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counterintuitive. It raises intriguing questions regarding the origin of control over such processes and regarding the role of the "self" as the active agent of setting and regulating goal pursuit (see, for example, Bargh & Ferguson, 2000; Baumeister, Schmeichel, & Vohs, 2007). More generally speaking, the idea that attention controls goal-directed behavior independently of consciousness creates an ongoing debate about the causal role of conscious intention in shaping human action and the sense of control and, if such a causal role of intention is absent, which mechanism creates in people's mind the belief that they are the agent of their own behavior. Accordingly, current research that aims to understand the experience of self-agency and conscious will can be divided into two domains of inquiry: (1) research that tries to understand how agency experiences arise from conscious intentional behavior (i.e., behavior that results from a conscious intention to produce a specific action or outcome); and (2) research that considers agency experiences as the result of unconscious goal-directed actions (i.e., behavior that results from the mere priming of the representation of a specific action or outcome).

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Experienced Agency and Conscious Intentional Behavior

The experience of self-agency appears quite natural to us. Whether our jokes make our colleagues smile, or lights turn on when we push the switch as part of our routine of entering the office in the morning, we tend to believe our actions cause their effects in the external environment. The establishment of the sense of self-agency requires specific mechanisms that have been elucidated only recently. From research in this domain we know that the processing of self-agency draws on a variety of authorship indicators, such as direct bodily feedback (e.g., Gandevia & Burke, 1992; Georgieff & Jeannerod, 1998), direct bodily feedforward (e.g., Blakemore & Frith, 2003; Blakemore, Wolpert, & Frith, 2002), and visual and other indirect feedback (e.g., Daprati et al., 1997). In essence, these signals provide us with information about the outcome of our actions.

Research proposes different accounts of how such outcome information is linked to the conscious experience of self-agency. However, what they have in common is the notion that conscious intentions play a vital role in the process of agency feelings. For instance, in social psychological models of goal-directed behavior, self-agency is often seen as a product of a comparison between expected and actual outcomes. According to this account, self-agency emerges when the perception of an outcome corresponds with the outcome that one consciously intends to attain by performing an action (Ajzen, 1991; Bandura, 1986; Carver & Scheier, 1998; Deci & Ryan, 1985; Weiner, 1986). A common finding in this research is that perceptions of control over behavior (e.g., "I can perform the action or produce the outcome") are often associated with conscious intentions that people form about performing the behavior. Thus, people seem to consult their feelings of control when making plans for future action. In addition, people have been shown to engage in conscious attributional (sense-making) processes to deal with internal causes for failure and success, and these attributional processes modulate perceptions of control as well as the conscious intentions that people

form by taking feedback about action performance into account. Such findings are taken, therefore, as compelling evidence for the idea that the sense of self-agency and conscious will have an intimate relationship.

Furthermore, studies that focus on conscious awareness of motor behavior suggest that self-agency arises from predictive motor control processes before actual bodily movement takes place. Specifically, awareness of intentional action (e.g., grabbing a glass) is not based on actual body position, but on the predicted position derived from efferent commands in the motor control system (Blakemore et al., 2002; Haggard, 2005). This feedforward predictive signal of the sensory effects of our motor actions is considered to be the reason we cannot tickle ourselves, because the intention to touch our own body (e.g., the skin of the hand) predicts the sensation of the effect, which is attenuated before we actually touch our own body.

In an intriguing experiment exploiting this notion, Haggard, Clark, and Kalogeras (2002) demonstrated how the perception of actions and their effects bind together in time to produce a feeling of self-agency over behavior. Participants were asked to press a key, which on some trials was followed 250 ms later by an auditory tone. Their task was to judge the timing of their key press and the tone by reporting the corresponding position of a moving clock hand. Remarkably, when the tone was causally linked to the key press, participants judged the key press to occur 15 ms later and the tone to occur 46 ms earlier than if the two events occurred alone. However, this temporal binding effect diminished when an unintended movement (caused by transcranial magnetic stimulation) was followed by a tone or when the gap between action and tone increased in time (from 250 to 650 ms).

The observation that action and effect bind together in time when they are intentionally produced has been shown for other modalities (visual, touch) as well (Engbert, Wohlschläger, & Haggard, 2008) and has been demonstrated to increase as a function of higher action–outcome contingencies (Moore & Haggard, 2008; Moore, Lagnado, Deal, & Haggard, 2009). Taken together, then, these results suggest that when a person intentionally performs an action to attain a desired effect, the perceived times of these two events shift toward each other. This intentional binding between actions and their observable effects may enhance our feeling of agency (Ebert & Wegner, 2010) and could be the key to our experiences of action unity and coherence (Haggard & Tsakiris, 2009).

The research discussed above makes clear that our conscious intention creates a link between action and the feeling of controlling and causing the action. It is important to note, however, that this research considers intentions as the starting point (or at least, the most proximal cause) of behavior. In this view, experiences of self-agency are the obvious result of consciously forming and pursuing one's goals. However, as we have seen earlier, research has shown that intentions originate in the unconscious (Libet et al., 1983) and that our goal-directed behavior is under unconscious control (Custers & Aarts, 2010). Still, the idea that our goal pursuit materializes unconsciously may sound counterintuitive and odd because the actions we conduct and the outcomes they produce are often accompanied with feelings of agency. How can much of our behavior unfold outside of conscious awareness when we have these pervasive agency experiences?

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One way to address this issue is by arguing that nonconscious goals do not reach conscious experiences of self-agency, and hence, self-agency only emerges from conscious intentional behavior: We consciously intend to produce a specific action or outcome, and when the perception of the action or outcome corresponds with this intention, we feel self-agency. The idea that the feeling of self-agency only arises from conscious intentional processes fits well with the everyday experiences we have when engaging in highly automatic and reflexive behavior. Most of us would not feel much agency over moving (in fact, kicking) one's own leg when the doctor taps a hammer on the knee. Similarly, when we drive a car and our attention is directed to the conservation of the children in the backseat, we may not feel a strong (or at least, continuously) agency over the foot and hand movements that enable us to keep the car on the road. In other words, experiences of self-agency are absent when our behavior is directly triggered by stimuli or the context at hand and attention is somewhere else. Experiences of agency occur, though, when we reach a goal (either on the motor level, such as moving one's finger or steering a wheel, or on the environmental level, such as turning on a light or making someone smile) that we consciously attend to and intend to produce.

However, although dismissing the possibility that self-agency does not involve and ensue from nonconscious goal-directed processes may be one strategy to solve the fundamental issue of how we establish a sense of personal authorship, recent research offers a somewhat different perspective. This research shows that agency experiences not only arise from conscious goal pursuit, but they also accompany our unconscious goal pursuit, leading us to believe that the outcomes of our behaviors were consciously intended, whereas in fact they were influenced by cues in our environment outside conscious awareness. As we will see, and in line with the present proposal, this research suggests and demonstrates that it is not consciousness, but rather the unconscious operation of goals and attention, that forms the input for the sense of self-agency. But how can agency experiences arise from unconscious goal pursuit? A possible way to understand this issue is by suggesting that our conscious experience of self-agency is an inference that occurs fluently and perfunctorily after action performance and is not accurate per se (Wegner, 2002).

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Experienced Agency and Unconscious Goal-Directed Behavior

To understand how our conscious experience of self-agency can result from unconscious goal-directed behavior we need to appreciate the way the mind is designed to determine our causal influence in the environment. Human beings have a natural tendency to understand and represent their actions in terms of the effects or outcomes they produce (e.g., James, 1890; Jeannerod, 1997; Prinz, 1997; Vallacher & Wegner, 1987). Furthermore, unconscious goal-directed behavior is activated and controlled by the representation of the outcome one desires to produce, and these primed outcome representations also play a fundamental role in the feeling of control. That is, because the sense of self-agency relies on a match between represented outcomes and the actual observation of

these outcomes, the authorship ascription process is susceptible to primes that render the representation of outcomes active before one performs an action and observes the matching outcome.

According to Wegner (2002), the mind is a system that produces appearances for its owner, which may lead to *apparent mental causation*: The experience we have about causing an outcome arises whenever our thoughts preceding the outcome match the outcome and we infer to have caused it—whether we truly caused it or not. Based on the principles underlying causal perception for physical events (e.g., Gilbert, 1998; Kelley, 1972; Michotte, 1963), Wegner further proposed that for the experience of personal causation, three preconditions have to be met—the priority, consistency, and exclusivity of the thought we have about our own behavior. That is, if the thought of the outcome occurs appropriately prior to the observed outcome, is consistent with the observed outcome, and is not accompanied by other potential causes, we experience the behavior as willfully caused by ourselves. Experienced self-agency may therefore be augmented merely because the representation of an outcome is primed just before one performs an action and then observes the outcome. This inferential character of experiences of self-agency has been demonstrated in a number of recent studies (e.g., Aarts, 2007b; Aarts, Custers, & Marien, 2009; Aarts, Custers, & Wegner, 2005; Aarts, Oikawa, & Oikawa, 2010; Custers, Aarts, Oikawa, & Elliot, 2009; Dijksterhuis et al., 2008; Jones, de-Wit, Fernyhough, & Meins, 2008; Sato & Yasuda, 2005; Wegner & Wheatley, 1999).

In what can be considered as the first test of the inferential nature of self-agency as part of unconscious behavior, Wegner and Wheatley (1999) designed an experiment to learn whether prior and consistent thoughts of action outcomes influence experience of personal causation in a situation in which the exclusivity of the cause of outcomes is ambiguous. Participants were asked to move a small square board in circles together with a confederate while music was played through their headphones. The square board was mounted atop a computer mouse, thereby moving a cursor on a screen on which several small objects were displayed (e.g., car, dog). Participants were instructed to stop the cursor every 30 s or so. On some trials they were exposed to a word over the headphone that served to prime thoughts about an item on the screen (e.g., car). Thus, representations of possible outcomes of stopping the movement with the mouse were made accessible at different points in time (e.g., 30 or 1 s before the stop). On these trials, however, the confederate received instructions over the headphone to move the cursor to the primed item. After each stop (when the cursor had landed on the primed item) participants indicated the extent to which they believed they caused the stop. In line with the general decay function of covert priming effects in perception and cognition (e.g., McKone, 1995), results showed that experienced control was lower when the prime appeared 30 s before the stop, and increased when it was presented 5 s or 1 s before the stop. On trials when stopping on an item was not forced, however, it was found that prior primes did not incline participants toward stopping on the primed item. These data indicate that priming of effects biases experiences of personally causing the effects, even when those effects are not personally caused.

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In a conceptual replication and extension of this effect (Aarts et al., 2005), participants and the computer each moved a single gray square on a computer screen in opposite directions on a rectangular path consisting of eight white tiles. Participants could press a key to stop the rapid movement of the squares, which would turn one of the eight tiles black. From a participant's perspective, this black tile could represent the location of either the participant's square or the computer's square at the time he or she pressed the stop key. Thus, the participant or computer could have caused the square to stop on the position (outcome), rendering the exclusivity of causes of outcomes ambiguous. In actuality, however, the computer always determined the stops, so actual control was absent. In this task, participants either consciously set the intention to stop on a position, or they were subliminally primed with that position just before they saw the presented stop on the corresponding location. To measure experiences of self-agency, participants then rated the extent to which they believed they had caused the square to stop. Results showed that both intention and priming led to an increased sense of self-agency, suggesting that online self-agency experiences were primarily based on a match between preactivated and actual outcomes, irrespective of whether the source of this activation was conscious or unconscious. Interestingly, these outcome priming effects have been shown to be more pronounced when people attend to or represent their behavior in terms of the primed outcomes (Van der Weiden, Aarts, & Ruys, 2010), suggesting that attention plays a crucial role in unconscious goal-priming effects on self-agency.

Experienced agency is not only determined by preactivated outcomes, but also by the activation of agents or causes themselves. For example, Dijksterhuis et al. (2008) showed that people were more likely to experience self-agency after they were subliminally primed with the self (with words like I or me) than when they were not primed (cf., the earlier presented notion of Ziehen, 1899). Interestingly, participants showed less agency experiences after they were primed with the word God, but this effect only occurred for believers, that is, for those who think God is indeed a potential agent. Similar effects of agent priming on self-causation processes have been documented in research on superstition beliefs (e.g., Damisch, Stoberock, & Mussweiler, 2010: Kramer & Block, 2008).

These findings, together with others, indicate that agency experiences not only arise from conscious goals but are also caused by unconscious forces. Such unconscious processes can lead us to believe that the outcomes of our behaviors were consciously intended, whereas they were, in fact, influenced by cues in our environment outside of our conscious awareness. Furthermore, these priming effects on illusory experiences of self-causation seem to be culturally independent (Aarts et al., 2010) and occur even in those who are depressed (Aarts, Wegner, & Dijksterhuis, 2006) and are commonly thought to be less sensitive to such illusions in perception of control (Alloy & Abramson, 1979; Dobson & Franche, 1989).

So far, our conceptual analysis indicates that experiences of self-agency and nonconscious goal pursuit may rely on the same outcome information. That is, priming the representation of an outcome before it is produced enhances experiences of personal authorship. Furthermore, priming a desired goal (an outcome that is attached to positive affect; Custers & Aarts, 2005) controls attention

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in the service of goal pursuit, as is revealed in studies that show, for instance, that unconsciously activated goals cause people to keep that goal representation active over a critical period of time. It is important to emphasize that in studies on outcome priming effects on self-agency, the prime always occurred just before participants produced the outcome. As we noted before, the activation of primed items usually fades quickly, within a few seconds, unless some intervention holds the item active. This brief time window suggests that an outcome that is primed too far in advance may not yield the experience of agency (see Wegner & Wheatley, 1999), unless the outcome is represent as a desired goal and controls attention in the service of goal attainment (e.g., by keeping the goal active over time). Ironically, then, the mechanism operating on the representation of an outcome that renders nonconscious goal pursuit more likely to occur may also facilitate the sense of self-agency. In other words, the attentional processes that control unconscious goal pursuit may also be involved in the process of creating the sense of self-agency.

A recent series of experiments explored this idea (Aarts et al., 2009). In these experiments, participants stopped a rapidly presented sequence of colors (e.g., blue, yellow, green) on a computer screen. Subsequently, they were presented either with what could have been the color (e.g., blue) on which they had stopped the sequence or a color that had been randomly picked by the computer. The computer always determined the stopped color, thus actual control over stopping the color was absent. Agency ratings after each trial revealed that priming outcomes (a specific color, e.g., blue) just before the outcome was produced enhanced experienced self-agency (thus replicating the standard priming effect on experienced self-agency). Importantly, priming outcomes relatively far in advance did not augment self-agency, unless the outcome was represented as a desired goal (by experimentally linking the outcome to positive affect; Custers & Aarts, 2005), and thus operated as a nonconscious goal that caused participants to maintain the outcome representation active over time. These findings show how the mechanisms underlying nonconscious goal pursuit also promote experiences of self-agency.

The studies on priming of self-agency discussed above all took great care to make sure that participants were not the actual cause of the primed outcomes, and hence, the self-agency experiences were illusive. Testing this illusion of self-causation is important, as it demonstrates that our feelings of control do not always correspond with actual control, and as such are different concepts that need to be distinguished in the comprehension and examination of the role of consciousness in control, attention, and agency.

However, we wish to stress that considering ourselves as the cause of our own actions and the resulting outcomes is not necessarily illusory. After all, desired outcome representations (i.e., goals) that are activated outside awareness are also more likely to guide attention and the actions that produce the outcome than when these representations are not activated. Take the situation in which one engages in self-presentation behavior, a pattern of social actions that is thought to largely rely on unconscious strategic mental processes (Schlenker, 1985). If, for instance, you want another person to like you, this changes your behavior toward that person in the service of the given goal, even though you may not be aware of the goal and

the effects it has by pursuing it. Hence, self-agency and nonconscious goal pursuit may go hand in hand as nonconscious activation of goals promotes both goal attainment as well as agency experiences. As a result, agency experiences in such situations may not be deceptive, but rather an accurate assessment of the source that produced the outcome. Thus, whereas the experience of self-agency can be a guess, sometimes this guess is right. Although these experiences could be seen as a by-product of our nonconscious goal pursuit, they may serve us well because they can help us to identify the results of our actions in social situations when we lack conscious knowledge of producing them.

CONCLUSIONS AND ISSUES FOR FUTURE RESEARCH

To conclude, actual control and self-agency, or the subjective feeling of control, are two distinct mechanisms. However, both processes are first and foremost guided by goals, and hence, although they are theoretically orthogonal, they often go hand in hand in real life. Still, distinguishing the two processes is important. Psychological scientists are well trained and equipped with tools that enable them to understand and sometimes change the behavior of others. However, the distinction between actual control and feelings of control implies that interventions aimed at changing feelings of control do not necessarily change behavior itself.

The new insights into the relation between goals, attention, and consciousness (Dehaene et al., 2006; Dijksterhuis & Aarts, 2010; Koch & Tsuchiya, 2006) and their consequences for our understanding of actual control and feelings of control, as outlined here, lead to a number of interesting questions. First, although attention and consciousness may be, strictly speaking, independent, they are strongly related in real life. Stricter tests of the assumed mediational role of attention in the relation between goals and behavior (independent of consciousness) would be most welcome. Second, we still know surprisingly little about what exactly determines which information enters consciousness and which information does not. A general understanding of this matter, as well as a better understanding of the role of attention in such processes, needs to be systematically addressed in future research. Such an enterprise may call for new methods and operationalizations that allow us to distinguish attention from consciousness as to the content as well as the workings of the goal-directed mind (e.g., Lau, 2009; Seth, Dienes, Cleeremans, Overgaard, & Pessoa, 2008) and to empirically establish their unique contribution in the effects of unconsciously activated goals on behavior.

It is also of interest to investigate the difference between unconscious and conscious goals. Strictly speaking, these terms may be misnomers, as our analysis suggests that unconscious goals usually remain unconscious throughout goal pursuit and that unconscious goals occasionally enter consciousness. Still, why are we sometimes aware of the goals that originate and unfold in the unconscious? In a recent study, Bongers, Dijksterhuis, and Spears (2010) demonstrated that people may become aware of primed (i.e., unconscious) goals in the face of obstacles. Such a finding, though, raises the intriguing question of whether such conscious experiences are merely the result of heightened attention paid to the goal (due to the necessity to adjust ongoing behavior), or whether, in this

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particular case, consciousness is more important and serves a causal status in the process of goal pursuit.

There is some research that showed that consciously set goals (vs. no goal at all) facilitate human functioning in several ways (Baddeley, 1993; Locke & Latham, 2002), and these data portray the general picture that consciousness plays a causal status in goal-directed (volitional) behavior. Although tempting, such a conclusion may be wrong or at least premature, as most studies lack the proper controls to exclude the possibility that attention actually does the work (cf., Custers & Aarts, 2011; Lau, 2009). In fact, we only know that we can become consciously aware of the decisions that we make and goals we pursue without having a proper empirical test telling us how consciousness itself exactly influences our behavior. Future research thus will have to explore when consciously and unconsciously activated goals direct attention and information processing in similar or distinct manners to recruit the cognitive functions and brain systems that translate goals into behavior. Such research, in the end, may also promote a better understanding of how consciousness itself exactly influences our behavior.

Finally, and this is at least as much a philosophical question as a scientific one, why do we have conscious experiences of agency? If we are willing to accept that actual behavioral control is guided by goals and attention, but not by consciousness, and we accept that (unconscious) goals create the sense of self-agency through attentional processes, why then do we believe we are in control of our own behavior? Whether the establishment of the experience of self-agency serves an adaptive utility or more basic human needs is an essential problem in its own right and remains a topic of intriguing theorizing and empirical scrutiny (e.g., Dennett, 1996; Neisser, 1993; Pinker, 1997; Wegner, 2002). In this respect, then, our analysis, as well as the research that we discussed, suggests that people share the social belief that they can and do have an influence on their own behavior, simply because they are able to experience such feelings of control in their conscious awareness and have learned to express them. It is this circular and mind-boggling line of reasoning that is hard to grasp and, in our view, makes the study on goals and their effects on behavior in a social context an exciting and promising topic for future research.

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REFERENCES

Aarts, H. (2007a). Health and goal-directed behavior: The nonconscious regulation and motivation of goals and their pursuit. *Health Psychology Review, 1*, 53–82.

Aarts, H. (2007b). Unconscious authorship ascription: The effects of success and effect-specific information priming on experienced authorship. *Journal of Experimental Social Psychology, 43*, 119–126.

Aarts, H., & Custers, R. (in press). Unconscious goal pursuit: Nonconscious goal regulation and motivation. In R. Ryan (Ed.), *Oxford handbook of motivation*. Oxford: Oxford University Press.

Aarts, H., Custers, R., & Holland, R. W. (2007). The nonconscious cessation of goal pursuit: When goals and negative affect are coactivated. *Journal of Personality and Social Psychology, 92*, 165.

Aarts, H., Custers, R., & Marien, H. (2008). Preparing and motivating behavior outside of awareness. *Science, 319*, 1639.

Aarts, H., Custers, R., & Marien, H. (2009). Priming and authorship ascription: When nonconscious goals turn into conscious experiences of self-agency. *Journal of Personality and Social Psychology, 96*, 967–979.

Aarts, H., Custers, R., & Veltkamp, M. (2008). Goal priming and the affective-motivational route to nonconscious goal pursuit. *Social Cognition, 26*, 497–519.

Aarts, H., Custers, R., & Wegner, D. M. (2005). On the inference of personal authorship: Enhancing experienced agency by priming effect information. *Consciousness and Cognition, 14*, 439–458.

Aarts, H., Gollwitzer, P. M., & Hassin, R. R. (2004). Goal contagion: Perceiving is for pursuing. *Journal of Personality and Social Psychology, 87*, 23–37.

Aarts, H., Oikawa, M., & Oikawa, H. (2010). Cultural and universal routes to authorship ascription: Effects of outcome priming on experienced self-agency in the Netherlands and Japan. *Journal of Cross-Cultural Psychology, 41*, 87–98.

Aarts, H., Wegner, D. M., & Dijksterhuis, A. (2006). On the feeling of doing: Dysphoria and the implicit modulation of authorship ascription. *Behaviour Research and Therapy, 44*, 1621–1627.

Alloy, L. B., & Abramson, L. Y. (1979). The judgment of contingency in depressed and nondepressed students: Sadder but wiser? *Journal of Experimental Psychology: General, 108*, 441–485.

Ach, N. (1910). *Uber den willensakt und das temperament.* Leipzig: Quelle & Meyer.

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes, 50*, 179–211.

Baars, B. J., & Franklin, S. (2003). How conscious experience and working memory interact. *Trends in Cognitive Sciences, 7*, 166–172.

Baddeley, A. D. (1993). Working memory and conscious awareness. In A. Collins & S. Gathercole (Eds.), *Theories of memory* (pp. 11–28). Hillsdale, NJ: Erlbaum.

Baddeley, A. D., & Logie, R. H. (1999). The multiple-component model. In A. Miyake & P. Shah (Eds.), *Models of working memory: Mechanisms of active maintenance and executive control* (pp. 28–61). Cambridge, U.K.: Cambridge University Press.

Badgaiyan, R. D. (2000). Executive control, willed actions, and nonconscious processing. *Human Brain Mapping, 9*, 38–41.

Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory.* Englewood Cliffs, NJ: Prentice-Hall.

Bargh, J. A. (1994). The four horsemen of automaticity: Awareness, efficiency, intention, and control in social cognition. In R. S. Wyer, Jr., & T. K. Srull (Eds.), *Handbook of social cognition* (2nd ed., pp. 1–40). Hillsdale, NJ: Erlbaum.

Bargh, J. A., Chen, M., & Burrows, L. (1996). Automaticity of social behavior: Direct effects of trait construct and stereotype activation on action. *Journal of Personality and Social Psychology, 71*, 230–244.

Bargh, J. A., & Ferguson, M. J. (2000). Beyond behaviorism: On the automaticity of higher mental processes. *Psychological Bulletin, 126*, 925–945.

Bargh, J. A., Gollwitzer, P. M., Lee-Chai, A., Barndollar, K., & Trotschel, R. (2001). The automated will: Nonconscious activation and pursuit of behavioral goals. *Journal of Personality and Social Psychology, 81*, 1014–1027.

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Baumeister, R. F., Masicampo, E. J., & Vohs, K. D. (2011). Do conscious thoughts cause behavior? *Annual Review of Psychology, 62*, 331–361.

Baumeister, R. F., Schmeichel, B. J., & Vohs, K. D. (2007). Self-regulation and the executive function. In A. W. Kruglanski & E. T. Higgins (Eds.), *Social psychology: Handbook of basic principles* (2nd ed., pp. 516–539). New York: Guilford.

Bijleveld, E., Custers, R., & Aarts, H. (2009). The unconscious eye opener: Pupil dilation reveals strategic recruitment of mental resources upon subliminal reward cues. *Psychological Science, 20*, 1313–1315.

Bijleveld, E., Custers, R., & Aarts, H. (2010). Unconscious reward cues increase invested effort, but do not change speed-accuracy tradeoffs. *Cognition, 115*, 330–335.

Blakemore, S. J., & Frith, C. (2003). Self-awareness and action. *Current Opinion in Neurobiology, 13*, 219–224.

Blakemore, S. J., Wolpert, D. M., & Frith, C. D. (2002). Abnormalities in the awareness of action. *Trends in Cognitive Sciences, 6*, 237–242.

Bongers, K. C. A., Dijksterhuis, A., & Spears, R. (2010). On the role of consciousness in goal pursuit. *Social Cognition, 28*, 262–272.

Bos, M. W., Dijksterhuis, A., & van Baaren, R. B. (2008). On the goal-dependency of unconscious thought. *Journal of Experimental Social Psychology, 44*, 1114–1120.

Carver, C. S., & Scheier, M. F. (1998). *On the self-regulation of behavior*. New York: Cambridge University Press.

Custers, R., & Aarts, H. (2005). Positive affect as implicit motivator: On the nonconscious operation of behavioral goals. *Journal of Personality and Social Psychology, 89*, 129–142.

Custers, R., & Aarts, H. (2010). The unconscious will: How the pursuit of goals operates outside of conscious awareness. *Science, 329*, 47–50.

Custers, R., & Aarts, H. (2011). Learning of predictive relations between events depends on attention, not on awareness. *Consciousness and Cognition*, *20*, 368–378.

Custers, R., Aarts, H., Oikawa, M., & Elliot, A. (2009). The nonconscious road to perceptions of performance: Achievement priming, success expectations and self-agency. *Journal of Experimental Social Psychology, 45*, 1200–1208.

Damisch, L., Stoberock, B., & Mussweiler, T. (2010). Keep your fingers crossed! How superstition improves performance. *Psychological Science, 21,* 1014–1020.

Daprati, E., Franck, N., Georgieff, N., Proust, J., Pacherie, E., & Dalery, J. (1997). Looking for the agent: An investigation into consciousness of action and self-consciousness in schizophrenic patients. *Cognition, 65*, 71–86.

Davidson, D. (1980). How is weakness of the will possible? In D. Davidson (Ed.), *Essays on actions and events* (pp. 21–42). Oxford: Oxford University Press.

Deci, E. L., & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behavior*. New York: Plenum.

Dehaene, S., Changeux, J. P., Naccache, L., Sackur, J., & Sergent, C. (2006). Conscious, preconscious, and subliminal processing: A testable taxonomy. *Trends in Cognitive Sciences, 10*, 204–211.

Dennett, D. C. (1996). *Kinds of minds.* New York: Basic Books.

Devine, P. G. (1989). Stereotypes and prejudice. Their automatic and controlled components. *Journal of Personality and Social Psychology, 56*, 5–18.

Dijksterhuis, A. (2010). Automaticity and the unconscious. In S. T. Fiske, D. T. Gilbert, & G. Lindzey (Eds.). *The handbook of social psychology* (5th ed., pp. 228–267). Boston: McGraw-Hill.

Dijksterhuis, A., & Aarts, H. (2010). Goals, attention, and (un)consciousness. *Annual Review of Psychology, 61*, 467–490.

Dijksterhuis, A., & Nordgren, L. F. (2006). A theory of unconscious thought. *Perspectives on Psychological Science, 1*, 95–109.

Downloaded by [Karen Hudson] at 03:29 22 March 2015

Dijksterhuis, A., Preston, J., Wegner, D. M., & Aarts, H. (2008). Effects of subliminal priming of self and god on self-attribution of authorship for events. *Journal of Experimental Social Psychology, 44*, 2–9.

Dobson, K. S., & Franche, R. L. (1989). A conceptual and empirical review of the depressive realism hypothesis. *Canadian Journal of Behavioral Science, 21*, 419–433.

Ebert, J. P., & Wegner, D. M. (2010). Time warp: Authorship shapes the perceived diming of actions and events. *Consciousness and Cognition, 19*, 481–489.

Eitam, B., Hassin, R. R., & Schul, Y. (2008). Nonconscious goal pursuit in novel environments: The case of implicit learning. *Psychological Science, 19*, 261–267.

Engbert, K., Wohlschläger, A., &Haggard, P. (2008). Who is causing what? The sense of agency is relational and efferent-triggered. *Cognition, 107*, 693–704.

Field, A. P., & Moore, A. C. (2005). Dissociating the effects of attention and contingency awareness on evaluative conditioning effects in the visual paradigm. *Cognition and Emotion, 19*, 217–243.

Fishbach, A., Friedman, R. S., & Kruglanski, A. W. (2003). Leading us not unto temptation: Momentary allurements elicit overriding goal activation. *Journal of Personality and Social Psychology, 84*, 296–309.

Fourneret, P., & Jeannerod, M. (1998). Limited conscious monitoring of motor performance in normal subjects. *Neuropsychologia, 36*, 1133–1140.

Funahashi, S. (2001). Neuronal mechanisms of executive control by the prefrontal cortex. *Neuroscience Research, 39*, 147–165.

Galinsky, A. D., & Moskowitz, G. B. (2000). Perspective-taking: Decreasing stereotype expression, stereotype accessibility, and ingroup favoritism. *Journal of Personality and Social Psychology, 78*, 708–724.

Gandevia, S., & Burke, D. (1992). Does the nervous system depend on kinesthetic information to control natural limb movements? *Behavioral and Brain Sciences, 15*, 614–632.

Georgieff, N., & Jeannerod, M. (1998). Beyond consciousness of external reality: A "who" system for consciousness of action and self-consciousness. *Consciousness and Cognition, 7*, 465–477.

Gilbert, D. T. (1998). Ordinary personology. In D. T. Gilbert, S. T. Fiske, & G. Lindzey (Eds.), *The handbook of social psychology* (pp. 89–150). Boston: McGraw-Hill.

Haggard, P. (2005). Conscious intention and motor cognition. *Trends in Cognitive Sciences, 9*, 290–295.

Haggard, P. (2008). Human volition: Towards a neuroscience of will. *Nature Reviews Neuroscience, 9*, 934–946.

Haggard, P., Clark, S., & Kalogeras, J. (2002). Voluntary action and conscious awareness. *Nature Neuroscience, 5*, 382–385.

Haggard, P., & Tsakiris, M. (2009). The experience of agency: feelings, judgements, and responsibility. *Current directions in psychological science, 18*, 242–246.

Hassin, R. R., Aarts, H., Eitam, B., Custers, R., & Kleiman, T. (2009). Nonconscious goal pursuit and the effortful control of behavior. In E. Morsella, J. A. Bargh, & P. M. Gollwitzer (Eds.), *Oxford handbook of human action: Mechanisms of human action* (pp. 549–568). New York: Oxford University Press.

Heckhausen, H., & Beckmann, J. (1990). Intentional action and action slips. *Psychological Review, 97*, 36–48.

Holland, R. W., Hendriks, M., & Aarts, H. (2005). Nonconscious effects of scent on cognition and behavior. *Psychological Science, 16*, 689–693.

James, W. (1890). *The principles of psychology*. New York: Holt.

Jeannerod, M. (1997). *The cognitive neuroscience of action*. New York: Blackwell.

Jones, S. R., de-Wit, L., Fernyhough, C., & Meins, E. (2008). A new spin on the wheel of fortune: Priming of action-authorship judgements and relation to psychosis-like experiences. *Consciousness and Cognition, 17*, 576–586.

Downloaded by [Karen Hudson] at 03:29 22 March 2015

Kelley, H. H. (1972). Causal schemata and the attribution process. In E. E. Jones, D. E. Kanouse, H. H. Kelley, R. E. Nisbett, S. Valins, & B. Weiner (Eds.), *Attribution: Perceiving the causes of behavior* (pp. 151–174). Morristown, NJ: General Learning Press.

Koch, C., & Tsuchiya, N. (2006). Attention and consciousness: Two distinct brain processes. *Trends in Cognitive Sciences, 11*, 16–22.

Koch, C., & Ullman, S. (1985). Shifts in selective visual attention: Towards the underlying neural circuitry. *Human Neurobiology, 4*, 219–227.

Kramer, T., & Block, L. (2008). Conscious and non-conscious components of superstitious beliefs in judgment and decision-making. *Journal of Consumer Research*, *36*, 783–793.

Lakin, J. L., & Chartrand, T. L. (2003). Using nonconscious behavioral mimicry to create affiliation and rapport. *Psychological Science, 14*, 334–339.

Lamme, V. A. F. (2003). Why visual attention and awareness are different. *Trends in Cognitive Sciences, 7*, 12–18.

Lau, H. (2009). Volition and the function of consciousness. In M. S. Gazzaniga (Ed.), *Cognitive neurosciences* (Vol. 4, pp. 1191–1200). Cambridge: MIT Press.

Libet, B., Gleason, C. A., Wright, E. W., & Pearl, D. K. (1983). Time of conscious intention to act in relation to onset of cerebral activity (readiness-potential): The unconscious initiation of a freely voluntary act. *Brain, 106*, 623.

Locke, E. A., & Latham, G. P. (2002). Building a practically useful theory of goal setting and task motivation. A 35-year odyssey. *American Psychologist, 57*, 705–717.

Maljkovic, V., & Nakayama, K. (2000). Priming of popout: III. A short-term implicit memory system beneficial for rapid target selection. *Visual Cognition, 7*, 571–595.

McKone, E. (1995). Short-term implicit memory for words and nonwords. *Journal of Experimental Psychology: Learning, Memory and Cognition, 21*, 1108–1126.

Michotte, A. (1963). *The perception of causality.* [T. R. Miles & E. Miles, Trans.]. New York: Basic Books.

Miller, E. K., & Cohen, J. D. (2001). An integrative theory of prefrontal cortex function. *Annual Review of Neuroscience, 24*, 167–202.

Mischel, W., Shoda, Y., & Rodriguez, M. I. (1989). Delay of gratification in children. *Science, 244*, 933–938.

Miyake, A., & Shah, P. (1999). *Models of working memory: Mechanisms of active maintenance and executive control*. Cambridge, U.K.: Cambridge University Press.

Monsell, S., & Driver, J. (2000). *Control of cognitive processes: Attention and performance,* Vol. 18. Cambridge, MA: MIT Press.

Moore, J. W., & Haggard, P. (2008). Awareness of action: Inference and prediction. *Consciousness and Cognition, 17*, 136–144.

Moore, J. W., Lagnado, D., Deal, D. C., & Haggard, P. (2009). Feelings of control: contingency determines experience of action. *Cognition, 110*, 279–283.

Moors, A., & De Houwer, J. (2006). Automaticity: A theoretical and conceptual analysis. *Psychological Bulletin, 132*, 297–326.

Moskowitz, G. B. (2002). Preconscious effects of temporary goals on attention. *Journal of Experimental Social Psychology, 38*, 397–404.

Moskowitz, G. B., Gollwitzer, P. M., Wasel, W., & Schaal, B. (1999). Preconscious control of stereotype activation through chronic egalitarian goals. *Journal of Personality and Social Psychology, 77*, 167–184.

Moskowitz, G. B., & Ignarri, C. (2010). Implicit volition and stereotype control. *European Review of Social Psychology, 20*, 97–145.

Moskowitz, G. B., Li, P., & Kirk, E. R. (2004). The implicit volition model: On the preconscious regulation of temporarily adopted goals. *Advances in experimental social psychology, 36*, 317–414.

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Myrseth, K. O. R., & Fishbach, A. (2009). Self-control: A function of knowing when and how to exercise restraint. *Current Directions in Psychological Science, 18*, 247–252.

Myrseth, K. O. R., Fishbach, A., & Trope, Y. (2009). Counteractive self-control. *Psychological Science, 20*, 159–163.

Neisser, U. (1993). The self-perceived. In U. Neisser (Ed.), *The perceived self: Ecological and interpersonal sources of self-knowledge* (pp. 3–21). Cambridge: Cambridge University Press.

Nordgren, L. F., Chou, E., & Dijksterhuis, A. (2010). *The push and pull of temptation: Temptation's bi-directional influence on self-control*. Manuscript under review.

Oikawa, M. (2004). Moderation of automatic achievement goals by conscious monitoring. *Psychological Reports, 95*, 975–980.

Papies, E. K., Stroebe, W., & Aarts, H. (2008). The allure of forbidden food: On the role of attention in self-regulation. *Journal of Experimental Social Psychology, 44*, 1283–1292.

Pinker, S. (1997). *How the mind works.* New York: Norton.

Plant, E. A., & Devine, P. G. (1998). Internal and external motivation to respond without prejudice. *Journal of Personality and Social Psychology, 75*, 811–832.

Plato. (1986). Protagoras. In B. A. F. Hubbard & E. S. Karnofsky (Trans.), *The dialogues of Plato*. New York: Bantam.

Posner, M. I., & Fan, J. (2008). Attention as an organ system. In J. Pomerantz (Ed.), *Neurobiology of perception and communication: From synapse to society: The 4th de Lange conference* (pp. 31–61). Cambridge, U.K.: Cambridge University Press.

Posner, M. I., & Snyder, C. R. R. (1975). Attention and cognitive control. In R. L. Solso (Ed.), *Information processing and cognition: The Loyola symposium* (pp. 55–85). Hillsdale, NJ: Erlbaum.

Prinz, W. (1997). Perception and action planning. *European Journal of Cognitive Psychology, 9*, 129–154.

Reason, J. (1979). Actions not as planned: The price of automatization. In G. Underwood & R. Stevens (Eds.), *Aspects of unconsciousness* (pp. 67–89). London: Academic Press.

Sato, A., & Yasuda, A. (2005). Illusion of sense of self-agency: Discrepancy between the predicted and actual sensory consequences of actions modulates the sense of self-agency, but not the sense of self-ownership. *Cognition, 94*, 241–255.

Schlenker, B. R. (1985). Identity and self-identification. In B. R. Schlenker (Ed.), *The self and social life* (pp. 65–99). New York: McGraw-Hill.

Seth, A. K., Dienes, Z., Cleeremans, A., Overgaard, M., & Pessoa, L. (2008). Measuring consciousness: Relating behavioural and neurophysiological approaches. *Trends in Cognitive Sciences, 12*, 314–321.

Shah, J. Y., Friedman, R., & Kruglanski, A. W. (2002). Forgetting all else: On the antecedents and consequences of goal shielding. *Journal of Personality and Social Psychology, 83*, 1261–1280.

Sheeran, P., Aarts, H., Custers, R., Rivis, A., Webb, T. L., & Cooke, R. (2005). The goal-dependent automaticity of drinking habits. *British Journal of Social Psychology, 44*, 47–63.

Smith, E. E., & Jonides, J. (1999). Storage and executive processes in the frontal lobes. *Science, 283*, 1657–1661.

Strick, M. A., Dijksterhuis, A., & van Baaren, R. B. (2010). *Unconscious thought and conscious thought can reduce racial bias, but in different ways*. Manuscript in preparation.

Trope, Y., & Fishbach, A. (2000). Counteractive self-control in overcoming temptation. *Journal of Personality and Social Psychology, 79*, 493–506.

Vallacher, R. R., & Wegner, D. M. (1987). What do people think they're doing? Action identification and human behavior. *Psychological Review, 94*, 3–15.

Van der Weiden, A., Aarts, H., & Ruys, K. I. (2010). Reflecting on the action or its outcome: behavior representation level modulates outcome priming effects on self-agency experiences. *Consciousness and Cognition, 19*, 21–32.

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Wegner, D. M. (2002). *The illusion of conscious will*. Cambridge, MA: MIT Press.
Wegner, D. M., & Wheatley, T. P. (1999). Why it feels as if we're doing things: Sources of the experience of will. *American Psychologist, 54*, 480–492.
Weiner, B. (1986). *An attributional theory of motivation and emotion*. New York: Springer-Verlag.
Zedelius, C. M., Veling, H., & Aarts, H. (2011). Boosting or choking—How conscious and unconscious reward processing modulate the active maintenance of goal-relevant information. *Consciousness and Cognition*, 20, 355–362.
Ziehen, T. (1899). *Introduction to physiological psychology*. New York: Macmillan.

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