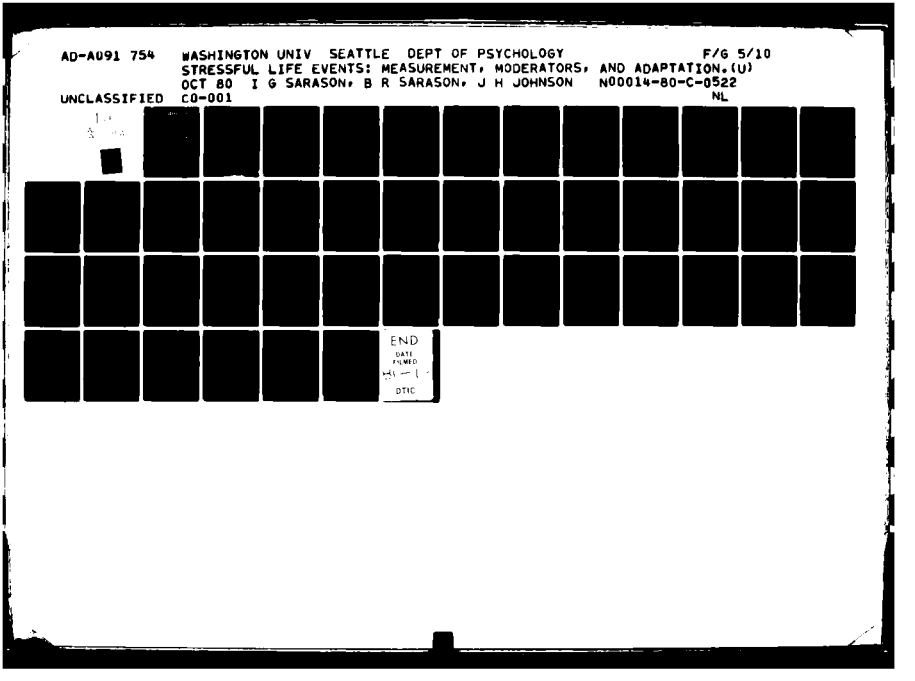
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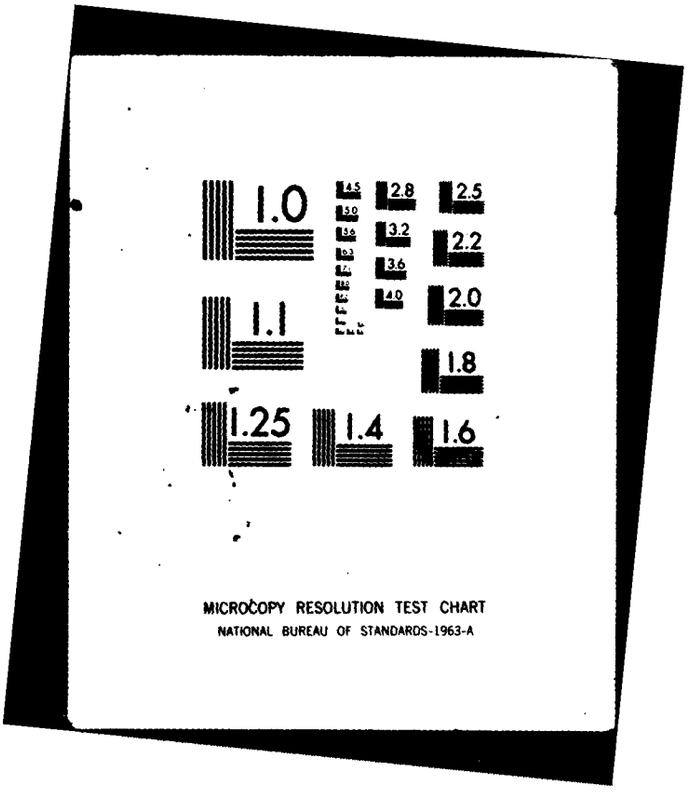
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Stressful Life Events:

Measurement, Moderators, and Adaptation

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This report reviews research on stressful life events with special attention to the role of moderator variables. Social support is used to illustrate the role of individual differences and environmental factors in response to stress. Theoretical issues and problems requiring study are discussed.

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Stressful Life Events:
Measurement, Moderators, and Adaptation

While the idea that everybody has a breaking point is widely accepted, it is not immediately obvious how individual differences in breaking points can best be assessed. Nor is it clear how breaking points vary as a function of the types of situations that are stress-arousing. Additionally, definitions of the thoughts, behavior, and bodily processes that occur at the breaking point have varied widely. Despite these problems, research on stress and its sequelae has burgeoned during recent years. One of the areas of greatest activity concerns the quantitative assessment of what has come to be called stressful life events or life stress. This chapter reviews the literature on this topic and provides a theoretical perspective for future research.

The evidence that led to efforts at quantifying stressful life events was diverse. Clinical observations have long suggested that personal experiences, such as the loss of a job, often precede illness and psychological maladjustment. Personal experiences that seem especially conducive to later illness or maladjustment are those that involve losses (such as the death of a loved one), sudden environmental changes (natural catastrophes), war, threats to and loss of control over one's life (as experienced, for example, by people in concentration camps), and personal failures or even personal successes.

Although the mechanisms involved are still obscure, researchers interested in stress have long observed that events in a person's life and unwanted outcomes (maladjustment, illness) are linked. These observations led Adolf Meyer to introduce the concept of the "life chart," a recording of significant biographical and medical events in a person's life (Leif, 1948). Later,

Harold Wolff (1953) introduced the term "life stress" by which he meant the responses of people to noxious stimulation and ego threats. Both Walter Cannon (1932) and Hans Selye (1946) gave special emphasis to the body's reaction to environmental events that call for action and the mobilization of bodily resources. Hinkle (1973), recognizing that similar life events do not lead to symptoms in all people, pointed out the need to take account of person variables (personality, general level of health) along with situational variables (life events). It is now clear that a complete understanding of the effects of stressful life events will require investigations at several levels, including the delineation of influential situations, identification of sequelae, and mapping the psychological and physiological mechanisms that link the two.

This chapter is particularly concerned with the first level, the events in people's lives that appear to be stressful and to influence future functioning. It begins with a survey of measurement approaches, proceeds to an examination of methodological issues surrounding the assessment of stressful life events, and discusses the role of moderator variables that help determine how these events influence behavior. The chapter concludes with a discussion of theoretical considerations and suggestions for future research.

ASSESSMENT OF STRESSFUL LIFE EVENTS

Measures of stressful life events are becoming so numerous that any comprehensive survey of them would soon be doomed to incompleteness. This review will be directed towards illustrating approaches that have been taken in this assessment.

Schedule of Recent Events

The publication by Holmes and Rahe (1967) of an article describing their attempt to quantify the importance of life changes provided a major impetus to

research. Their Schedule of Recent Experiences (SRE) has been widely used in life stress investigations. The popularity of this instrument is no doubt related to the fact that it provided a convenient measure of the cumulative effects of life changes.

The SRE consists of a list of 42 events. Subjects respond to it by indicating, for each item, whether they experienced that event during the recent past and the number of times the event was experienced. To determine scoring weights for specific events, Holmes and Rahe had subjects rate each of the 42 events with regard to the amount of social readjustment the various events would require. The item "marriage" was employed as a standard or anchor point in these ratings. This item was given an arbitrary value of 500 and subjects were asked to rate the other items by assigning values of above or below 500 to reflect the degree to which events required more or less readjustment than marriage. Mean adjustment ratings were obtained for each of the items. These values, termed "life change units," when divided by the constant 10, were taken to represent the average amount of social readjustment considered necessary in response to the SRE events. To illustrate, the event "Death of spouse" is given a value of 100, "Pregnancy" a value of 40, "Change in financial state" a value of 38, and "Minor violations of the law" a value of 11. A total life stress score for the SRE is obtained by determining the events experienced by the respondent and summing the life change units associated with these events.

Since its initial development, the SRE has been used in numerous studies designed to determine relationships between life stress and indices of health and adjustment. Retrospective and prospective studies have provided support for a relationship between SRE scores and a variety of health related variables. Life stress has, for example, been related to sudden cardiac death (Rahe & Lind, 1971), myocardial infarction (Edwards, 1971; Theorell & Rahe, 1971),

pregnancy and birth complications (Gorsuch & Key, 1974), chronic illness (Bedell, Giordani, Amour, Tavormina, & Boll, 1977; Wyler, Masuda & Holmes, 1971), and other major health problems such as tuberculosis, multiple sclerosis, and diabetes and a host of less serious physical conditions (Rabkin & Struening, 1976). While not providing conclusive evidence, these studies have provided support for the position taken by Holmes and Masuda (1974) that life stress serves to increase overall susceptibility to illness.

The Life Experiences Survey

Another attempt to quantify the effects of life events is the Life Experiences Survey developed by I. Sarason, Johnson, and Siegel (1978). Two major features distinguish the Life Experiences Survey (LES) from the Schedule of Recent Experiences (SRE). First, it provides both positive and negative life change scores. Second, it permits individualized ratings of the impact of events and their desirability. These individualized measures have the advantage of providing reflections of person-to-person differences in the perception of events. Evidence in support of this approach was provided by Yamamoto and Kinney (1976) who found life stress scores, based on self-ratings, to be better predictors than scores derived by employing mean adjustment ratings similar to those used with the SRE. Other investigators have also found that individualized self-ratings of the impact of life events aid in the prediction of clinical course (Lundberg, Theorell, & Lind, 1975).

The LES is a 47-item self-report measure that allows subjects to indicate events they have experienced during the past year. Subjects can also indicate the occurrence of significant events they have experienced that are not on the LES list. A special supplementary list of 10 events relevant primarily to student populations is available. Other special adaptations are possible. The LES items were chosen to represent life changes frequently experienced by individuals in the general population. Others were included because they

were judged to be events which occurred frequently and might exert a significant impact on the lives of persons experiencing them. Thirty-four of the events listed in the LES are similar in content to those found in the SRE. However, certain SRE items were made more specific. For example, the SRE contains the item "Pregnancy" which might be endorsed by women but perhaps not by a man whose wife or girlfriend has become pregnant. The LES allows both men and women to endorse the occurrence of pregnancy in the following manner: Female: Pregnancy; Male: Wife's/girlfriend's pregnancy. The Schedule of Recent Experiences includes the item "Wife begins or stops work," an item which fails to assess the impact on women whose husbands begin or cease working. The present scale lists two items: Married male: Change in wife's work outside the home (beginning work, ceasing work, changing to a new job, etc.), and Married female: Change in husband's work (loss of job, beginning of a new job, etc.). Examples of events not listed in the SRE but included in the LES are: male and female items dealing with abortion and concerning serious injury or illness of a close friend, engagement, and breaking up with boyfriend/girlfriend. Nine of the 10 special school related items are unique to the LES.

Subjects respond to the LES by separately rating the desirability and impact of events they have experienced. Ratings are on a 7-point scale ranging from -3 to +3. A rating of -3 indicates a negative event judged to have had an extreme impact on the respondent. A rating of +3 indicates a positive event having an extreme impact. Summing the impact ratings of events designated as positive by the subject provides a positive change score. A negative change score is derived by summing the impact ratings of those events experienced as negative by the subject. Scores on the LES do not seem to be influenced by the respondent's mood state at the time of filling out the questionnaire (Siegel, Johnson, & Sarason, 1979b). The LES items are presented in the appendix to this article.

In an initial study (Sarason, Johnson, & Siegel, 1978), undergraduate psychology students were administered the LES, the State-Trait Anxiety Inventory (Spielberger, Gorsuch, & Lushene, 1970), and a short form of the Marlowe-Crowne Desirability Scale (Strahan & Gerbasi, 1972). Grade point averages were available for the quarter during which the testing occurred. No significant correlations were obtained between LES scores and social desirability, indicating that LES scores are unbiased by a social desirability response set. Negative change related significantly and in a positive direction with both state and trait anxiety while the positive change score was unrelated to either measure. (Significant correlations between negative change and anxiety were also found for a sample of naval personnel.) Negative change correlated significantly with grades, with higher levels of negative life change related to poorer academic performance. Knapp & Magee (1979) have replicated this finding.

The relationship between stressful life events and personal maladjustment was estimated by correlating the LES with the Psychological Screening Inventory (PSI) using a student sample. The PSI (Lanyon, 1970, 1973) is a 130-item true-false inventory which yields scores on five subscales; Alienation (Al), Social Nonconformity (Sn), Discomfort (Di), Expression (Ex), and Defensiveness (De). The Al scale was designed for "assessing similarity to psychiatric patients," and the Sn scale for "assessing similarity to incarcerated prisoners." The Di scale measures neuroticism, the Ex scale measures introversion-extraversion, and the De scale measures test-taking attitude. Correlations between the LES and the PSI showed a significant relationship between negative life change and two measures of maladjustment, the Social Nonconformity and Discomfort scales. Only the PSI Expression scale correlated significantly with positive change. Extraverts appear to experience greater degrees of positive change than do introverts.

Scores on the LES, the Beck Depression Scale (Beck, 1967), and the Locus of Control (I-E) Scale (Rotter, 1966) were also obtained for college students.

There was a significant relationship between negative change and scores on the Beck Depression Scale, high negative change scores being associated with depression. Positive change was not significantly correlated with depression. These findings are consistent with evidence presented by Vinokur and Selzer (1975), who found negative change to be related to self-ratings of depression. Subjects who have experienced high levels of negative change appear to be more externally oriented, perceiving themselves as being less capable of exerting control over environmental events. No relationship between positive change and locus of control was found.

Although it is a newer instrument and consequently there is a less extensive array of evidence concerning its correlates, the LES has certain advantages over the SRE. Its positive and negative change scores have not been found to correlate significantly with the same dependent measures in the same direction. This, together with evidence of the validity of the negative change score, suggests that the distinction between negative and positive events is a meaningful one. Recent studies have found the LES negative change score to be related to myocardial infarction (Pancheri et al., 1980), menstrual discomfort (Siegel, Johnson, & Sarason, 1979a), the attitudes of mothers of at-risk infants (Crnic et al., 1980), and job satisfaction (Sarason & Johnson, 1979).

THE DIVERSITY OF APPROACHES TO ASSESSING STRESSFUL LIFE EVENTS

Research on the assessment of stressful life events has explored a wide variety of both populations and assessment devices. Several recent instruments, like the LES, have gone beyond a mere count of life changes in the recent past to provide measures of the undesirability and impact of the events. There seems to be increasing agreement that the perceptions of life events may be as significant as the events themselves (Masuda & Holmes, 1978). Redfield and

Stone (1979) have provided striking indications of individual differences in how people perceive life events. Tennant and Andrews (1978), using a specially devised list of events, found that the distressing quality of life events rather than the events themselves is associated with the onset of neurotic symptoms. Horowitz, Wilner, and Alvarez (1979) were successful in developing a measure of the subjective impact of major life events that reflects psychiatric decompensation.

Several researchers have used interviews to assess stressful life events. Interviews have the advantage of permitting greater individualization and depth than do questionnaires. For example, Paykel (1976) used the interview method in studies of the risk for depression and suicide attempts. On the other hand, the interview method does not lend itself to surveys of large samples because of its cost, primarily in the need for qualified and specially trained personnel and the length of time involved in gathering the data on an individual basis. Furthermore, even standardized interviews by carefully trained interviewers introduce variations that increase the unreliability of the result. Sometimes it is not possible to either interview subjects or administer a questionnaire to them. In such cases, Schless and Mendels (1978) have found that "significant others" (family members, friends) can provide useful quantifiable information about subjects' recent life events.

Whereas some researchers have been concerned with the development of measures of these events experienced in the general population, others have been concerned with particular groups within the population. Children have been the most widely studied special population and there are a number of instruments available that can be used with pre-schoolers through adolescents (Coddington, 1972; Monaghan, Robinson, & Dodge, 1979; Sandler & Block, 1979). Johnson and McCutcheon (1980) and Yeaworth et al. (1980) have developed measures specifically directed toward stressful events in the lives of adolescents. These measures include content related to such topics as new school experiences, dating, and work.

The development of methods of recording life events and their impact on people allows researchers to explore personal crises more objectively and conveniently than was the case in the past. Despite a number of methodological problems, life stress scores have been linked to a variety of physical and psychological conditions. Often these linkages have been statistically significant but of limited practical applicability. As solutions to methodological problems are found, the number of practical applications should increase.

METHODOLOGICAL ISSUES IN ASSESSING STRESSFUL LIFE EVENTS

Despite the numerous correlates of stressful life events, a certain degree of caution is warranted in interpreting available findings. Studies in this area have been primarily correlational in design, so cause-effect conclusions cannot be drawn with a high level of confidence. Even though it seems reasonable to expect that such events may have a detrimental effect on the health and adjustment of individuals, significant correlations may be obtained for other reasons. For example, people with problems of health and adjustment may as a result tend to experience greater degrees of life change or it may be that both stressful events and problems of health and adjustment covary with some third variable. Some preliminary studies designed to investigate the possibility of causal relationships have been conducted, however, and have yielded data consistent with the hypothesis that stressful life events exert a causal influence (Johnson & Sarason, 1978; Vossel & Froehlich, 1978). Further research concerning the nature of life stress-dependent variable relationships is greatly needed.

In addition to considering the nature of the relationships found in studies of stressful life events and health adjustment studies, it is necessary also to examine their magnitude. Although exceptions are to be

found, correlations between measures of stressful life events and dependent variables have typically been low, often in the .20 to .30 range. These significant relationships are of theoretical interest, but life stress seems to account for a relatively small proportion of the variance in the dependent measures that have been studied. It would seem that by themselves life stress measures are not likely to be of much practical value as predictors. A logical question is whether this poor predictive ability is due to the inadequacies of life stress measures (unreliability of measurement, failure to assess separately positive and negative life changes, insensitive methods of quantifying the impact of events) or to other factors. As has been noted, several approaches to the assessment of stressful life events have been employed in the studies published to date. While instruments that distinguish between positive and negative events typically yield somewhat higher correlations with dependent variables, even these correlations tend to be relatively low in magnitude. Factors other than inadequacies of measurement may also be related to the low correlations that have typically been found. For example, people may experience stress that is not a product of life change. In addition, researchers have often failed to consider the role of moderator variables.

Life change represents only one type of stressor. Ecological stressors such as crowding and noise pollution are constants for many people, not sudden life changes. There are also a host of other stressors that impinge on people's lives that are not experienced as sudden life events. Examples of these stressors include the knowledge that one has some probability of developing a genetically related disease, or the gradual realization that one will not reach goals set earlier in one's life. Finally, there are undoubtedly a variety of day-to-day situations that do not bring about major life changes but that nevertheless serve as stressors. Examples might be friction with teen-aged children over responsibilities and privileges or work deadlines

that involve periodic pressures to produce material by a certain date. To the extent that health and adjustment are influenced by stressors other than those assessed by life change measures, one might expect to find lower correlations between stressful life events and dependent variables.

An example of the critical role methodological issues play in discussions of life stress is provided by research on the relationship between life events and coronary heart disease. Over 50 studies have examined this relationship; yet no unifying explanation has emerged to account for all the reported findings. While life events and coronary heart disease seem to be linked, most studies have been retrospective, life events being assessed after occurrence of the heart attack. Brown (1974) has pointed out the confounding role played by retrospective contamination or distortion in life events assessment. Some heart attack victims may want to "blame" their attacks on certain circumstances in their lives. On the other hand, stressful life events can lead to lifestyle changes which aggravate an existing predisposition to coronary heart disease. A sudden change in one's life, such as a heart attack, produces all manner of psychological reactions and behavioral changes (sleep disturbances, food intake, confusion, and suggestiblity) which may produce observable clinical symptoms. A heart attack would seem to be both a consequence of stressful life events and a stressful life event in its own right.

The following are some methodological issues concerning which clarifications or improvements in research design are needed.

1. Types of events. A wide variety of events may be considered as stressful. Very little is known about the particular types of events that are related to particular types of outcome. The work of Holmes and Rahe (1967) was based on the assumption that symptoms are caused by the total amount of change in a person's life. Later research has suggested that symptoms and maladjustment are related more to negative (unwanted, undesirable) than to

positive (wanted, desirable) change (Mueller, Edwards, & Yarvis, 1977; Ross & Mirowsky, 1979). Within the category of negative life events there may be certain types of events that are more important than others. Research on this possibility is needed. These are some types of events whose properties, correlates, and consequences need to be better understood:

a) Physical illness and injuries,

b) Personal failures (loss of job due to inadequate performance),

c) Loss of attachments (bereavement, divorce),

d) Interpersonal changes (a new supervisor, entrance of new member into one's social group),

e) Victimization (being burglarized),

f) Natural disasters (earthquake, volcano eruption).

In addition to categorizing types of events, it also seems important to determine the degree to which they are or might be predictable or controllable. Unpredictable events and those over which people have little or no control are among the most distressing experiences people go through. Predictability or the lack of it is a major factor in the stress experienced from an event.

2. Magnitude of events. What contributions do particular individual events make to the total level of stressfulness experienced by the individual? Research is needed to determine the ways in which events differing in personal significance combine to produce behavioral and physical effects. Is it worse to experience one really major undesirable event or six medium-sized ones? How might events differing in magnitude of stress-arousal be optimally weighted and combined?

3. Timing of events. The incubation time for the impact of life events is probably not a constant. It seems reasonable that different types of events exert their influence in different ways and over different periods of time. A tantalizing question concerns the impacts exerted by remote events. At what

points do the effects of stressful life events begin to wear off? Brown and Harris (1978) found that one of the major distinguishing features of middle-aged depressed women was the childhood loss of their mothers through death or separation. The interests of psychoanalysts and stress researchers overlap in their attention to stressful life events. They differ in their attention to remote impactful events. Stress researchers are more interested in recent events, psychoanalytically oriented researchers in events that occurred early in life.

4. Meaning of events. Lazarus and others have pointed out the distinction between events per se and how they are appraised (Folkman, Schaefer, & Lazarus, 1979). It would seem desirable to assess both the things that happen to people and how they appraise them. Some events may be over-appraised in that the individual attaches more significance to them than they really merit. Other events may be under-appraised, with the individual failing to appreciate their present or future implications.

5. Person variables. How events are appraised depends on the personality and circumstances of the individual experiencing them. This topic will be discussed later in the chapter when moderator variables are discussed.

6. Causality versus correlation. Given that it is desirable ultimately to reach the point where causal inferences can be made and that, for ethical reasons, we will continue to be unable to manipulate life stress experimentally, how then does one proceed? It is likely that no one study, no matter how well designed, will be capable of providing data sufficient to justify the conclusion that a causal relationship exists. It is, in fact, impossible to "prove" the existence of a causal relationship from correlational data. However, by conducting a variety of studies, specifically designed to investigate and control for specific variables, it may be possible to accumulate a body of information which, when taken together, would allow an inference of causality to be made with some justification.

A large number of studies of life events are retrospective, with all the limitations of that type of research. Prospective or longitudinal studies are valuable both practically and theoretically because assessment of stressful life events takes place before the appearance of symptoms.

One potentially fruitful approach to investigating the possibility of a causal relationship in the life stress area would involve the use of a cross-lagged correlational methodology. This quasi-experimental approach, originally suggested by Simon (1954), involves obtaining data on two variables of interest at two points in time and comparing the correlations among these variables from one time period to another.

Johnson and Sarason (1979) measured stressful life events (previous six months) and obtained several self-report indices of health and adjustment on a sample of undergraduate psychology students. Seven months later subjects were contacted and these same measures were used a second time. Negative life change scores at Time 1 were significantly correlated with the reporting of physical symptoms at Time 2. No significant relationship was found between physical symptoms at Time 1 and subsequent life stress scores. Vossel and Froehlich (1978) examined the relationship between negative life changes, as assessed by the LES, and measures of job tension and task performance effectiveness. The findings of this study were interpreted as being consistent with a causal relationship in the predicted direction (e.g., life stress leads to job tension and decreased performance effectiveness).

7. Extraneous variables. Life stress and indicators of illness and maladjustment may both be influenced by other variables. Socioeconomic status (SES) may function in this way. People low in SES may be more likely to experience negative life changes and to also, for a variety of reasons, be more prone to develop health related and adjustment problems. Correlations between life stress and illness in this instance might simply result from the fact that both variables covary with SES. Extraneous variables may play important roles

in associations among independent and dependent variables. They are extraneous only in the sense that they are neglected.

MODERATORS OF STRESSFUL LIFE EVENTS

People vary considerably in how they are affected by potential stressors. Some individuals get divorced; lose their jobs; experience financial hardships, death, and illness in their families; and yet appear to suffer few serious long-term physical or psychological setbacks. At the same time, others break down even though they have experienced what would objectively seem to be a relatively low level of stress. An important question concerns the nature of those variables that may determine which individuals are likely to be most adversely affected by life change.

Although several authors (Jenkins, 1979; Johnson & Sarason, 1979; Rahe & Arthur, 1976) have pointed to the important role of moderator variables, previous studies of life events have usually been designed simply to assess the relationships between life change and other variables without considering that individuals may vary in how much they are affected by life changes. Lack of attention to moderator variables constitutes a major limitation of much of the research in this area. One might argue that it is unreasonable to expect to find strong correlates of life events unless such variables are examined and taken into account. As the mediators of life stress are identified, measured reliably, and included in research designs, increased effectiveness in prediction is likely to result.

There are three broad categories of moderator variables: a) relatively stable personal characteristics, such as internal-external locus of control, b) prior experiences that influence how a person responds to stress, and c) environmental factors, such as social support. Each type can influence how a person responds to problematic situations. While the nature of the

particular influence processes are often not clear, these moderators can generally be thought of as affecting vulnerability to life events.

Three variables that illustrate how moderators influence behavior will now be described. Two are personality characteristics (sensation-seeking and locus of control) and one is social support provided by the environment.

Sensation Seeking

An example of how a personality characteristic can moderate response to stressful events is sensation seeking. Some people appear to thrive on activities that are exciting and stimulating and that might be expected to increase arousal level. They may enjoy traveling to strange places, prefer the unfamiliar to the familiar, and participate in activities such as skydiving, automobile racing, motorcycle riding, and water skiing. On the other hand, many individuals shy away from the unfamiliar, would never think of racing cars or going skydiving, and find some everyday situations more arousing than they would like. There are, of course, many people who fall somewhere between these two extremes. They neither consistently seek out nor attempt to avoid stimulation.

Given that individuals vary in their desire for or need to seek out stimulation, and also in their tolerance for stimulation, sensation seeking as a personality attribute may well serve as an important moderator of life stress. High sensation seekers might be expected to be relatively unaffected by life changes, particularly if they are not too extreme. These individuals may be better able to deal with the increased arousal involved in experiencing such changes. On the other hand, life change might have a negative effect on people low in sensation seeking who are less able to cope with arousing stimulus input. To the extent that stimulation seeking mediates the effects of life change, one might expect to find significant correlations between life change and problems of health and adjustment with low but not high sensation seekers.

Smith, Johnson, and Sarason (1978) have examined the relationship between the LES, sensation seeking, and psychological distress. Sensation seeking was measured using the Sensation Seeking Scale (Zuckerman, 1979). Distress was assessed by means of the Psychological Screening Inventory (Lanyon, 1973), a self-report measure of neuroticism. The LES positive change score, either alone or in conjunction with sensation seeking, was unrelated to the individual's psychological discomfort. The major result was that people with high negative change scores who were also low in sensation seeking reported high levels of distress. Subjects with high negative change scores, but also high scores in sensation seeking did not describe themselves as experiencing discomfort.

Similar results were obtained by Johnson, Sarason, and Siegel (1978), who were specifically interested in anxiety, depression, and hostility. They found that positive change was unrelated to dependent measures regardless of arousal-seeking status. Negative change, on the other hand, was significantly related to measures of both anxiety and hostility. As in the Smith et al. (1978) study, this relationship held only for subjects low in sensation seeking. It is possible that individuals low on the sensation seeking dimension are much more likely to be affected by life stress than are those high in sensation seeking.

Locus of Control

Predictability and controllability are aspects of situations that influence how people respond to them. The more predictable an event and the more confident a person feels about how to handle it, the greater the likelihood of an adaptive response. Are individuals who perceive themselves as having little control over events more adversely affected by stressful events than individuals who feel capable of exerting control over these events?

Johnson and Sarason (1978) have provided some evidence concerning this issue. They administered the LES, the Locus of Control Scale (Rotter, 1966),

the State-Trait Anxiety Inventory (Spielberger, Gorsuch, & Lushene, 1970), and the Beck Depression Inventory (Beck, 1967) to college students. The Locus of Control Scale is a self-report measure that assesses the degree to which individuals view environmental events as being under their personal control. Subjects scoring low on the measure (internals) tend to perceive events as being controllable by their own actions, whereas those scoring high on the scale (externals) tend to view events as being influenced by factors other than themselves. The State-Trait Anxiety Inventory assesses anxiety as a relatively stable dispositional variable (trait anxiety) as well as a more transient reaction to specific situations (state anxiety). The Beck scale is a self-report measure of depression.

Based on research findings concerning the controllability or uncontrollability of aversive stimuli, it was predicted that anxiety and depression would correlate with stressful life events only among subjects external in their locus of control orientation. This prediction seemed reasonable, as one might expect undesirable life events to be more threatening and hence exert a more negative impact on people perceiving themselves as having little control over such events. Johnson and Sarason found that negative life changes were significantly related to both trait anxiety and depression, but as predicted, this relationship held only for external subjects. Although this study does not allow for cause-effect conclusions, its results are consistent with the view that people are more adversely affected by life stress if they perceive themselves as having little control over their environment.

Social Support

While methodological rigor has not marked the literature on social supports, there is evidence that close social ties have a protective, stress-buffering effect and that their effect may be more important for some individuals than for others. This social support effect may be particularly

noticeable among people who bring to certain situations such cognitions as, "I'll fail," "I'm all alone," "No one cares about me." To the extent that this is true, social support may play powerful preventive and therapeutic roles in such areas as personality development, mental health, and physical well-being. However, these are merely suggestions. At the present time, neither the situations and circumstances conducive to a social support effect nor the mechanisms by which such an effect comes about can be specified. Heller (1979) has recently emphasized the need for extensive research into the ingredients and effects of social support. Experimental studies are needed to answer such questions as: Is lack of social support a cause of personal or social unhappiness, or are people low in personal or social competence deficient in the skills needed to elicit supportive social relationships?

Social support is usually defined as the existence or availability of people on whom we can rely, people who let us know that they care about, value, and love us. As Cobb (1976) has pointed out, someone who believes he or she belongs to a social network of communication and mutual obligation experiences social support. Available evidence suggests that social support may facilitate coping with crisis and adaptation to change. Its absence or withdrawal seems to have a negative effect. In this regard it is interesting that soldiers, many of whose buddies have been killed in combat, are more likely to develop combat exhaustion than soldiers who belong to intact units.

There is by no means agreement about how to assess a person's level of social support. Both interviews and questionnaires have been used as a basis for identifying social networks and estimating social support levels. Tolsdorf (1976) content analyzed interviews to assess subjects' relationships with kin and friends and with religious, political, and fraternal groups. Caplan, Cobb, and French (1975) constructed a 21-item self-report index of the support received from three types of work-related sources: immediate superior,

work group or peers, and subordinates. Two factors may be especially important aspects of social support: 1) the amount of social support available, and 2) individual's satisfaction with the available support.

Social Support and Health

One study of pregnant women investigated the role of psychosocial assets, an important component of which was defined as social support, in complications of pregnancy (Nuckolls,Cassell, & Kaplan, 1972). The women were assessed in two ways: 1) frequency and severity of recent life changes, and 2) psychosocial assets, people with whom the women were close, from whom they obtained affection, and on whom they could rely. These psychosocial assets by our definition might also be called social support. Women who had many psychosocial assets had significantly fewer pregnancy complications than women who had relatively few assets. This relationship was particularly dramatic among women who had experienced high levels of life change. For this group, 91 percent of women who were low in psychosocial assets had birth complications, while the comparable figure for those high in psychosocial assets was 33 percent. It appeared that while social support was important for all, it was especially important among women high in life stress.

However, there may be sex differences or other individual differences in response to social support. In a recent study, Whitcher and Fisher (1979) found that for hospitalized women, being physically and warmly touched by a caring nurse prior to undergoing surgery resulted not only in lowered anxiety, but also in a faster return to pre-operative blood pressure levels. For male patients, however, Whitcher and Fisher obtained results inconsistent with and in some cases opposite to those for women.

Several other studies also indicate that social support functions as a moderator of stressful life events. Lyon and Zucker (1974) found that the post-hospitalization adjustment of discharged schizophrenics was better when

social support (friends, neighbors) were present. Burke and Weir (1977) found that the husband-wife helping relationship is an important moderator between experiencing stressful life events and psychological well-being. A helping spouse seems to be particularly valuable in contributing to self-confidence and a sense of security in dealing with the demands of daily living. Brown, Bhrolchain, and Harris (1975) found that the presence of an intimate, but not necessarily sexual, relationship with a male reduced the probability of depression in women following stressful life events. Consistent with these findings, Miller and Ingham (1976) showed that social support (presence of a confidant and friends) reduced the likelihood of psychological and physical symptoms (anxiety, depression, heart palpitations, dizziness) under stress.

In a large scale epidemiological investigation, Berkman and Syme (1979) found that people who lacked social and community ties were more likely to die during the nine-year period they were studied than those with more extensive contacts. The association between social ties and mortality was independent of self-reported physical health status at the beginning of the nine-year period. It was also independent of physical activity, socioeconomic status, and utilization of preventive health services. Gore (1978) studied the relationship between social support and workers' health after being laid off and found that a low sense of social support exacerbated illnesses following the stress of job loss.

Social Support and Effective Behavior

Maladaptive ways of thinking and behaving are more common among those with little social support (Silberfeld, 1978). Reliance on others and self-reliance may not only be compatible but complementary to one another. While the mechanism by which an intimate relationship is protective has yet to be

worked out, the following factors are probably involved: intimacy, social integration through shared concerns, reassurance of personal worth, the opportunity to be nurtured by others, a sense of reliable alliance, and guidance.

There are data consistent with the view that adults who are self-reliant, adept at coping with stress, and able to maintain a task-oriented attitude in the face of challenges frequently had childhoods marked by the personal security that goes along with warm relationships and shared experiences and responsibilities. For example, Ruff and Korchin (1967), in their study of astronauts, found that these self-reliant, adaptable men come from families that provided stable, supportive environments. Reinhardt (1970), in a study of exemplary Air Force fighter pilots found that as children they had spent more time in joint activities with their fathers (fishing, making things) than did other pilots.

Preventive Measures Based on Social Support

Henderson (1980), after reviewing the literature, pointed out three competing hypotheses that have been offered by researchers: 1) a deficiency in social support is a cause of morbidity, 2) a deficiency in social support is a cause of morbidity only when adverse circumstances and events are present, and 3) a deficiency of social support is a consequence of a low level of social competence. While acknowledging some discrepant findings and the need to identify the causes of different levels of social support, the available evidence suggests that high levels of social support may play a stress-buffering role and to some degree protect an individual from the effects of cumulative life changes. If this is true, there are some important implications for preventative action. As Dean and Lin (1977) have suggested, although it may not be possible for people to avoid experiencing stressful life events, it may be possible to help them mobilize supports within the community and thus, to some extent, protect themselves against the effects of stress. Furthermore,

training people in the social skills needed to get help from friends, relatives, and the community when stress reaches high levels might prevent a significant number of individuals from experiencing personal difficulties.

An important question concerning which there is little evidence is the matter of the relative contributions of personality, experience, and social support to health and adjustment. Because both experience and social support influence personality, it would seem important wherever possible to incorporate all three types of variables in research designs. One useful starting point is the identification of exemplary people, those who are particularly stress-resistant. Kobasa (1979) took this tack in a study of middle and upper level executives who had had comparably high degrees of stressful life events during the previous three years. She found that executives who had high levels of life stress but little illness seemed more hardy than high stress -- high illness executives. The defining properties of hardiness seemed to include a strong commitment to self, an attitude of vigorousness toward the environment, a sense of the meaningfulness of life, and an internal locus of control. Kobasa's findings seem consistent with Antonovsky's (1979) concept, resistance resources, according to which stress-resistant people manage their tensions well and have a feeling of social belongingness. According to Antonovsky, stress-resistant people have a sense of coherence, a general orientation that sees life as meaningful and manageable. The sources of the sense of coherence, according to Antonovsky, are to be found in people's upbringing, social relationships, and cultural background. He believes people who have resistance resources are high in flexibility, which includes the capacities to 1) tolerate differences in values, and 2) adapt quickly to misfortune.

COGNITIVE APPRAISAL AND THE EXPERIENCE OF STRESS

Any event can be viewed as providing information that must be processed by the individual who experiences it. This procedure does not take place in a

vacuum. Many moderating factors are involved. Personality characteristics, such as personal needs, dispositions, fears, motivations, and also prior experiences influence the particular aspects of an event that are attended to and how they are interpreted. Other moderators include environmental factors such as the presence or absence of social support and the circumstances surrounding an event also contribute to the individual's cognitive appraisal of the situation. Personal characteristics and prior experiences as well as environmental factors also combine in the mobilization of resources to cope with problems posed by the event. In this way, the interaction of person and situation variables can be thought of as important in the way life events are experienced and in reactions to them.

People usually differ in the salience or pull value events have for them. Some situations are universally salient because most people have learned the same meaning for a particular cue. For example, when a stop light turns red most automobile drivers stop. Other situations are universally salient because their overwhelming characteristics evoke similar stress reactions in large numbers of people. Severe earthquakes, catastrophic fires, bridge collapses, mass riots, and nuclear explosions are examples of this type of stress-producing situation. Sometimes, however, when environmental conditions are not stereotyped or extreme, personal salience plays a major role in influencing behavior by directing attention to the particular elements of a situation that have personal significance. Hearing a particular song may evoke a grief reaction or feelings of nostalgia or a relaxed state depending on whether it was associated with someone who died recently, someone who is away and whose return is uncertain, or with happy memories of a high school romance. Some situations may not initially be experienced as stressful, but, because of learning that subsequently takes place, when the situation reoccurs it has become capable of arousing stress responses.

The moderator variables discussed earlier, personal characteristics (locus of control, sensation seeking), and environmental factors (social support, circumstances surrounding an event) can also be viewed as factors determining vulnerability to a stressful situation. Vulnerable people are those who are especially sensitive and responsive to particular types of life event stressors. Because vulnerability factors vary among individuals, the degree to which particular types of events cause problems and require special coping efforts varies widely in different persons. Zubin and Spring's (1977) vulnerability model, designed to explain the behavior of schizophrenics, but which seems to have the potential for wide applicability, is concerned with this problem. Specifically, these writers emphasize the need to develop methods for differentiating those who are vulnerable to a particular stressor from the rest of the population. Such people might be described as lacking an effective moderator to lessen the effect of the stimulus.

The chain of events involved in the experience of stress begins with a problematic situation. A call for action is issued when either the environment or personal concerns identify the need to do something. The experience of stress follows the call for action when one's capabilities are perceived as falling short of the needed personal resources. For example, in automobile driving, personal ability is usually perceived as commensurate with the situational challenge and the call for action is handled in a routine, task-oriented manner. However, stress may well up on treacherous mountain roads among persons who are not confident of their ability in that situation. Experimental and anecdotal evidence from many sources suggests that individuals use different cognitive strategies in stressful situations and that these cognitions may be important in determining the level of adaptability of ensuing behavior. While some people are able to maintain a task-orientation in the face of the call, for others, self-preoccupation often interferes with realistic planning and weighing of alternatives. There are wide individual differences in the

frequency and preoccupying character of stress-related cognitions. The most adaptive cognitive response to stressful situations is a task-orientation which directs the individual's attention to the task at hand, rather than emotional reactions. The ability to set aside unproductive worries and preoccupations seems to be crucial in functioning well under pressure.

Whether danger will be seen in a situation depends on its personal salience. Consequently, an understanding of the effects of stress and prediction of individual behavior must take into account the individual's perceptions both of the demands of the situation and of his or her ability to meet them. The magnitude and manageability of the perceived demand varies among individuals depending on the particular moderator variables involved.

Research on stressful life events may be on the threshold of progressing from merely assessing whether or not certain events have taken place and correlating the events with outcomes such as illness, to integrating the occurrence of life events into a cognitive theory of stress.

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Appendix

The Life Experiences Survey

Instructions

Listed below are a number of events which sometimes bring about change in the lives of those who experience them and which necessitate social readjustment. Please check those events which you have experienced in the recent past and indicate the time period during which you have experienced each event. Be sure that all check marks are directly across from the items they correspond to

Also, for each item checked below, please indicate the extent to which you viewed the event as having either a positive or negative impact on your life at the time the event occurred. That is, indicate the type and extent of impact that the event had. A rating of -3 would indicate an extremely negative impact. A rating of 0 suggests no impact either positive or negative. A rating of +3 would indicate an extremely positive impact.

SECTION I

	0 to 6 mo.	7 mo. to 1 yr.	extremely negative	moderately negative	somewhat negative	no impact	slightly positive	moderately positive	extremely positive
1. Marriage			-3	-2	-1	0	+1	+2	+3
2. Detention in jail or comparable institution			-3	-2	-1	0	+1	+2	+3
3. Death of spouse			-3	-2	-1	0	+1	+2	+3
4. Major change in sleeping habits (much more or much less sleep)			-3	-2	-1	0	+1	+2	+3
5. Death of close family member:									
a. mother			-3	-2	-1	0	+1	+2	+3
b. father			-3	-2	-1	0	+1	+2	+3
c. brother			-3	-2	-1	0	+1	+2	+3
d. sister			-3	-2	-1	0	+1	+2	+3
e. grandmother			-3	-2	-1	0	+1	+2	+3
f. grandfather			-3	-2	-1	0	+1	+2	+3
g. other (specify)			-3	-2	-1	0	+1	+2	+3
6. Major change in eating habits (much more or much less food intake)			-3	-2	-1	0	+1	+2	+3
7. Foreclosure on mortgage or loan			-3	-2	-1	0	+1	+2	+3
8. Death of close friend			-3	-2	-1	0	+1	+2	+3
9. Outstanding personal achievement			-3	-2	-1	0	+1	+2	+3
10. Minor law violations (traffic tickets, disturbing the peace, etc.)			-3	-2	-1	0	+1	+2	+3

Appendix continued

	0 to 6 mo.	7 mo. to 1 yr.	extremely negative	moderately negative	somewhat negative	no impact	slightly positive	moderately positive	extremely positive
11. Male: Wife/girlfriend's pregnancy			-3	-2	-1	0	+1	+2	+3
12. Female: Pregnancy			-3	-2	-1	0	+1	+2	+3
13. Changed work situation (different work responsibility, major change in working conditions, working hours, etc.)			-3	-2	-1	0	+1	+2	+3
14. New job			-3	-2	-1	0	+1	+2	+3
15. Serious illness or injury of close family member:									
a. father			-3	-2	-1	0	+1	+2	+3
b. mother			-3	-2	-1	0	+1	+2	+3
c. sister			-3	-2	-1	0	+1	+2	+3
d. brother			-3	-2	-1	0	+1	+2	+3
e. grandfather			-3	-2	-1	0	+1	+2	3
f. grandmother			-3	-2	-1	0	+1	+2	+3
g. spouse			-3	-2	-1	0	+1	+2	+3
h. other (specify)			-3	-2	-1	0	+1	+2	+3
16. Sexual difficulties			-3	-2	-1	0	+1	+2	+3
17. Trouble with employer (in danger of losing job, being suspended, demoted, etc.)			-3	-2	-1	0	+1	+2	+3
18. Trouble with in-laws			-3	-2	-1	0	+1	+2	+3
19. Major change in financial status (a lot better off or a lot worse off)			-3	-2	-1	0	+1	+2	+3
20. Major change in closeness of family members (increased or decreased closeness)			-3	-2	-1	0	+1	+2	+3
21. Gaining a new family member (through birth, adoption, family member moving in, etc.)			-3	-2	-1	0	+1	+2	+3
22. Change of residence			-3	-2	-1	0	+1	+2	+3
23. Marital separation from mate (due to conflict)			-3	-2	-1	0	+1	+2	+3
24. Major change in church activities (increased or decreased attendance)			-3	-2	-1	0	+1	+2	+3
25. Marital reconcilliation with mate			-3	-2	-1	0	+1	+2	+3

Appendix continued

	0 to 6 mo.	7 mo. to 1 yr.	extremely negative	moderately negative	somewhat negative	no impact	slightly positive	moderately positive	extremely positive
26. Major change in number of arguments with spouse (a lot more or a lot less arguments)			-3	-2	-1	0	+1	+2	+3
27. Married male: Change in wife's work outside the home (beginning work, ceasing work, changing to a new job, etc.)			-3	-2	-1	0	+1	+2	+3
28. Married female: Change in husband's work (loss of job, beginning new job, retirement, etc.)			-3	-2	-1	0	+1	+2	+3
29. Major change in usual type and/or amount of recreation			-3	-2	-1	0	+1	+2	+3
30. Borrowing more than $10,000 (buying home, business, etc.)			-3	-2	-1	0	+1	+2	+3
31. Borrowing less than $10,000 (buying car, TV, getting school loan, etc.)			-3	-2	-1	0	+1	+2	+3
32. Being fired from job			-3	-2	-1	0	+1	+2	+3
33. Male: Wife/girlfriend having abortion			-3	-2	-1	0	+1	+2	+3
34. Female: Having abortion			-3	-2	-1	0	+1	+2	+3
35. Major personal illness or injury			-3	-2	-1	0	+1	+2	+3
36. Major change in social activities, e.g., parties, movies, visiting (increased or decreased participation)			-3	-2	-1	0	+1	+2	+3
37. Major change in living conditions of family (building new home, remodeling, deterioration of home, neighborhood, etc.)			-3	-2	-1	0	+1	+2	+3
38. Divorce			-3	-2	-1	0	+1	+2	+3
39. Serious injury or illness of close friend			-3	-2	-1	0	+1	+2	+3
40. Retirement from work			-3	-2	-1	0	+1	+2	+3
41. Son or daughter leaving home (due to marriage, college, etc.)			-3	-2	-1	0	+1	+2	+3
42. Ending of formal schooling			-3	-2	-1	0	+1	+2	+3
43. Separation from spouse (due to work, travel, etc.)			-3	-2	-1	0	+1	+2	+3

Appendix continued

	0 to 6 mo.	7 mo. to 1 yr.	extremely negative	moderately negative	somewhat negative	no impact	slightly positive	moderately positive	extremely positive
44. Engagement			-3	-2	-1	0	+1	+2	+3
45. Breaking up with boyfriend/ girlfriend			-3	-2	-1	0	+1	+2	+3
46. Leaving home for the first time			-3	-2	-1	0	+1	+2	+3
47. Reconciliation with boyfriend/ girlfriend			-3	-2	-1	0	+1	+2	+3
Other recent experiences which have had an impact on your life. List and rate.									
48. _____			-3	-2	-1	0	+1	+2	+3
49. _____			-3	-2	-1	0	+1	+2	+3
50. _____			-3	-2	-1	0	+1	+2	+3
SECTION II STUDENT ONLY									
51. Beginning a new school experience at a higher academic level (college, graduate school, professional school, etc.)			-3	-2	-1	0	+1	+2	+3
52. Changing to a new school at same academic level (undergraduate, graduate, etc.)			-3	-2	-1	0	+1	+2	+3
53. Academic probation			-3	-2	-1	0	+1	+2	+3
54. Being dismissed from dormitory or other residence			-3	-2	-1	0	+1	+2	+3
55. Failing an important exam			-3	-2	-1	0	+1	+2	+3
56. Changing a major			-3	-2	-1	0	+1	+2	+3
57. Failing a course			-3	-2	-1	0	+1	+2	+3
58. Dropping a course			-3	-2	-1	0	+1	+2	+3
59. Joining a fraternity/sorority			-3	-2	-1	0	+1	+2	+3
60. Financial problems concerning school (in danger of not having sufficient money to continue)			-3	-2	-1	0	+1	+2	+3

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