

Stress Generation

J E Roberts

University at Buffalo, The State University of New York,
Buffalo, NY, USA

J A Ciesla

Vanderbilt University, Nashville, TN, USA

© 2007 Elsevier Inc. All rights reserved.

This article is a revision of the previous edition article
by J E Roberts and J A Ciesla, volume 3, pp 512–517,
© 2000, Elsevier Inc.

Life Stress in Psychopathology
Generation of Stressful Life Events
Generation of Stress Perceptions and Threat
Issues in Stress Assessment

Glossary

<i>Appraisal</i>	A cognitive process that involves evaluating the degree of threat associated with a life stressor, as well as the implications of that stressor.
<i>Camberwell life events and difficulties schedule</i>	An interview-based procedure for evaluating the presence, severity, and origins of stressful events and difficulties.
<i>Diatheses</i>	Vulnerability factors that increase the stressfulness and negative consequences of life events.
<i>Difficulties</i>	Ongoing stressful situations that persist for at least 3 months.
<i>Independence</i>	The degree to which a person's behavior or characteristics might have brought about a stressful life event.
<i>Matching events</i>	Acute major negative events that arise from or are thematically related to ongoing chronic stressors or role conflicts.

Life Stress in Psychopathology

Links between life stress and mental disorders such as depression have been drawn throughout history. For example, in the seventeenth century Robert Burton described how melancholia often was precipitated by environmental adversities, including interpersonal losses. Indeed, the very phenomenology of depression involves feelings of loss and ruminations on the hopelessness of one's life situation. When depressed, one experiences the world as impoverished and as imposing impossible demands. In such a frame of mind, ordinary hassles become insurmountable obstacles, deprivations, or failures over which people despair.

Thus, depression itself magnifies the apparent stress and strain of life.

Investigators have typically examined the role that life stress might play in the onset and maintenance of mental disorders. In other words, the focus has been on how life stress can result in psychopathology. However, it is also clear that life stress often results from individuals' behavior or characteristics. Many stressful life events and difficulties, therefore, are not random occurrences that happen to befall the unfortunate, but rather are at least in part created by the same individuals who suffer from them.

Likewise, certain individuals tend to react to negative life events with greater feelings of stress and distress than others. Increasingly, investigators are exploring the manner in which characteristics of the person and the environment can breed stressful life events and difficulties, as well as the more subjective stress reactions to those events. This generated stress, in turn, potentially contributes to other adverse psychological outcomes, such as episodes of depression. Although this is largely studied in the context of depression, an important area of future research involves determining whether other forms of psychopathology also contribute to stress generation.

As suggested earlier, stress generation can involve two separate processes. First, characteristics or behavior of the individual can contribute to the occurrence of actual life events. In other words, for various reasons, some people are more prone to encountering negative life events and difficulties than others. Second, characteristics of the individual can contribute to the level of threat or perceived stress associated with particular life events. In other words, given seemingly identical life events, some people will experience more severe subjective stress reactions than others.

Generation of Stressful Life Events

It is clear that people tend to select or even forge environments that reflect their personalities and genetic predispositions. Individuals with various temperaments create social-environmental niches that are consistent with these characteristics, and in turn these environments are likely to be associated with various types of life events. For example, studies have demonstrated that persons with higher levels of the personality characteristic neuroticism are more prone to experiencing negative life events, whereas those who are higher in extroversion are more prone to experiencing positive life events. Likewise, it is

quite possible that cognitive diatheses associated with depression, such as negative attributional styles or dysfunctional beliefs about interpersonal relationships, can lead to future stressful life events. For example, an individual who is cognitively biased to interpret ambiguous social encounters as rejection is likely to create the very abandonment so feared. The person's negative interpretations are likely to lead to conflict and rejection. In a similar vein, there is strong evidence that individuals genetically predisposed to depression are at heightened risk for negative life events. For example, the nondepressed biological relatives of depressed persons have been shown to be at greater risk of experiencing major life stressors than relatives of nondepressed individuals. Several quantitative behavioral genetic studies have confirmed this genetic contribution to stressful life events. Overall it is apparent that negative life events are not entirely randomly distributed and, instead, tend to cluster in certain persons. Furthermore, these individuals seem to be the same persons who are most vulnerable to psychological disorders, particularly depressive episodes, following life stress.

Brown and colleagues were among the first to explore the role that psychiatric symptomatology might play in generating stressful life events. Initial efforts by this research team were directed at establishing that negative life events could play a causal role in the development of subsequent depressive episodes. It was therefore critical that these investigators focused on events that clearly arose independently of psychiatric symptomatology. Across a number of studies, these and other researchers demonstrated that major acute stressful life events that were independent of depression itself (as opposed to events such as hospitalization for depression or losing one's job because of concentration difficulties) contributed to the onset of episodes of this disorder. However, these investigators also established that individuals with subclinical depressive conditions, as well as other psychiatric conditions, were at greater risk of encountering environmental adversities than those who were without symptomatology. In other words, individuals with subclinical depression or other psychiatric conditions were more likely to be faced with major acute stressful life events than were asymptomatic individuals. These acute stressors, in turn, were associated with the onset of episodes of clinical depression. Interestingly, subclinical depression and other psychiatric conditions failed to predict future depressive episodes in the absence of life stressors. Apparently, stress generation was largely responsible for the exacerbation of depressive symptoms, leading subclinical experiences to develop into full depressive episodes.

Furthermore, subclinical depression and other psychiatric conditions were associated with the generation of life events that are particularly depressogenic. Specifically, these conditions bred acute life events that matched either ongoing life difficulties (e.g., a conflictual marriage) or role conflicts (e.g., a conflict between one's career and family). These types of matching events have proven to be extremely potent contributors to the onset of episodes of clinical depression. In other words, matching events seem to be considerably more likely to result in clinical depression than other types of negative life events. Unfortunately, depression-prone individuals appear to generate the very types of stressors that are most likely to exacerbate their psychiatric conditions.

In a highly influential paper, Hammen also suggested that stress generation might be an important mechanism through which depression can lead to future depression. Across a number of studies based on adult, adolescent, and child samples, Hammen and colleagues have demonstrated that depression-prone individuals experience a greater frequency of subsequent life stressors compared to those with other psychiatric conditions, those with medical illnesses, and healthy control participants. Interestingly, this research suggests that interpersonal stressors, in particular, are generated by depression-prone individuals. Interpersonal stressors largely include conflicts and tension between people. Importantly, Hammen's work has demonstrated that stress generation can take place even during periods of remission, suggesting that factors beyond depressive symptomatology itself are likely to be at work. In other words, stress generation appears to be driven by some correlate or correlates of depression rather than depressive symptomatology itself.

What might these correlates be? Studies have explored aspects of personality pathology and interpersonal functioning, such as poor interpersonal problem solving and excessive reassurance seeking. For example, symptoms of cluster A (odd and eccentric) and cluster B (dramatic and erratic) personality pathology have been found to contribute to the generation of interpersonal stress, which in turn predicted the development of depressive symptomatology. Other research has focused on two personality styles implicated in vulnerability to depression, sometimes referred to as interpersonal relatedness (a style marked by excessive dependence on relationships) and self-definition (a style marked by excessive reliance on achievement and individuality in maintaining self-esteem), and has found that self-definition is particularly related to stress generation. In terms of interpersonal functioning, one study found that the generation of minor social stressors mediated the association between excessive

reassurance seeking and the development of depressive symptoms, whereas another found that the generation of interpersonal stressors mediated the association between poor interpersonal problem solving and subsequent depressive symptoms. Another line of research conducted by Kendler and colleagues has found that neuroticism and genetic liability to depression contribute to stress generation, whereas childhood sexual abuse and variation in the serotonin transporter gene increase individuals' sensitivity to the depressogenic effects of life stressors. Together, these studies suggest that personality pathology, interpersonal functioning, and some forms of genetic liability are associated with future depression by increasing the likelihood that individuals encounter stressful life events (particularly interpersonal stressors), whereas traumatic stress early in life and other types of genetic variability increase stress sensitivity. It will be important for future work to determine whether these characteristics contribute to stress generation and sensitivity on their own, or whether their effects become more potent in combination with pre-existing depressive symptomatology.

In addition to these characteristics of the person, it is likely that characteristics of the person's social environment are also related to stress generation. Brown and colleagues have documented how other ongoing aspects of the social world are associated with risk for future acute life events. These investigators developed the concept of life structure as being important in understanding the origins of life stress. In many cases, individuals who are faced with various forms of deprivation during childhood (e.g., parental loss, abuse, or neglect) become locked into an ongoing conveyor belt of environmental adversity and psychological vulnerability. These childhood environmental experiences put individuals at risk for further negative environmental experiences during later stages of life. For example, parental lack of care, neglect, and abuse during childhood can lead to teen pregnancy and marriage to an undesirable partner. In turn, these experiences set the stage for a variety of additional acute stressful life events and difficulties that are likely to occur in the future, such as marital violence, economic hardship, and infidelity. Simultaneously, this conveyor belt of adversity would continuously foster and reinforce psychological vulnerabilities, such as feelings of helplessness and low self-esteem, making it increasingly difficult to cope with stressors.

In summary, acute negative life events are more likely to be encountered by individuals with certain characteristics. In particular, this type of stress generation is associated with some forms of genetic predisposition, neuroticism, depression, and, quite

possibly, cognitive characteristics that are thought to increase risk for depression. Further, these generated life events appear to be characterized by interpersonal conflict and a resonance with other ongoing life stressors or role conflicts. It is presently unclear why depression-prone individuals are at risk for generating life stress. Important directions for future work include examining theoretically plausible mediators and moderators of this effect. For example, Hammen and colleagues have begun to explore the possible roles of interpersonal functioning, comorbidity, and personality pathology, while Brown and colleagues have focused on the individual's unfolding social-environmental context. Future work also needs to examine stress generation in psychological disorders beyond depression.

Generation of Stress Perceptions and Threat

Individuals differ in the degree to which they experience negative reactions to seemingly identical life events, i.e., stress reactions are determined not only by the nature of the event, but also by the nature of the individual. Lazarus and Folkman proposed that stress itself is best thought of as a process in which the individual actively mediates the relationship between life events and psychological distress. In response to a life event, individuals are thought to first engage in a primary appraisal of the potential negativity or threat. Different individuals are likely to appraise the same event in quite different ways. One person may view a job demotion as an irreversible career blemish, while another may view this event as only a minor setback. Subsequent to this initial threat appraisal, individuals are thought to engage in another assessment. This secondary appraisal involves further evaluation of the situation and the degree to which the person has the resources available to effectively deal with the event. In a number of ways, this involves cognitive, emotional, and social aspects of the individual. Finally, following primary and secondary appraisal, different coping strategies can be initiated. Individuals are known to differ in their coping efficacy and typical coping styles, both of which are likely to effect psychological adjustment to life stress. In describing this stress process, Lazarus has been influential in identifying multiple ways in which properties of the individual can affect vulnerability to life stress.

Lazarus' model highlights the importance of individual differences in appraisal processes as contributing to the generation of stress reactions, but what underlies and influences these appraisals? From a theoretical perspective, other types of vulnerability

(so-called diatheses) may contribute to these negative appraisals. Diathesis stress models posit that certain characteristics increase the stress that individuals experience in response to negative life events. One such vulnerability factor that has received empirical support is attributional style.

According to Abramson and colleagues, individuals are motivated to understand and make sense of the causes of life events and tend to have relatively stable characteristic attributional styles. Persons who attribute negative life events to causes that are global (i.e., have far-reaching implications), stable (i.e., are predictive of future negative events), and internal (i.e., are caused by the self) are more likely to experience psychological distress than individuals who attribute negative life events to causes that are specific (i.e., are limited in life domain), unstable (i.e., are not likely to occur again), and external (i.e., are caused by the environment). While this is true of negative events, the opposite pattern is considered dysfunctional in the context of positive life events.

In addition to negative attributional styles, rigid, inappropriate, and perfectionistic beliefs about the self and the world, known as dysfunctional attitudes, likely contribute to the generation of stress perceptions and threat. Many of these beliefs concern contingencies of self-worth that are unrealistic in nature (e.g., one must be perfect or admired by all in order to be a person of worth or deserving of love). These cognitions are thought to interact with life stressors to result in psychological disorders. In this sense, a negative life event may be experienced as distressing in itself, but may also be considered by the individual to be an indication of a lack of self-worth. Through these beliefs, an event such as being laid off due to a factory closing may become a sign of one's personal incompetence and lack of value, generating more negative appraisals and perceived stress than would be generated by someone without these dysfunctional beliefs. In this way, the manner in which an individual's self-esteem is maintained and structured influences how much perceived stress is generated by particular classes of negative life events.

It is also apparent that environmental factors can contribute to these appraisal processes and, consequently, to the degree of stress generated by the occurrence of negative life events. For example, individuals with inadequate social support are likely to have more severe stress reactions than those with more supportive close relationships. Brown and colleagues have found that individuals who were "let down" during the negative event itself were more likely to develop episodes of depression than those who received expected crisis support. In the former situation, individuals' positive expectations about their close relationships would be shattered, leading to disappointment and

a reevaluation of the nature and quality of these relationships. Consequently, the event and its surrounding context would likely be appraised as considerably more threatening than if support had been forthcoming.

Likewise, individuals who are already faced with significant life stressors, particularly severe ongoing difficulties, are more likely to suffer from more severe stress reactions in response to additional negative life events than those without these additional burdens. Making matters more complicated, Coyne and Wiffen have argued that it is likely that these environmental factors are closely associated with the cognitive vulnerabilities discussed previously. For example, to some extent attributions about the implications of negative interpersonal events or dysfunctional beliefs about relationships likely arise from conflictual interpersonal relationships, such as unstable marriages. It becomes less clear whether it is primarily the cognitive characteristic (e.g., negative attributional style or dysfunctional beliefs about relationships) or the environmental factor (e.g., conflictual marriage) that contributes to the generation of stress reactions following an acute negative life event (e.g., a major argument with one's spouse).

In summary, characteristics of the individual and his or her social environment contribute to the degree of stress and distress that is generated in response to negative life events. These characteristics include appraisal processes that, in turn, are likely to be driven by underlying cognitive diatheses (such as negative "attribution styles" and dysfunctional beliefs), as well as environmental characteristics (such as inadequate social support and chronic stressors). An important area of future investigation involves attempting to disentangle the overlapping roles of these cognitive and environmental characteristics.

Issues in Stress Assessment

The notion of stress generation mandates that careful attention be paid to a number of issues in the assessment of life stress. First, it becomes crucial to examine the dimension of event independence. Presumably, generated events are those that were at least somewhat dependent on the individual's behavior or characteristics. Second, as previously discussed, stress generation involves two different processes: the first reflects the generation of actual negative life events, whereas the second reflects the generation of stress perceptions and reactions. Assessment procedures must be able to distinguish between these two processes. Third, it is becoming clear that in terms of objective events, stress generation is specific to certain classes of events, namely, events that match ongoing problems or that involve interpersonal

conflict. Assessment procedures need to be able to cleanly distinguish these classes of events from others.

In contrast to the stress generation studies conducted by Brown, Hammen, and their colleagues, the vast majority of research on the role of life stress in depression has relied on self-report checklists to assess life events. Unfortunately, self-report measures of life stress likely combine both relevant and irrelevant aspects of the stress construct, making it difficult to advance knowledge in this area. First, self-report measures of life events are unable to partition the occurrence of objective life events from the perception of life stress. As a result, it is unclear whether a participant's score is the result of actual changes in the environment or the perception of changes. A second major limitation of self-report life event measures is that they are unable to assess the degree to which events were influenced by the person or by other independent causes. Clearly, in order to investigate the hypothesis that individuals contribute to their own stress, it is necessary to establish that a given stressor was the result of an individual's behavior and was not completely independent or random. Finally, self-report measures make it difficult, if not impossible, to classify events into particular domains (e.g., interpersonal and matching versus nonmatching) in order to examine specific types of events.

Importantly, Hammen and colleagues' work suggests that depression generates interpersonal conflict events, but not other types of events. As such, these interpersonal conflict events should be examined separately from other types of events. It is notoriously difficult to make these distinctions on the basis of self-report checklists. For example, events that seemingly reflect noninterpersonal experiences (such as loss of one's job) often can involve an interpersonal conflict (such as a fight with one's boss). More in-depth probing is required to determine whether or not an event had significant interpersonal overtones.

Clearly, advancements in this area of inquiry are going to require the use of more sophisticated interview-based procedures that can more cleanly assess particular dimensions and domains of stressful life events. The Camberwell Life Events and Difficulties Schedule (LEDS) is the most well-developed and methodologically sound system. The LEDS first involves careful questioning about potential events in a variety of different life domains, as well as in-depth probing about the context surrounding each event. Events are then rated on a number of dimensions, including threat and independence, by a team of individuals who did not conduct the interview and who are kept blind to the psychological reactions to the events. In order to evaluate the likely individual meaning and importance of the event, ratings of degree of threat (stress) are made on the basis of the context

surrounding the event. So, for example, a pregnancy would be rated quite differently if it occurred in the context of a happy marriage and good financial resources than it would if it occurred in the context of marital violence, financial hardship, and poor living quarters. Of particular importance is the fact that the LEDS includes more than 5000 examples of different events that help anchor ratings of threat and independence. In addition, guidelines are provided to help determine what counts as an event. These guidelines set thresholds for inclusion and exclusion. Consequently, they help prevent individuals who report a number of very minor and trivial incidents from receiving higher scores than those who experienced the same incidents, but who failed to mention them during the interview. The LEDS is currently the only interview that includes these important features.

The notion of stress generation implies that the stressful life event in part resulted from the person's behavior or characteristics. As such, it is crucial that the dimension of life event independence is examined. The LEDS classifies events on a 12-point scale that includes categories that vary in terms of their independence of the person's behavior. Point 1 refers to events that are completely independent, such as accidents occurring to family members; point 2 refers to events for which it is impossible to completely rule out some aspect of the subject's behavior in leading to the event, e.g., a close friend deciding to move to another city; point 3 refers to events that possibly arose through the subject's behavior, but is unlikely, e.g., a child's academic difficulties; point 4 refers to physical illnesses of the subject; point 5 refers to events in which the subject consented or complied with external circumstances, e.g., agreeing to care for a sick relative; point 6 refers to intentional acts of the subject, e.g., deciding to return to school; point 7 refers to events that probably arose as a result of the subject's negligence, e.g., an automobile accident while subject was intoxicated; point 8 refers to events involving arguments or breaking off contact with someone after tension; point 9 refers to breaking off contact with someone without a precipitating argument or period of tension; point 10 refers to the subject's love events; point 11 refers to the subject's partner's love events, e.g., a partner's affair; and point 12 refers to events that are clearly the result of depression, e.g., fatigue, irritability, and concentration problems contributing to reprimands from one's boss and, eventually, to being fired.

In summary, research is beginning to document the ways in which individuals prone to psychological disorders, particularly depression, contribute to the stress that they experience in their lives. In turn, this generated stress might effect the onset, maintenance,

and recurrence of these conditions. Our developing understanding of these complicated transactional pathways suggests that more refined evaluations of life stress are required to advance knowledge in this area. In-depth interview-based approaches, such as the LEDS, are required to evaluate life events in terms of their severity, independence, content, and relation to other ongoing life problems.

See Also the Following Articles

Life Events and Health; Life Events Scale; Genetic Predispositions to Stressful Conditions; Psychosocial Factors and Stress.

Further Reading

- Abramson, L. Y., Alloy, L. B. and Metalsky, G. I. (1989). Hopelessness depression: a theory-based subtype of depression. *Psychological Review* **96**, 358–372.
- Brown, G. W. and Harris, T. O. (1978). *The social origins of depression*. New York: Free Press.
- Brown, G. W. and Harris, T. O. (eds.) (1989). *Life events and illness*. New York: Guilford Press.
- Coyne, J. C. and Whiffen, V. E. (1995). Issues in personality as diathesis for depression: the case of sociotropy-dependency and autonomy-self-criticism. *Psychological Bulletin* **118**, 358–378.
- Daley, S. E., Hammen, C., Davila, J. and Burge, D. (1998). Axis II symptomatology, depression, and life stress during the transition from adolescence to adulthood. *Journal of Consulting and Clinical Psychology* **66**, 595–603.
- Davila, J., Hammen, C., Burge, D., Paley, B. and Daley, S. E. (1995). Poor interpersonal problem solving as a mechanism of stress generation in depression among adolescent women. *Journal of Abnormal Psychology* **104**, 592–600.
- Hammen, C. (1991). Generation of stress in the course of unipolar depression. *Journal of Abnormal Psychology* **100**, 555–561.
- Kendler, K. and Kartowski-Shuman, L. (1997). Stressful life events and genetic liability to major depression: genetic control of exposure to the environment? *Psychological Medicine* **27**, 539–547.
- Lazarus, R. S. and Folkman, S. (1984). *Stress, appraisal and coping*. New York: Springer.
- Monroe, S. M. and Roberts, J. E. (1990). Conceptualizing and measuring life stress: problems, principles, procedures, progress. *Stress Medicine* **6**, 209–216.
- Monroe, S. M. and Simons, A. D. (1991). Diathesis-stress theories in the context of life stress research: implications for the depressive disorders. *Psychological Bulletin* **110**, 406–425.
- Potthoff, J. G., Holahan, C. J. and Joiner, T. E. (1995). Reassurance seeking, stress generation, and depressive symptoms: an integrative model. *Journal of Personality and Social Psychology* **68**, 664–670.
- Roberts, J. E. and Monroe, S. M. (1994). A multidimensional model of self-esteem in depression. *Clinical Psychology Review* **14**, 161–181.
- Scarr, S. and McCartney, K. (1983). How people make their own environments: a theory of genotype – environment effects. *Child Development* **54**, 424–435.

Stress Hyporesponsive Period

S Levine

University of California, Davis, CA, USA

E R de Kloet

Leiden/Amsterdam Center for Drug Research, Leiden, Netherlands

G Dent

AstraZeneca Pharmaceutical Co., Wilmington, DE, USA

M S Schmidt

Max Planck Institute of Psychiatry, Munich, Germany

© 2007 Elsevier Inc. All rights reserved.

This article is a revision of the previous edition article by S Levine, G Dent, and E R de Kloet, volume 3, pp 518–526, © 2000, Elsevier Inc.

Stress Hyporesponsive Period

Stress Hyporesponsive Period, the Adrenal, and Corticosterone

Stress Hyporesponsive Period and the Pituitary

Stress Hyporesponsive Period and the Brain

Corticosteroid Feedback

Conclusion

Glossary

Maternal deprivation

Separation of mother and infant during the stress hyporesponsive period, which needs to last for at least 8 h for immediate and persistent effects on the neuroendocrine regulation of the hypothalamic-pituitary-adrenal axis.

Stress hyporesponsive period (SHRP)

A period of reduced adrenal corticosterone and pituitary adrenocorticotrophic hormone release in response to stress, lasting in the rat from postnatal day 4 to 14 and in the mouse from postnatal day 1 to 12.