

HUMAN AGGRESSION

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■ **Abstract** Research on human aggression has progressed to a point at which a unifying framework is needed. Major domain-limited theories of aggression include cognitive neoassociation, social learning, social interaction, script, and excitation transfer theories. Using the general aggression model (GAM), this review posits cognition, affect, and arousal to mediate the effects of situational and personological variables on aggression. The review also organizes recent theories of the development and persistence of aggressive personality. Personality is conceptualized as a set of stable knowledge structures that individuals use to interpret events in their social world and to guide their behavior. In addition to organizing what is already known about human aggression, this review, using the GAM framework, also serves the heuristic function of suggesting what research is needed to fill in theoretical gaps and can be used to create and test interventions for reducing aggression.

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INTRODUCTION

In its most extreme forms, aggression is human tragedy unsurpassed. Hopes that the horrors of World War II and the Holocaust would produce a worldwide revolution against killing have been dashed. Since World War II, homicide rates have actually increased rather than decreased in a number of industrialized countries, most notably the United States. Thus, in recent years there has been renewed interest in learning why humans sometimes behave aggressively.

Some of the causes of increased violence have been identified. For example, the accessibility of guns (O'Donnell 1995), global warming (Anderson et al. 1997), violence against children in schools and homes (Hyman 1995, Straus 2000), and the widespread exposure to violent entertainment media (Bushman & Huesmann 2001) all contribute to the high level of violence and aggression in modern societies. Recent psychological research has yielded promising new treatments (e.g., Borduin 1999), new empirical discoveries (e.g., Baumeister et al. 1996, Bushman 1995), and new theoretical analyses (e.g., Eron et al. 1994, Geen & Donnerstein 1998, Huesmann et al. 1996).

We begin by offering some basic definitions. Next we describe several domain-specific theories of aggression. Finally we describe the general aggression model, an integrative framework that will bring more order and structure to the field of aggression. Subsequent sections address inputs, routes, and outcomes of aggression, illustrating recent advances in aggression research.

BASIC DEFINITIONS

Aggression

Human aggression is any behavior directed toward another individual that is carried out with the *proximate* (immediate) intent to cause harm. In addition, the perpetrator must believe that the behavior will harm the target, and that the target is motivated to avoid the behavior (Bushman & Anderson 2001, Baron & Richardson 1994, Berkowitz 1993, Geen 2001).

Accidental harm is not aggressive because it is not intended. Harm that is an incidental by-product of helpful actions is also not aggressive, because the harm-doer believes that the target is not motivated to avoid the action (e.g., pain experienced during a dental procedure). Similarly, the pain administered in sexual masochism is not aggressive because the victim is not motivated to avoid it—indeed, the pain is actively solicited in service of a higher goal (Baumeister 1989).

Violence

Violence is aggression that has extreme harm as its goal (e.g., death). All violence is aggression, but many instances of aggression are not violent. For example, one child pushing another off a tricycle is an act of aggression but is not an act of violence.

Hostile vs. Instrumental Aggression

Hostile aggression has historically been conceived as being impulsive, thoughtless (i.e., unplanned), driven by anger, having the ultimate motive of harming the target, and occurring as a reaction to some perceived provocation. It is sometimes called affective, impulsive, or reactive aggression. *Instrumental aggression* is conceived as a premeditated means of obtaining some goal other than harming the victim, and being proactive rather than reactive (Berkowitz 1993, Geen 2001). Our recent analysis (Bushman & Anderson 2001) modifies these definitions in two ways. First, we distinguish between proximate and ultimate goals. We view intention to harm as a necessary feature of all aggression (as in purely hostile aggression models), but it is necessary only as a proximate goal. Second, we distinguish between different types of aggression at the level of ultimate goal. Thus, both robbery and physical assault are acts of aggression because both include intention to harm the victim at a proximate level. However, they typically differ in ultimate goals, with robbery serving primarily profit-based goals and assault serving primarily harm-based goals. In short, our definition allows us to discuss the commonalities in and distinctions between affective and instrumental aggression, while including aggression that has mixed motives.

DOMAIN SPECIFIC THEORIES OF AGGRESSION

Five main theories of aggression guide most current research. The theories themselves overlap considerably, which is what instigated early attempts to integrate them into a broader framework (Anderson et al. 1995, 1996a).

Cognitive Neoassociation Theory

Berkowitz (1989, 1990, 1993) has proposed that aversive events such as frustrations, provocations, loud noises, uncomfortable temperatures, and unpleasant

odors produce negative affect. Negative affect produced by unpleasant experiences automatically stimulates various thoughts, memories, expressive motor reactions, and physiological responses associated with both fight and flight tendencies. The fight associations give rise to rudimentary feelings of anger, whereas the flight associations give rise to rudimentary feelings of fear. Furthermore, cognitive neoassociation theory assumes that cues present during an aversive event become associated with the event and with the cognitive and emotional responses triggered by the event.

In cognitive neoassociation theory, aggressive thoughts, emotions, and behavioral tendencies are linked together in memory (Collins & Loftus 1975). Figure 1 contains a simplified schematic of an associative memory structure in which the concept of "gun" is linked to a number of aggression-related concepts (CA Anderson et al. 1998). Concepts with similar meanings (e.g., hurt, harm) and concepts that frequently are activated simultaneously (e.g., shoot, gun) develop strong associations. In Figure 1 associations are illustrated by lines between the concepts, with thicker lines representing stronger associations and shorter distances representing greater similarity of meaning. When a concept is primed or activated, this activation spreads to related concepts and increases their activation as well.

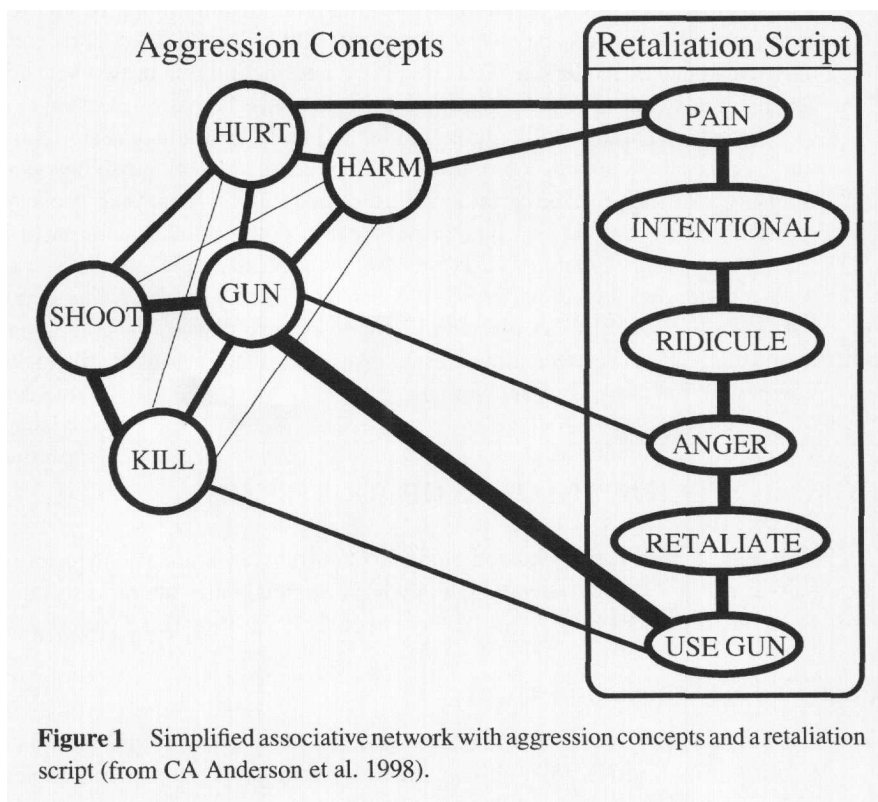


Figure 1 Simplified associative network with aggression concepts and a retaliation script (from CA Anderson et al. 1998).

Cognitive neoassociation theory also includes higher-order cognitive processes, such as appraisals and attributions. If people are motivated to do so, they might think about how they feel, make causal attributions for what led them to feel this way, and consider the consequences of acting on their feelings. Such deliberate thought produces more clearly differentiated feelings of anger, fear, or both. It can also suppress or enhance the action tendencies associated with these feelings.

Cognitive neoassociation theory not only subsumes the earlier frustration-aggression hypothesis (Dollard et al. 1939), but it also provides a causal mechanism for explaining why aversive events increase aggressive inclinations, i.e., via negative affect (Berkowitz 1989). This model is particularly suited to explain hostile aggression, but the same priming and spreading activation processes are also relevant to other types of aggression.

Social Learning Theory

According to social learning theories (Bandura 1983, 2001; Mischel 1973, 1999; Mischel & Shoda 1995), people acquire aggressive responses the same way they acquire other complex forms of social behavior—either by direct experience or by observing others. Social learning theory explains the acquisition of aggressive behaviors, via observational learning processes, and provides a useful set of concepts for understanding and describing the beliefs and expectations that guide social behavior. Social learning theory—especially key concepts regarding the development and change of expectations and how one construes the social world—is particularly useful in understanding the acquisition of aggressive behaviors and in explaining instrumental aggression. For example, Patterson's work on family interactions and the development of antisocial behavior patterns relies heavily on this approach (Patterson et al. 1989, 1992).

Script Theory

Huesmann (1986, 1998) proposed that when children observe violence in the mass media, they learn aggressive scripts. Scripts define situations and guide behavior: The person first selects a script to represent the situation and then assumes a role in the script. Once a script has been learned, it may be retrieved at some later time and used as a guide for behavior. This approach can be seen as a more specific and detailed account of social learning processes.

Scripts are sets of particularly well-rehearsed, highly associated concepts in memory, often involving causal links, goals, and action plans (Abelson 1981, Schank & Abelson 1977). When items are so strongly linked that they form a script, they become a unitary concept in semantic memory. Furthermore, even a few script rehearsals can change a person's expectations and intentions involving important social behaviors (Anderson 1983, Anderson & Godfrey 1987, Marsh et al. 1998). A frequently rehearsed script gains accessibility strength in two ways. Multiple rehearsals create additional links to other concepts in memory, thus increasing the number of paths by which it can be activated. Multiple rehearsals also

increase the strength of the links themselves. Thus, a child who has witnessed several thousand instances of using a gun to settle a dispute on television is likely to have a very accessible script that has generalized across many situations. In other words, the script becomes chronically accessible. This theory is particularly useful in accounting for the generalization of social learning processes and the automatization (and simplification) of complex perception-judgment-decision-behavioral processes. Figure 1 includes an example of one simple aggression script involving retaliation.

Excitation Transfer Theory

Excitation transfer theory (Zillmann 1983) notes that physiological arousal dissipates slowly. If two arousing events are separated by a short amount of time, arousal from the first event may be misattributed to the second event. If the second event is related to anger, then the additional arousal should make the person even angrier. The notion of excitation transfer also suggests that anger may be extended over long periods of time if a person has consciously attributed his or her heightened arousal to anger. Thus, even after the arousal has dissipated the person remains ready to aggress for as long as the self-generated label of anger persists.

Social Interaction Theory

Social interaction theory (Tedeschi & Felson 1994) interprets aggressive behavior (or coercive actions) as social influence behavior, i.e., an actor uses coercive actions to produce some change in the target's behavior. Coercive actions can be used by an actor to obtain something of value (e.g., information, money, goods, sex, services, safety), to exact retributive justice for perceived wrongs, or to bring about desired social and self identities (e.g., toughness, competence). According to this theory, the actor is a decision-maker whose choices are directed by the expected rewards, costs, and probabilities of obtaining different outcomes.

Social interaction theory provides an explanation of aggressive acts motivated by higher level (or ultimate) goals. Even hostile aggression might have some rational goal behind it, such as punishing the provocateur in order to reduce the likelihood of future provocations. This theory provides an excellent way to understand recent findings that aggression is often the result of threats to high self-esteem, especially to unwarranted high self-esteem (i.e., narcissism) (Baumeister et al. 1996, Bushman & Baumeister 1998).

THE GENERAL AGGRESSION MODEL

A Heap of Stones is Not a House

"Science is built up with fact, as a house is with stone.

But a collection of fact is no more a science than a heap of stones is a house."

Jules Henri Poincaré

Poincaré's analogy fits the scientific study of aggression. The several current domain-specific theories are the important stones awaiting blueprints, mortar, and a construction crew to build the much more useful house, a general theory of human aggression.

This chapter presents the most recent version of our integrative framework, called the general aggression model (GAM). This theoretical framework was designed to integrate existing mini-theories of aggression into a unified whole. We have fruitfully used various forms of this model for several years (e.g., Anderson 1997; K.B. Anderson et al. 1998; Anderson et al. 1995, 1996a; Anderson & Dill 2000; Bushman & Anderson 2001; Lindsay & Anderson 2000). This general model has at least four advantages over smaller domain theories. First, it is more parsimonious than the set of existing mini-theories. Second, it better explains aggressive acts that are based on multiple motives, e.g., both instrumental and affect-based aggression (Bushman & Anderson 2001). Third, it will aid in the development of more comprehensive interventions designed to treat individuals who are chronically aggressive; many current treatment attempts fail because they focus on only one specific type of aggression or use only one mini-theoretical approach to treatment (Tate et al. 1995). Fourth, it provides broader insights about child rearing and development issues, thus enabling parents, teachers, and public policy makers to make better decisions about child-rearing practices (Zigler et al. 1992).

We believe that GAM provides a useful integrative framework for domain-specific theories of aggression, transforming a heap of stones into a house. For this chapter we have expanded earlier versions of the model (e.g., Anderson 1997; Anderson et al. 1995, 1996a; Anderson & Dill 2000; K.B. Anderson et al. 1998). Specifically, we have dropped the "affective" part of the earlier general affective aggression model, based on the new and broadening definitions of the proximate and ultimate goals of aggression elucidated in Bushman & Anderson (2001). GAM draws heavily on recent work on the development and use of knowledge structures for perception, interpretation, decision making, and action (e.g., Bargh 1996, Collins & Loftus 1975, Fiske & Taylor 1991, Higgins 1996, Wegner & Bargh 1998). Key features include the ideas that knowledge structures (a) develop out of experience; (b) influence perception at multiple levels, from basic visual patterns to complex behavioral sequences; (c) can become automatized with use; (d) can contain (or are linked to) affective states, behavioral programs, and beliefs; and (e) are used to guide people's interpretations and behavioral responses to their social (and physical) environment. Three particularly relevant subtypes of knowledge structures are (a) *perceptual schemata*, which are used to identify phenomena as simple as everyday physical objects (chair, person) or as complex as social events (personal insult); (b) *person schemata*, which include beliefs about a particular person or groups of people; and (c) *behavioral scripts*, which contain information about how people behave under varying circumstances.

Knowledge structures include affect in three different ways. First, they contain links to experiential affect "nodes" or concepts. When a knowledge structure containing anger is activated, anger is experienced. Second, they include knowledge about affect, such as when a particular emotion should be experienced, how

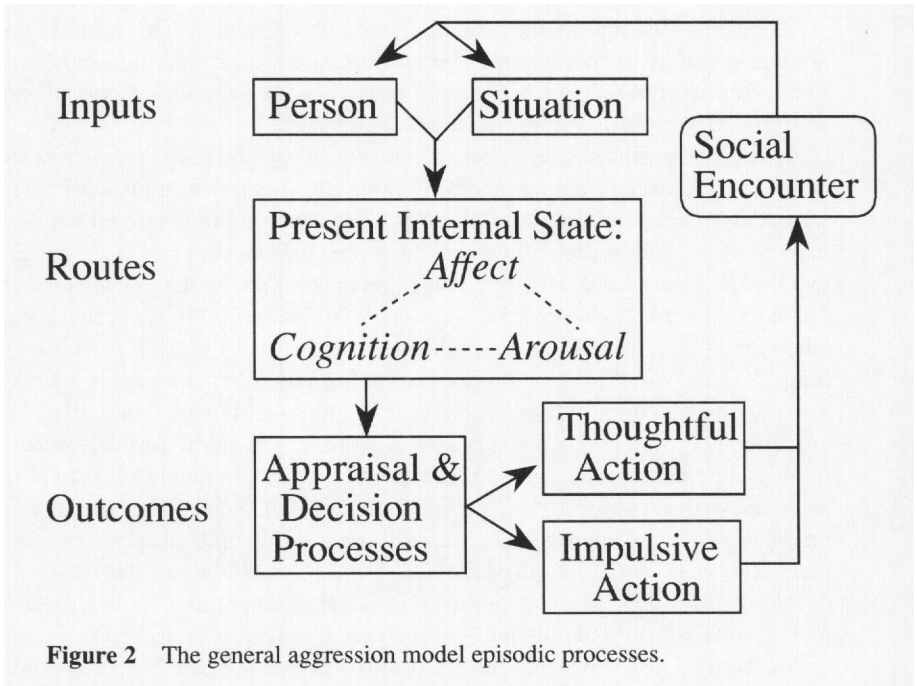


Figure 2 The general aggression model episodic processes.

emotions influence people's judgments and behavior, and so on. Third, a script may include affect as an action rule (Abelson 1981). For example, a personal insult script may prescribe aggressive retaliation but only if anger is at a high level or fear is at a low level.¹

GAM focuses on the "person in the situation," called an *episode*, consisting of one cycle of an ongoing social interaction. Figure 2 presents a simplified version of the main foci of the model. The three main foci concern (a) person and situation inputs; (b) cognitive, affective, and arousal routes through which these input variables have their impact; and (c) outcomes of the underlying appraisal and decision processes.

INPUTS

Aggression research focuses on discovering what biological, environmental, psychological, and social factors influence aggressive behavior, and on how to use these discoveries to reduce unwarranted aggression. These factors can be

¹See Anderson & Dill 2000, Anderson et al. 2000, Bushman & Anderson 2001 for additional details about types of knowledge structures key to understanding human aggression and the advantages of this approach.

categorized as features of the situation or as features of the person in the situation. The following list of personological and situational input variables is illustrative of key causal factors. Though this list is somewhat biased towards recent research and is not comprehensive, discussing it in a GAM framework leads to a simpler and more comprehensive understanding of human aggression than is possible using the mini-theory approach so commonly used throughout contemporary psychology. Specifically, GAM indicates the types of underlying processes to examine to see how various inputs lead to aggressive (or nonaggressive) behavior.²

Person Factors

Person factors include all the characteristics a person brings to the situation, such as personality traits, attitudes, and genetic predispositions. Stable person factors are those that display consistency across time, across situations, or across both. This consistency is largely the result of the person's consistent use of schemata, scripts, and other knowledge structures (Mischel 1999, Mischel & Shoda 1995). In a very real sense, personality is the sum of a person's knowledge structures. Knowledge structures also influence what situations a person will selectively seek out and what situations will be avoided, further contributing to trait-like consistency. Together, person factors comprise an individual's preparedness to aggress.

TRAITS Certain traits predispose individuals to high levels of aggression. One recent breakthrough, for example, was the discovery that certain types of people who frequently aggress against others do so in large part because of a susceptibility towards hostile attribution, perception, and expectation biases (e.g., Crick & Dodge 1994, Dill et al. 1997). Another recent breakthrough contradicts longstanding beliefs of many theoreticians and the lay public alike: A type of high self-esteem (and not low self-esteem) produces high aggression. Specifically, individuals with inflated or unstable self-esteem (narcissists) are prone to anger and are highly aggressive when their high self-image is threatened (Baumeister et al. 1996, Bushman & Baumeister 1998, Kernis et al. 1989). Both discoveries fit the GAM knowledge structure approach quite well.

SEX Males and females differ in aggressive tendencies, especially in the most violent behaviors of homicide and aggravated assault. The ratio of male to female murderers in the United States is about 10:1 (FBI 1951–1999). Laboratory studies often show the same type of sex effect, but provocation dramatically reduces sex differences in physical aggression, and specific types of provocation differentially affect male and female aggression (Bettencourt & Miller 1996). The preferred types of aggression also differ for males and females. Males prefer direct aggression, whereas females prefer indirect aggression (e.g., Oesterman et al.

²Space limitations preclude detailed discussion of how biological factors operate within GAM. Briefly, we believe that genetic and other biological factors operate via influences on learning, decision-making, arousal, and affective processes (see Scarpa & Raine 2000).

1998). Developmental research suggests that many of these differences result from different socialization experiences (White 2001). However, evolutionary explanations of some key gender differences also have received empirical support (Buss & Shackelford 1997, Campbell 1999, Geary 1998). For example, males are more upset by sexual infidelity of their mates than by emotional infidelity, whereas the opposite pattern occurs for females (Geary et al. 1995). In all of these examples, our understanding of sex differences in aggression is greatly enhanced by the discovery of differential affective reactions.

BELIEFS Many types of beliefs play a role in preparedness to aggress. Efficacy-related beliefs are particularly important (e.g., Bandura 1977). Those who believe that they can successfully carry out specific aggressive acts (*self-efficacy*) and that these acts will produce the desired outcomes (*outcome efficacy*) are much more likely to select aggressive behaviors than those who are not so confident of the efficacy of aggressive acts. Aggression-related beliefs significantly predict future levels of aggressive behavior (Huesmann & Guerra 1997). The source of such beliefs in children is often the family (Patterson et al. 1989, 1992).

ATTITUDES Attitudes are general evaluations people hold about themselves, other people, objects, and issues (Petty & Cacioppo 1986, p. 4). Positive attitudes towards violence in general also prepare certain individuals for aggression. More specific positive attitudes about violence against specific groups of people also increase aggression against those people. For example, attitudes about violence against women are positively related to sexual aggressiveness against women (e.g., Malamuth et al. 1995). Males prone to aggress against women are not generally aggressive against all people in all situations; rather, they specifically target women (but not men) who have provoked them (Anderson 1996).

VALUES Values—beliefs about what one should or ought to do—also play a role in aggression preparedness. For many people, violence is a perfectly acceptable method of dealing with interpersonal conflict, perhaps even a preferred method. For example, the value system in parts of the southern and western regions of the United States dictates that affronts to personal honor must be answered, preferably with violence (Nisbett & Cohen 1996). There is evidence that some youth gang violence results from similar codes of honor and personal respect (Baumeister & Boden 1998).³

LONG-TERM GOALS Long-term, abstract goals also influence the preparedness of the individual for aggression. For example, the overriding goal of some gang members is to be respected and feared (Horowitz & Schwartz 1974, Klein & Maxson

³Though Nisbett & Cohen present evidence that a culture of honor is positively related to violence, their claim that this “explains away” apparent hot temperature effects on violent crime is not supported by recent empirical and theoretical analyses (Anderson et al. 2000, Berkowitz 2001).

1989). Such a goal obviously colors one's perceptions of episodes, values, and beliefs about the appropriateness of various courses of action. Similarly, a personal life goal of obtaining wealth can increase one's preparedness for instrumental aggression.

SCRIPTS The interpretational and behavioral scripts a person brings to social situations influences that person's preparedness for aggression (Huesmann 1988, 1998). Scripts are composed of many of the preceding elements.

Situational Factors

Situational factors include any important features of the situation, such as presence of a provocation or an aggressive cue. Like the person factors, situational factors influence aggression by influencing cognition, affect, and arousal.

AGGRESSIVE CUES Aggressive cues are objects that prime aggression-related concepts in memory. For instance, Berkowitz & LePage (1967) found that the mere presence of guns (versus badminton racquets and shuttlecocks) increased the aggressive behavior of angered research participants (see Carlson et al. 1990 for a meta-analytic confirmation of this phenomenon). More recently, our understanding of the weapons effect has been enhanced by the discovery that weapon pictures and words automatically prime aggressive thoughts (CA Anderson et al. 1998). Other situational variables that increase aggression, such as exposure to violent television, movies, or video games, also appear to do so via cognitive cueing effects (Anderson & Dill 2000, Bushman 1998).

PROVOCATION Perhaps the most important single cause of human aggression is interpersonal provocation (Berkowitz 1993, Geen 2001). Provocations include insults, slights, other forms of verbal aggression, physical aggression, interference with one's attempts to attain an important goal, and so on. One emerging line of research concerns workplace violence, aggression, and bullying (Cowie et al. 2001, Folger & Baron 1996). One study (Baron 1999) found that perceived injustice was positively related to workplace aggression.

FRUSTRATION Frustration can be defined as the blockage of goal attainment. Most provocations can be seen as a type of frustration in which a person has been identified as the agent responsible for the failure to attain the goal. Even frustrations that are fully justified have been shown to increase aggression against the frustrating agent (e.g., Dill & Anderson 1995) and against a person who was not responsible for the failure to attain the goal (e.g., Geen 1968). More recent work has shown that displaced aggression, wherein the target of aggression is not the person who caused the initial frustration, is a robust phenomenon (Marcus-Newhall et al. 2000, Pedersen et al. 2000). Whether such frustration effects operate primarily by influencing cognitions, affect, or arousal is unclear.

PAIN AND DISCOMFORT Other research has shown that even nonsocial aversive conditions (e.g., hot temperatures, loud noises, unpleasant odors) increase aggression (Berkowitz 1993). Acute aversive conditions, such as pain produced by immersing a hand in a bucket of ice water, increase aggression (e.g., Berkowitz et al. 1981). General discomfort, such as that produced by sitting in a hot room, can also increase aggression; this effect appears to be mediated primarily by increasing negative affect, though there may be cognitive and arousal processes at work too (Anderson et al. 2000).

DRUGS Various drugs such as alcohol and caffeine can also increase aggression (Bushman 1993). These effects appear to be indirect rather than direct; Bushman (1997) found that aggression-facilitating factors (e.g., provocation, frustration, aggressive cues) have a much stronger effect on people who are under the influence of drugs than on people who are not.

INCENTIVES The types of incentives that can increase aggression are as numerous as the number of objects that people want or desire. Indeed, the whole advertisement industry rests on the goal of making people want more things (e.g., Kilbourne 1999). By increasing the value of an object, one changes the implicit or explicit perceived cost/benefit ratios, thereby increasing premeditated, instrumental aggression. Momentary appearance of an incentive, such as money left on a table, can also influence aggression in a less premeditated way.

ROUTES

Input variables influence the final outcome behavior through the *present internal state* that they create. For instance, trait hostility and exposure to violent movie scenes interactively influence accessibility of aggressive thoughts (Anderson 1997), aggressive affect (Bushman 1995), and aggressive behavior (Bushman 1995). The internal states of most interest concern cognition, affect, and arousal.

Cognition

HOSTILE THOUGHTS Some input variables influence aggressive behavior by increasing the relative accessibility of aggressive concepts in memory. Frequent activation of a concept results in its becoming chronically accessible, whereas an immediate situational activation results in making the concept accessible for a short time (e.g., Bargh et al. 1988; Sedikides & Skowronski 1990). The temporary increase in the accessibility is often called priming. A host of factors, such as media violence, can prime aggressive thoughts (e.g., Anderson & Dill 2000, Bushman 1998).

SCRIPTS Huesmann (1998) has described in detail the basic processes underlying the development of highly accessible aggressive scripts. Similarly, the hostile

attribution biases characteristic of aggressive children can be seen as instances of hostility-related scripts (Crick & Dodge 1994, Dodge & Coie 1987).

Affect

MOOD AND EMOTION Input variables can also directly influence affect, setting the stage for later effects on aggressive behavior. For example, pain increases state hostility or anger (Berkowitz 1993, K.B. Anderson et al. 1998). Uncomfortable temperatures produce a small increase in general negative affect and a larger increase in aggressive affect (Anderson et al. 1996a). Exposure to violent movie clips also increases hostile feelings (Anderson 1997, Bushman 1995, Bushman & Geen 1990, Hansen & Hansen 1990).

Many personality variables are related to hostility-related affect. For example, trait hostility as measured by self-report scales is positively related to state hostility (Anderson 1997, K.B. Anderson et al. 1998, Bushman 1995).

EXPRESSIVE MOTOR RESPONSES Expressive motor responses are the automatic reactions that occur in conjunction with specific emotions, largely in the face. Even in early infancy, unexpected pain (e.g., immunization inoculations) quickly produces "a clear cut, full-faced anger expression" (Izard 1991, p. 245). Berkowitz (1993) postulated that aversive experiences directly activate aggression-related motor programs that go beyond mere facial expression. This notion fits well with our knowledge structure approach in that many knowledge structures (such as scripts) include action tendencies that are activated whenever the knowledge structure itself reaches threshold.

Arousal

Arousal can influence aggression in three ways. First, arousal from an irrelevant source can energize or strengthen the dominant action tendency, including aggressive tendencies. If a person is provoked or otherwise instigated to aggress at the time that increased arousal occurs, heightened aggression can result (Geen & O'Neal 1969). Second, arousal elicited by irrelevant sources (e.g., exercise) can be mislabeled as anger in situations involving provocation, thus producing anger-motivated aggressive behavior. This mislabeling process has been demonstrated in several studies by Zillmann (1983, 1988), who has named it excitation transfer. Excitation transfer theory suggests that this type of arousal effect may persist over a long period. Even after the arousal has dissipated, the individual may remain potentially aggressive for as long as the self-generated label of "angry" persists. A third, and as yet untested, possibility is that unusually high and low levels of arousal may be aversive states, and may therefore stimulate aggression in the same way as other aversive or painful stimuli.

A large number of situational variables influence both physiological and psychological arousal. Exercise increases both, whereas alcohol decreases both. Interestingly, changes in physiological and psychological arousal do not always coincide. Hot temperatures increase heart rate while simultaneously decreasing

perceived arousal. This suggests that heat might increase aggression through the arousal route (Anderson et al. 2000).

Interconnections

As shown in Figure 2, the contents of these three routes are highly interconnected. That cognitions and arousal influence affect is an idea that goes back several generations, through Schachter & Singer (1962) and William James (1890). Affect also influences cognition and arousal (Bower 1981). Research has shown that people often use their affective state to guide inference and judgment processes (Forgas 1992, Schwarz & Clore 1996). At a theoretical level, one can view affect as a part of semantic memory that can be primed via spreading activation processes. Thus, hostile cognitions might make hostile feelings more accessible, and vice versa.

OUTCOMES

The third focus, on outcomes, includes several complex information processes, ranging from the relatively automatic to the heavily controlled (e.g., Robinson 1998, Smith & Lazarus 1993). As shown in Figure 2, results from the inputs enter into the appraisal and decision processes through their effects on cognition, affect, and arousal. In Figure 3 the more automatic processes are labeled "immediate appraisal," whereas the more controlled processes are labeled "reappraisal." The outcomes of these decision processes themselves determine the final action of the episode. The final outcomes then cycle through the social encounter to become part of the inputs for the next episode, as depicted in Figure 2.

The appraisal and decision processes depicted in Figure 3 are taken from research on spontaneous inferences (Krull 1993, Krull & Dill 1996, Uleman 1987)

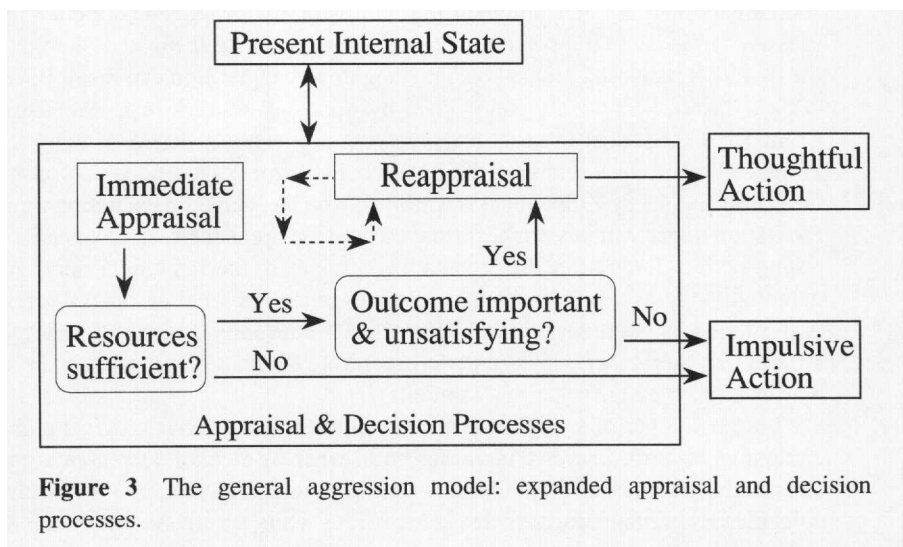


Figure 3 The general aggression model: expanded appraisal and decision processes.

and on explanation and attribution processes (Anderson et al. 1996). To conserve space, we present only a brief tour here.

Immediate appraisal is automatic, i.e., relatively effortless, spontaneous, and occurring without awareness. Depending on the circumstances, immediate appraisal may produce either an automatic trait or situational inference. For example, if a person (target) has been thinking aggressive thoughts and is bumped by another person (actor), the target is likely to perceive the bump as an aggressive act by the actor. However, if the target has been thinking about how crowded the room is, the same bump is likely to be immediately perceived as an accidental consequence of the crowded situation. The present internal state determines, to a great extent, which type of automatic inference is generated. And of course, both person and situation factors determine the present internal state. Thus, Crick & Dodge's (1994) hostile-attribution-bias children bring to the situation a readiness to see intentional affronts where none exists.

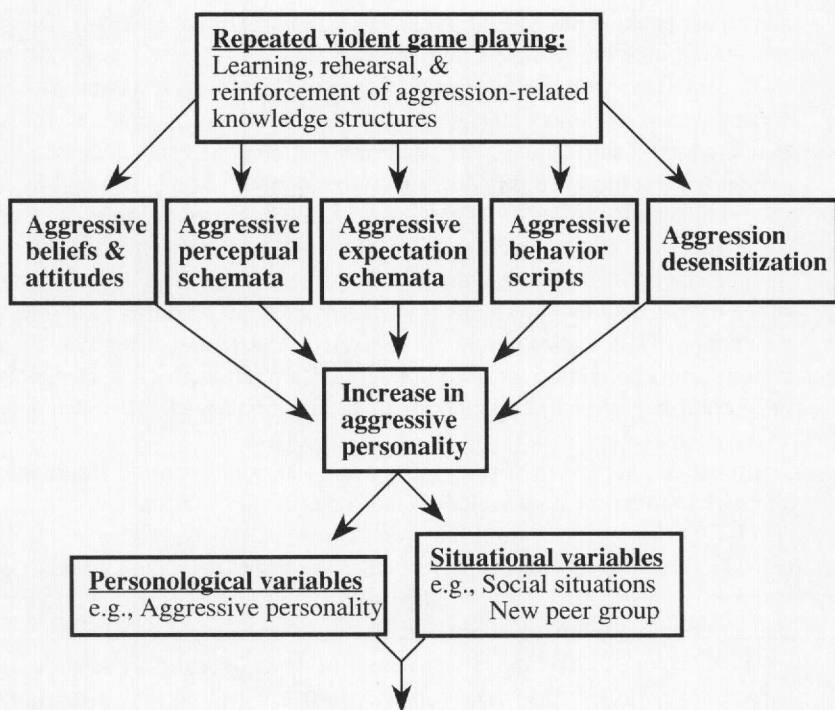
Immediate appraisals include affective, goal, and intention information. An aggressive appraisal may include anger-related affect, a retaliation goal, and a specific intention to carry out that goal. However, the exact response will differ considerably from person to person, depending on the person's social learning history (i.e., their personality) and present state of mind (i.e., which knowledge structures are currently most accessible).

What happens after immediate appraisal depends on other resources. If the person has sufficient resources (time, cognitive capacity) and if the immediate appraisal outcome is both important and unsatisfying, then the person will engage a more effortful set of reappraisals. Otherwise, impulsive action results, action that may be aggressive or nonaggressive depending on the content of the immediate appraisal.

Reappraisal involves searching for an alternative view of the situation. It can include a search for relevant information about the cause of the event, a search for relevant memories, and a search for features of the present situation. Reappraisal may include numerous cycles as alternatives are considered and discarded. At some point the recycling process ceases and a thoughtful course of action occurs. If reappraisal leads the person to believe that the bump was an intentionally harmful act, the person may well respond with a thoughtful aggressive action, which may be coldly calculating or may still have hot affective characteristics. Indeed, the reappraisal can increase the level of anger as past wrongs are dredged up from memory or as the damage to one's social image becomes more apparent. Note that the "present internal state" is affected by both types of appraisal, indicated by the double-headed arrow in Figure 3.

PERSONALITY PROCESSES

Just because GAM focuses on the episode and the present internal state does not mean that either the past or the future are irrelevant. The past is represented by what people bring with them to the present episode. Similarly, the future is represented by the person's plans, expectations, goals, and other similar knowledge structures.



General Aggression Model, as in Figure 2

Figure 4 The general aggression model personality processes.

Repeatedly exposing children to certain factors (e.g., media violence, poor parenting) produces aggressive adults (Huesmann & Miller 1994, Patterson et al. 1992). Such long-term effects result from the development, automatization, and reinforcement of aggression-related knowledge structures. Figure 4 identifies five types of such knowledge structures. In essence, the creation and automatization of these aggression-related knowledge structures and the desensitization effects change the individual's personality. Long-term consumers of violent media, for example, can become more aggressive in outlook, perceptual biases, attitudes, beliefs, and behavior than they were before the repeated exposure, or would have become without such exposure.

Theoretically, these long-term changes in aggressive personality operate in the immediate situation through both types of episodic process input variables depicted in Figure 2: person and situation variables. The link to person variables is obvious—the person is now more aggressive in outlook and propensity. Less obvious is how long-term effects of repeated exposure to maladaptive situations can systematically change other situational variables.

Huesmann & Miller (1994) proposed a model of the long-term social and academic effects of repeated exposure to television violence. A generalized version of this model accounts for other long-term effects, too. As a child becomes more aggressive, the social environment responds. The types of people who are willing to interact with the child, the types of interactions that are held, as well as the types of situations made available, all change. Interactions with teachers, parents, and nonaggressive peers are likely to degenerate, whereas interactions with other "deviant" peers may well increase. Repeated exposure to other situational factors that produce short-term increases in aggression, described earlier, are believed to produce long-term increases in a similar manner.

RELATED PHENOMENA

Opportunity

There are several other features of human aggression that must be successfully explained by any "general" model. For instance, one powerful predictor of aggression is opportunity, or the social situation (Goldstein 1994). Some situations restrict opportunities to aggress; others provide good opportunities. Church services contain many impediments to aggression—witnesses, strong social norms against aggression, and specific nonaggressive behavioral roles for everyone in attendance. Country/Western bars on Saturday nights present better opportunities for aggression. Many aggression facilitators are present: alcohol, aggressive cues, aggression-prone individuals, males competing for the attention of females, and relative anonymity. This phenomenon fits well with GAM and its underlying knowledge structure approach.

Overriding Inhibitions

Another phenomenon of interest has garnered increased attention in recent years—the aggression inhibitions that normally operate in most people. Several research groups have independently identified and discussed how these inhibitions are sometimes overridden (Bandura 2001; Bandura et al. 1996; Keltner & Robinson 1996; Staub 1989, 1998). Most people do not commit extreme acts of violence even if they could do so with little chance of discovery or punishment. Such self-regulation is due, in large part, to the fact that people cannot easily escape the moral standards that they apply to themselves. Self-image, self-standards, and sense of self-worth are used in normal self-regulation of behavior. However, people with apparently normal moral standards sometimes behave reprehensibly towards others, by committing such actions as murder, torture, and even genocide. Two particularly important mechanisms that allow people to disengage their normal moral standards involve moral justification and victim dehumanization. Common justifications for extreme and mass violence include "it is for the

person's own good," or the good of the society, or that personal honor demands the violent action. These justifications can be applied at multiple levels, from a parent's abuse of a child to a genocidal war. Dehumanizing the victim operates by making sure that one's moral standards are simply not applicable. War propaganda obviously fits this mechanism, but people also use it at an individual level. Potential victims are placed in the ultimate outgroup—one that has no human qualities. In essence, new knowledge structures are created that explicitly move the target group into a category for which aggression is not only acceptable, but a part of the script.

Several of the more "acute" factors influencing aggression may also operate by reducing inhibitions. For instance, some drugs reduce aggression inhibitions, though the exact mechanism is unknown (e.g., Bushman 1997). Similarly, extreme anger or agitation may increase aggression by reducing inhibitions.

Shared Motivations

People require more than food and shelter to survive. From an evolutionary standpoint, the species also requires an ability and propensity to work cooperatively in social groups. Several common social needs appear repeatedly in the writings of scholars across many areas of psychology (e.g., Baumeister & Leary 1995, Hogan 1998). One such list might include the needs to (a) view oneself positively (self-esteem); (b) believe that others view the self positively (social esteem); (c) believe the world as a just place, if not here then in the hereafter; (d) belong to a social group; (e) view one's group positively (group esteem).

Threats to these needs are often the source of aggressive behavior. Of course, an individual's learning history determines to a great extent what kinds of behaviors will be linked to various threats. Nonetheless, it is striking how often aggression is the dominant response to such threats. We suggest two sources for this commonality. First, aggression frequently works in the short run, especially for big people who wish to control the behavior of small people (e.g., parents punishing children, male-on-female aggression). Second, there seems to be a "preparedness" (Berkowitz 1993, Seligman 1970) to emit aggressive behaviors when faced with pain, physical or psychological. Perhaps the anger-aggression linkage is one that humans are evolutionarily prepared to learn.

Role of Anger

In recent years, aggression scholars have questioned the traditional assumption that anger causes aggression (e.g., Berkowitz 1993, Geen 2001). We believe anger plays several causal roles in aggression (see Berkowitz 2001). First, anger reduces inhibitions against aggressing in at least two ways. Anger sometimes provides a justification for aggressive retaliation—it is part of the decision rule in the aggression script. Anger may sometimes interfere with higher-level cognitive processes, including those normally used in moral reasoning and judgment, which are part of the reappraisal process.

Second, anger allows a person to maintain an aggressive intention over time. Anger increases attention to the provoking events, increases the depth of processing of those events, and therefore improves recall of those events. Thus, anger allows one to reinstate the state that was present in the originally provoking situation.

Third, anger (like other emotions) is used as an information cue. It informs people about causes, culpability, and possible ways of responding (e.g., retaliation). If anger is triggered in an ambiguous social situation, the anger experience itself helps resolve the ambiguities, and does so in the direction of hostile interpretations.

Fourth, anger primes aggressive thoughts, scripts, and associated expressive-motor behaviors. Such anger-related knowledge structures are used to interpret the situation and to provide aggressive responses to the situation. One related consequence of the many links between anger and various knowledge structures is that people frequently pay more attention to anger-related stimuli than to similar neutral stimuli (Cohen et al. 1998).

Fifth, anger energizes behavior by increasing arousal levels. Given that aggression-related knowledge structures are also primed by anger, aggressive behavior is one likely form of behavior that is energized by anger.

Interventions

GAM fully accounts for the fact that attempts to change overly aggressive individuals become increasingly less successful as these individuals become older. With increasing life experiences, one's typical construal of the social world is largely based on well-rehearsed and accessible knowledge structures, which are inherently difficult to change.

Similarly, the model accounts for the fact that narrowly based prevention or treatment programs tend not to work, probably because there are so many ways that maladaptive knowledge structures can be learned. The most successful interventions appear to be those that address multiple sources of potentially maladaptive learning environments, and do so at a relatively young age (e.g., Zigler et al. 1992).

Attempts at treatment or "rehabilitation" of violent adults, usually done in the context of prison programs, have led to a general consensus of failure. Many treatments have been tried with violent juvenile offenders, including such things as "boot camps," individual therapy, "scared straight" programs, and group therapy. Unfortunately, there is little evidence of sustained success for any of these approaches. One problem is that these approaches do not address the wide range of factors that contribute to the development and maintenance of violent behavior. However, there is evidence that treatment can have a significant beneficial impact on violent juvenile offenders (e.g., Simon 1998).

One approach that appears promising is multisystemic therapy (Borduin 1999, Henggeler et al. 1998). Multisystemic therapy is a family-based approach that first identifies the major factors contributing to the delinquent and violent behaviors of the individual undergoing treatment. Biological, school, work, peer-group, family,

and neighborhood factors are examined. Intervention is then tailored to fit the individual constellation of contributing factors. Opportunities to observe and commit further violent and criminal offenses are severely restricted, whereas prosocial behavior opportunities are greatly enhanced and rewarded. Both the long-term success rate and the cost/benefit ratio of this approach have greatly exceeded other attempts at treating violent individuals.

In sum, GAM provides a useful framework for understanding and integrating what is already known about human aggression. It provides the mortar and structure to hold together the current domain-specific aggression theories so they form a house rather than a heap of stones. It incorporates smaller domain-specific aggression theories. It organizes recent theories of the development and persistence of the aggressive personality. It serves the heuristic function of suggesting important directions for future research designed to fill in theoretical gaps. Finally, it provides direction for creating and testing interventions designed to reduce unnecessary human aggression. As Immanuel Kant once remarked, research without theory is blind. We believe that theory-based aggression research can reduce the level of violence in society by increasing our understanding of the causes of aggression and violence.

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