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Stress, health and illness: Four challenges for the future

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The concept of stress has a long and perhaps foundational history in health psychology. However, it is also not without its detractors, who point out imprecise and simplistic use of the concept. Four challenges for stress research in health psychology delineate the nuanced and contextualised future. First, 'stress' can be located in the environment, in appraisal or in response (e.g., emotions or physiology). Careful conceptualisation and assessment can differentiate among these locales, as well as reveal interactions among them. Second, coping refers to the transaction between stress and the affected person. Understanding exactly *why* coping moderates the effects of stress is a major challenge for coping research. Third, stress happens to different people with different personalities and temperaments and at different stages of their lives. People may even be different from themselves at different life stages. These individual differences can impact all manner of stress and coping. Fourth, stress is dynamic. Minor events come and go, and major events create a cascade of changes in the individual's life. Understanding how stress, coping and health change over time within individuals (i.e., in a multi-level framework) will be a major advance for the field.

Keywords: stress; health; coping; personality; daily diaries

Introduction

The effect of psychological stress on health and illness has received a large amount of scientific and media coverage over the last three decades and beyond. There is accumulated evidence to suggest that stress affects health directly, not only by impacting autonomic and neuroendocrine responses, but also indirectly, by changing habitual and non-habitual health behaviours. Over the years, researchers have successfully explored its links with many of the leading causes of death in the world (e.g., ischaemic heart disease, stroke, HIV/AIDS, diabetes mellitus, etc.). The seven articles in this themed issue illustrate the breadth of this area and are exemplars of methodological and statistical innovations. Nevertheless, a number of important challenges remain. This article will briefly describe four challenges around the conceptualisation of stress (What and where is stress?), coping (What and where is

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coping?), personality (Need to incorporate personality and lifespan approaches) and methodology (Embracing multilevel methods in stress research) which ought to be resolved in order to further advance the field of stress research in health psychology.

Challenge #1: What and where is stress?

The concept of stress has a long and productive history in health research. Definitions of stress abound, but for the most part, each has been associated with poorer psychological and physical health. First, stress can be defined as ‘external events or conditions that affect the organism’ (Breznitz & Goldberger, 1993, p. 3). Of course, physiological stressors such as heat, cold, exertion or injury fall under this definition, and in fact seminal work by Cannon (1939) and Selye (1936) used such stressors to study the general adaptation syndrome. Health psychologists now more often turn to the effects of psychological rather than physiological stressors, including major stressors such as a disease diagnosis and the associated demands related to disease progression, treatment and so on (Downing et al., 2012; Gustavsson-Lilius, Julkunen, Keskivaara, Lipsanen, & Hietanen, 2012; Rinaldis, Pakenham, & Lynch, 2012). Role changes appear to be some of the most important stressors because of their ubiquity over the life course and the significant downstream consequences of what might be otherwise conceptualised as a discrete event (Arigo & Smyth, 2012). Prototypically, younger adults transition into new roles (e.g., via entry into college, employment or marriage), while older adults transition out (e.g., via retirement or bereavement) (Pearlin, 2010). However, there are new roles for older adults as well. For example, many older adults become caregivers of an ill spouse. This stressor has many downstream consequences, particularly social disruption (Brækhus, Øksengård, Engedal, & Laake, 1998; Russo & Vitaliano, 1995). Major stressors may exert some of their negative effects on health through a related cascade of minor undesirable events (Pearlin, 2010; Zautra, Finch, Reich, & Guarnaccia, 1991). This dynamic, in which one stressor leads to others, is most explicitly specified by resource models of stress, in which stress is operationalised as a loss of resources. In turn, fewer resources are predictive of further loss, as when lack of money to get a car repaired leads to loss of a job (Hobfoll, 1988). The effects of major stressors such as caregiving on the immune system, morbidity, and mortality (Segerstrom & Miller, 2004; Vitaliano, Zhang, & Scanlan, 2003) may reflect the combined effects of the initial stressor and this subsequent cascade; such effects emphasise the importance of studying major stressors in longitudinal designs.

Although life events – major and minor – and role transitions are conceptualised as psychological stressors, the stressor is still conceptually located in the circumstances. A second approach to stress locates stress within the person. An influential definition of stress (Lazarus & Folkman, 1984) approaches the effect of an event from the perspective of the person experiencing it. Appraisals of the demand of the event relative to one’s resources and the degree of threat, harm or challenge inherent in the situation determine whether an event is in fact experienced psychologically as stress. In this model, two people may experience the same external or objective circumstances, but different appraisals may lead one to feel ‘stressed’ but not the other. Perceived stress is often measured with the Perceived Stress Scale (PSS; Cohen, Kamarck, & Mermelstein, 1983), which captures feelings of overload,

uncontrollability, negative emotion such as anger or anxiety and low perceived ability to cope. Appraisal models can be used in conjunction with stressor or event-focused models (e.g., measuring perceived stress in the context of a stressor; Downing et al., 2012; Rinaldis et al., 2012) or in conjunction with distress models (e.g., measuring perceived stress along with distress; Howard & Hughes, 2012; see also Thoma, Scholz, Ehlert, & Nater, 2012). This approach may capture some of the cascade of stressors that arise from major events. It may also capture the effects of a major stressor on *appraisals* of subsequent events. For example, why do people who have been diagnosed with cancer endorse high frequency on an item on the PSS such as 'how often have you been able to control irritations in your life?' One definite possibility is that a cancer diagnosis increases the number of uncontrollable irritations in one's life. Another is that the cancer diagnosis makes one *feel* less in control of irritations, this feeling having generalised from the stress of the diagnosis itself to other minor life events.

A third approach also locates stress within the person, but defines stress as that which causes distress. For example, Verkuil, Brosschot, Meerman, and Thayer (2012) ask about 'events that have made you feel tense, irritated, angry, sad, disappointed or negative' (p. 145). This approach operationalises the presence or absence of a stressor by its consequences. This is analogous to early stress approaches, which defined stress by the presence or absence of physiological change (i.e., adrenal enlargement, gastrointestinal ulcers; Selye, 1936). Like the other two approaches, defining stress as that which causes distress has implications for other conceptualisations of stress. For example, negative mood can lead to attentional biases and changes in social networks that lead to new stressful appraisals and events.

The construct of stress, while useful, has also been robustly critiqued. Roberts (1950) famously wrote that 'stress, in addition to being itself and the result of itself, is also the cause of itself' (p. 105), having pointed out that the term applies to that which organisms respond (stressors), the responses themselves (stress) and the condition caused by these responses (distress). The first challenge to stress research, then, is to appropriately and explicitly locate stress and to understand the effects on other stress 'locations'. Table 1 suggests how one might decompose the effects of a major life transition such as those represented in this issue by the transition to college

Table 1. An example of how a major stressor such as role transition can have stressor, perceived stress and distress consequences whilst interacting among levels.

	Major stressor: Role transition	Interactions among levels
Stressor consequences	Financial and social stressors cascading from the transition	Additional stressor burden contributing to further perceived stress and distress
Perceived stress consequences	Sense of uncontrollability from the transition generalising to other situations or stressors	Sense of uncontrollability leading to passive coping, exacerbating stressors and increasing distress
Distress consequences	Anxiety or depression resulting from the transition	Distress can lead to attentional and social changes that could feed back to perceived stress and stressor consequences, respectively

and by disease diagnosis. Such a transition can lead to other, related stressors; to changes in appraisals of other major or minor events; and to distress. These consequences can also feed back on each other, insofar as appraisals can feed distress, distress can feed events and appraisals, and so on. The challenge of locating stress also implies a further challenge in understanding the interactions among these levels. For example, when cancer patients report increases in perceived stress, how much of this increase is due to the cancer diagnosis *per se*, and how much is due to a cascade of related stressors following from the diagnosis?

Challenge #2: What and where is coping?

How does one escape this vicious cascade of a major stressor and avoid the negative health consequences? Many studies have focused on coping. Coping is a *reaction* to the circumstances of a stressor and its consequent emotions, leading to an oft-used distinction between problem-focused and emotion-focused coping (Lazarus & Folkman, 1984). However, when it comes to subsequent adjustment, whether or not people are trying to change their circumstances (problem-focused coping) or their emotions (emotion-focused coping) may be less important than whether they are using approach or avoidance strategies. People who actively try to change problems (e.g., through focusing efforts on tasks) or approach their emotions (e.g., through acceptance or reappraisal; cf., Stanton, Danoff-Burg, Cameron, & Ellis, 1994; Stanton, Kirk, Cameron, & Danoff-Burg, 2000) may have better psychological and physical health outcomes than those who try to avoid problems (e.g., by giving up or disengaging) or emotions (e.g., through distraction) (Solberg Nes & Segerstrom, 2008). Another increasingly influential model of stress has to do with constructs that fall under the umbrellas of repetitive thought (Segerstrom, Stanton, Alden, & Shortridge, 2003) or perseverative cognition (Brosschot, Gerin, & Thayer, 2006). For example, Verkuil et al. (2012) propose that stress (defined as events that cause negative affect) contributes to somatic complaints to the degree that it causes worry. Worry is a form of negative repetitive thought that has previously been linked to poor physiological regulation and higher risk for cardiovascular disease (Kubzansky et al., 1997; Pieper, Brosschot, van der Leeden, & Thayer, 2007; Segerstrom, Glover, Craske, & Fahey, 1999; Segerstrom, Solomon, Kemeny, & Fahey, 1998). Likewise, Rinaldis et al. (2012) define avoidant coping with a subscale labelled rumination. This scale (Rinaldis, Pakenham, Lynch, & Aitken, 2009) has items that are similar to the constructs of depressive rumination (e.g., ‘wondered, “why me?”’; Nolen-Hoeksema, 1991), searching for meaning (e.g., ‘tried to work out why the cancer has happened’; Davis, Nolen-Hoeksema, & Larson, 1998) and wishful thinking (e.g., ‘wished the cancer would go away’). Why are these strategies detrimental to quality of life and perceived health? The possibility proposed by the model of perseverative cognition involves the negative valence of these kinds of thoughts (Segerstrom et al., 2003; Segerstrom, Roach, Evans, Schipper, & Darville, 2010; Watkins, 2008) and the way in which negative repetitive thought creates prolonged cognitive representations of stressors. However, it is important to note that these representations can occur in the absence of stressors, and worriers may be focused on possible events that are unlikely to happen. Another possibility is that these forms of negative repetitive thought represent abortive or unconstructive forms of problem-solving. Worry is similar to problem-solving (Davey, 1994;

Segerstrom et al., 2003), and in fact when variance related to trait anxiety is removed, worry correlates positively with approach coping (Davey, 1994). However, 'strategies (related to worry) are only likely to reduce anxiety and stress and actively remove the stressor if the problem is potentially controllable' (Davey, 1994, p. 41). The same could be said for other strategies that are obviously not going to yield stress reduction (e.g., 'wished the cancer would go away').

Understanding exactly *why* coping contributes to the vicious cascade after a stressor or protects against it is a major challenge for coping research. Many studies have reported that problem-focused coping is associated with better psychosocial outcomes, but it is less well known whether problem-focused coping actually ameliorates the problem, and if so, which one(s)? Perhaps problem-focused coping ameliorates the downstream minor stressors without affecting the focal stressor or helps people feel more in control regardless of the actual efficacy of their coping efforts.

Another major issue concerns the best model for coping. Many studies take a mediational perspective. Mediation implies that a stressor, stress appraisal or distress affects health to the degree that it causes coping. However, more studies might also consider a moderator model, in which the degree of relationship between a stressor, stress appraisal, or distress is affected by coping. For example, perhaps stressors are slightly related to somatic complaints when worry is low, but strongly related when worry is high. Perhaps stressors are slightly related to quality of life when approach coping is high, but strongly related when approach coping is low. In these models, coping still intervenes between a stressor and distress, but in a different way. Intervention studies are more likely than observational studies to use moderator models (Arigo & Smyth, 2012), but moderation is equally plausible in observational studies. Examining these alternative models is an important future direction.

Challenge #3: Need to incorporate personality and lifespan approaches

There is a substantial body of research that has shown that components of the five factor model (FFM) of personality are associated with longevity and health status (e.g., Ferguson, in press; Friedman et al. 1993, 1995; Lodi-Smith et al., 2010; Mroczek & Spiro, 2007; Shipley, Weiss, Der, Taylor, & Deary, 2007). For example, Friedman et al. (1993), using data from the Terman Life Cycle Study, reported that childhood conscientiousness predicted longevity and the magnitude of this effect (as a risk factor) was comparable to those from elevated serum cholesterol and systolic blood pressure levels in adulthood. Over the last two decades, a large amount of work has focused on potential explanatory mechanisms that may explain how these beneficial effects are transmitted. In the case of conscientiousness, the protective influence of childhood conscientiousness on health status has been found to be accounted for, in part, by its impact on health behaviours such as alcohol use and smoking. More recently, from a diathesis-stress perspective, it has been demonstrated that conscientiousness has the capacity to moderate stress-related changes in health behaviours such that individuals low in conscientiousness respond more negatively to stressful encounters compared to high conscientious individuals (O'Connor, Conner, Jones, McMillan, & Ferguson, 2009; Penley & Tomaka, 2002).

These findings suggest multiple pathways through which personality (and stress) may exert its protective or damaging influence: directly via changes in health

behaviours or indirectly through influencing stress–health behaviour relationships. A third pathway may also exist where some components of the FFM may directly influence the frequency and nature of daily stressors an individual experiences (and the resulting physiological responses). However, in order to fully elucidate how personality and stress processes interact over time, there is a need for researchers to adopt life course approaches. Friedman (2008) has suggested that ‘multiple causal linkages between personality and disease may be simultaneously operating across long periods of time’ (p. 668) and has called on researchers to use a new life-span epidemiological personality approach. Moreover, he argues that researchers cannot randomly allocate participants to a particular personality trait or to stress, and consequently we are left with correlational designs. As a result, there is a need to assess multiple predictors and multiple outcomes across a large number of years in order to fully understand the plausible causal linkages between personality, stress and health status. Informed by recent developments, it seems clear that various pathways exist, that individuals will select, encounter and create different environments and stressors, these may lead to a cascade of related minor events and as a result ‘it is unwise to attend to only one path’ (Friedman, 2008, p. 673).

Recent work by Mroczek and Spiro (2007) raises further challenges for future stress research. In an 18-year follow-up study, these authors explored whether changes in personality traits, in addition to the level of traits, influence mortality risk. They found that participants whose neuroticism increased over time *and* had a high level of neuroticism were significantly more likely to have died compared to participants without this combination. A number of potential pathways may account for these findings, such that participants with high and increasing neuroticism may engage in more maladaptive health behaviours (e.g., smoking, alcohol consumption) as a way of coping with high levels of negative affect. In addition, it may be that increasing levels of neuroticism reduce an individual’s ability to cope with stressors and/or to learn new and effective coping strategies (Mroczek & Spiro, 2007). Changes in personality over the life course are not restricted to neuroticism. For example, Roberts, Walton, and Viechtbauer (2006) have shown that conscientiousness, agreeableness, openness and social dominance all change; however, increases and decreases have been observed at different life stages. Whatever the pathway, a challenge for future researchers is to use life course approaches to explore the extent to which changes in personality traits can influence stress responses, as well as directly impacting on mortality and morbidity.

The role of personality in stress research has not been restricted to the FFM (Ferguson, in press). For example, numerous traits such as alexithymia, Type D, cynical hostility, perfectionism and self-control have been found to moderate the effects of stress and/or have direct effects on various health-related outcomes (e.g., Boals, vanDellen, & Banks, 2011; Dittner, Rimes, & Thorpe, 2011; Howard & Hughes, 2012; O’Connor & Ashley, 2008; Ruthig, Hanson, Pedersen, Weber, & Chipperfield, 2011; Williams, O’Connor, Grubb, & O’Carroll, 2011). In the current issue, of particular note is the study by Howard and Hughes (2012) which explores the validity of Type D personality construct in the general population. Type D personality, defined as high negative affectivity coupled with high social inhibition, has been found to be associated with coronary heart disease and congestive heart failure (Denollet et al., 1996; Denollet, Schiffer, & Spek, 2010). However, recently the precise nature of the construct (Ferguson et al., 2009) and the relationship to the development of cardiovascular disease have been called into question (Smith, 2011).

Ferguson et al. (2009) conducted a taxometric analysis to assess whether the construct is taxonic or dimensional and concluded it was best represented as the latter (contrary to its original conceptualisation). Smith (2011), in an editorial comment following the publication of two large-scale, failed replication studies in cardiac patients, has highlighted a number of conceptual and methodological issues with the construct. The gauntlet has been laid down and it is incumbent on future researchers to provide a more rigorous and statistically robust test of the Type D personality model in order to elucidate whether the whole is greater than the individual parts. Nevertheless, this controversy provides further support for the need to adopt life-span and longitudinal approaches to stress and personality research.

Challenge #4: Embracing multilevel methods in stress research

A number of avenues of research exploring the effects of stress on health have tended to be overly reliant on laboratory-based, cross-sectional methodologies and many studies have utilised single indices (i.e., assessed stressful life events over the previous year or 5 years) or 'snap-shot' measurements of stress (i.e., assessed perceptions of stress over the past two weeks). This has been particularly the case in terms of studies exploring the relationship between stress and health behaviours (cf., O'Connor, Jones, Conner, McMillan, & Ferguson, 2008; O'Connor, Hendrickx, et al., 2009). Such approaches have ignored the burgeoning body of evidence showing that fluctuations in within-person stressful daily hassles are important in understanding stress-outcome processes and that major stressors can have a cascading effect on daily undesirable events (e.g., Affleck, Tennen, Urrows, & Higgins, 1994; Dancey, Taghavi, & Fox, 1998; Fifield et al., 2004; Kanner, Coyne, Schaefer, & Lazarus, 1981; Newman, O'Connor, & Conner, 2007; Verkuil et al., 2012; Zautra et al., 1991). An early example comes from work by Kanner et al. (1981). These authors suggested that indices of (life) stress provide no understanding of what actually happens in day-to-day life and it is 'day-to-day events that ultimately have proximal significance for health outcomes and whose accumulative impact...should be assessed' (p. 3). Nevertheless, in the 30 years since publication of this article, adoption of these innovative approaches has been relatively slow.

Over the last decade or so, a number of methods have come to prominence that allow researchers to identify momentary patterns and changes in behaviour that may be associated with health outcomes. These techniques, variously referred to as experience sampling methods or diary methods, allow for *in situ* assessments of behaviour, and most importantly they allow causality to be inferred (Affleck, Zautra, Tennen, & Armeli, 1999; Ferguson, 2005). In terms of stress research, the use of open-ended diaries is becoming more popular. They allow respondents to record day-to-day minor life events or daily stressors/hassles that are part of everyday life and have the advantage of not constraining respondents to a limited number of events. Daily stressors or hassles are events, thoughts or situations which, when they occur, produce negative feelings such as annoyance, irritation, worry or frustration, and/or make you aware that your goals and plans will be more difficult or impossible to achieve (Conner, Fitter, & Fletcher, 1999; DeLongis, Coyne, Dakof, Folkman, & Lazarus, 1982; Jones, O'Connor, Conner, McMillan, & Ferguson, 2007; Payne, Jones, & Harris, 2010). An excellent example of a diary study is included in the current issue (Verkuil et al., 2012). As outlined earlier, using electronic diaries,

Verkuil et al. (2012) investigated the effects of momentary-assessed stressful events and worry episodes on somatic health complaints and found strong support for the 'perseverative cognition hypothesis' (i.e., that stressful events influence somatic health outcomes because people continue to worry about them).

There are a number of benefits of using diary methods or experience sampling techniques. These are best summarised in the words of Affleck et al. (1999), who argue that daily diary studies allow researchers '(a) to capture as closely as possible the "real-time" occurrences or moments of change (in study variables); (b) to reduce recall bias; (c) to mitigate some forms of confounding by using participants as their own controls and (d) to establish temporal precedence to strengthen causal inferences' (p. 747). Diary methods can also be used not just to record on-going behaviour patterns but also to examine how the co-variation between patterns of behaviour (e.g., stress and diet) varies as a function of an intervention. Moreover, using daily diaries permits researchers to use sophisticated statistical techniques (e.g., multi-level modelling) to examine day-to-day within-person effects *together* with the impact of between-person factors such as personality or gender (see Ferguson, 2005, for a detailed review). Daily diaries also allow researchers to incorporate lagged designs in order to explore causal relations between stress and health outcomes. For example, researchers could explore the extent to which stressors encountered in the morning predict pain levels in the afternoon or how high levels of daily perceived stress are causally related to psychological and physiological processes the following day. These methods could also be easily incorporated into life-span approaches. There are essentially three different diary method protocols that researchers ought to consider when planning stress research designs (Ferguson, 2005).

- (1) Interval-contingent: the participant completes diary at pre-specified intervals (e.g., end of each day). For example, this protocol is useful if we wanted to know if daily stressors are associated with health behaviours and if this relationship varies over time. Interval-contingent protocols are especially useful for frequent behaviours without a definitive start and end.
- (2) Event-contingent: the participant completes diary each time a specific event happens. For example, this protocol is useful if we were interested in investigating whether the act of smoking moderates daily stressors. Event-contingent protocols are especially useful to estimate event prevalence.
- (3) Signal-contingent: the patient completes diary in response to random 'alarms' or 'beeps' from a palmtop computer or similar device. For example, this protocol is useful if we wanted to establish whether daily stress is associated with the onset of pain episodes in chronic pain patients. Signal-contingent protocols are especially useful for recording data on the distribution, frequency and duration of events.

The data from daily process studies are essentially hierarchical. As such multi-level modelling procedures should be used to examine such data (see Kreft & De Leeuw, 2006, or Hox, 2002, for detailed introductions to multi-level modelling). For example, if we wanted to know if daily stressors influence health behaviours and if this relationship is moderated by personality or by an intervention, we would set up a multi-level model at two levels. Level-1 would be the daily variation in daily stressors and health behaviours (within-subject variation) and Level-2 would be the between-subject variation in personality or the intervention (e.g., Jones et al., 2007; O'Connor et al., 2008). In multi-level modelling, the outputs at one level (regression coefficients)

become the parameters that are modelled/analysed at the next level. Multi-level modelling procedures can also be used to examine experimental data with repeated assessments and physiological data. However, in terms of the latter, relatively few studies have explored the relationships between daily assessments of stress and stress-related physiological outcome measures (such as diurnal cortisol levels; blood pressure).

The day reconstruction method (DRM) has been introduced by Kahneman, Krueger, Schkade, Schwarz, and Stone (2004) as an alternative to diary methods. The DRM is a structured recall technique that enables participants to recall events, mood and well-being indicators over the previous day. While recognising daily *in situ* assessment as the gold standard, the DRM is a more efficient and less time-consuming technique. For example, Stone et al. (2006) recently used DRM to examine the diurnal rhythms of emotions in a large-scale investigation and identified a number of specific patterns which have not previously been observed. These authors argue that diary methods are frequently expensive, are associated with a heavy participant burden, and do not allow for the detection of finer grained patterns of behaviour or emotion. Another concern that has been levelled at diary methods when used in stress research relates to identifying the appropriate time interval for assessments. If the interval is too long or too short for the process in question, there is a risk that the relationship under investigation will not be observed leading to a false positive conclusion (Ferguson, 2005). Therefore, it is necessary to conduct careful pilot work in order to maximise the sensitivity of any study design. Nevertheless, both approaches have substantial merit and allow researchers to develop complex designs to test multiple predictors and multiple outcomes; to explore the downstream consequences of major stressors on minor daily events and could be incorporated into longitudinal life span approaches.

There is one final matter that we would like to briefly comment upon. There remains an urgent need to firmly establish a causal role for stress in the development of illness and disease. There is emerging 'causal' evidence in terms of the impact of life events that shows that uncontrollable events such as bereavement and natural disasters are clearly associated with increased myocardial infarction and mortality risk (Kloner, Leor, Poole, & Perritt, 1997; Mostofsky et al., 2012). However, there are other cases where the direction of the stress-health outcome relationship is much less clear (e.g., subjective or perceived stress over the course of an illness such as cancer). Therefore, it is our view that adoption of life course and longitudinal approaches, improving our understanding of coping, utilising (lagged) diary designs together with inclusion of personality measures, will move us another step closer to establishing the causal direction for stress in health and illness.

Conclusion

As the study of stress and health proceeds, our understanding of why, how, when and for whom negative life events, appraisals and emotional experiences interact with health will become increasingly nuanced. The assumption that the same event is subjectively the same or should have the same consequences for each person who experiences it will no longer be warranted (if it ever was). Instead, events will be understood in the context of the personality and life stage of the individual. In addition to the transaction between the person and the event, transactions

between the focal stressful event and other aspects of the person's life – their work, marriage, friendships, hobbies – will become part of this larger understanding. How these transactions occur on a daily or momentary level will paint a dynamic, rather than static, picture of stress, coping and health. It is not a quantum leap to imagine what this kind of research will look like; indeed, studies are already incorporating some if not all of these advances. By meeting the four challenges outlined here, these studies presage the future of stress research in health psychology.

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