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## Personality Characteristics as Moderators of the Relationship between Stress and Disorder

SHELDON COHEN  
JEFFREY R. EDWARDS

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Evidence of an association between recent stressful life events and a variety of psychological and physical disorders has steadily accumulated over the last 20 years. Life events have been linked to depression, neurotic impairment, coronary heart disease, cancer, infectious diseases, and a host of other physical and psychological disorders (cf. Dohrenwend & Dohrenwend, 1978, 1981; Thoits, 1983). However, correlations between life event scores and measures of health and well-being have rarely risen above .30 suggesting

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that life events may account at best for 9% of the variance in illness. Upon initial consideration, this suggests that even if a causal link exists between life stress and physical and psychological outcomes, it is small and the etiological significance of stress may be exaggerated.

In response to this attack on the significance of stress in the etiology of mental and physical disorder, a number of investigators have proposed that the relationship between stress and illness varies with both personal and social characteristics (e.g., see reviews by Cohen et al., 1982; Cohen & Wills, 1985; Gentry & Kobasa, 1985; Johnson & Sarason, 1979; Rabkin & Struening, 1976). That is, differences in social support systems, skills, attitudes, beliefs, and personality characteristics render some persons relatively immune to stress-induced illness and others relatively susceptible. These moderating variables are commonly referred to as stress-buffering resources because they are presumed to protect or buffer people from the pathogenic effects of stress.

The vast majority of existing research on stress buffering has focused on the possible moderating role of social resources. This literature suggests that perceptions of the availability of stress-responsive social support provide relative protection from stress-induced symptomatology, while social network membership *per se* does not (see recent reviews by Cohen & Wills, 1985; Kessler & McLeod, 1985). This chapter explores the roles of *personal* resources (relatively stable individual differences) in the buffering of stress-induced disorder. Examples of personal resources studied include hardiness, locus of control, self-esteem, private self-consciousness, and type A behavior pattern.<sup>1</sup> We propose a model suggesting how personal characteristics might influence the process by which stress results in disorder, discuss methodological and conceptual issues involved in testing the moderating role of personal resources, and critically review the existing literature. Because most of the studies reviewed in this chapter index symptoms of psychological or physical distress rather than extreme disorder such as clinical depression or chronic physical illness, we use the term *symptomatology* to refer to criterion variables.

In general, we find little convincing evidence for personality factors operating as stress buffers. Although there is suggestive evidence in regard to a number of specific person resources that may influence stress appraisal and/or coping, statistical and conceptual problems, a lack of consistency of results across existing studies, and inadequate numbers of independent replications make much of the evidence difficult to interpret. Only in the case of generalized internal locus of control do we feel there is sufficient evidence to make even a tentative conclusion consistent with stress buffering.

<sup>1</sup> It can be argued that perceived availability of social support is a person rather than social resource since these perceptions may be partly or totally attributable to stable personality factors (Cohen, Sherrrod, & Clark, 1986; Gore, 1985). Because this literature is adequately reviewed elsewhere (Cohen & Wills, 1985; Kessler & McLeod, 1985), we will not address it in this chapter.

## STRESS BUFFERS

For our purposes, we posit that stress arises when one appraises a situation as threatening or otherwise demanding and does not have an appropriate coping response (cf. Lazarus, 1966; Lazarus & Launier, 1978). As noted by Sells (1970), these situations are ones in which the person perceives that it is important to respond but an appropriate response is not immediately available. Characteristic effects of stress appraisal include negative affect, elevation of physiological response, and behavioral adaptations (cf. Baum, Singer, & Baum, 1981). The specific mechanisms through which psychosocial stress is linked to mental health and physical illness, however, remain to be clarified. At a general level, it is assumed that stress leads to negative psychological states such as anxiety or depression. In turn, these psychological states may ultimately influence physical health, either through a direct effect on biological processes that influence susceptibility to disease, or through behavioral patterns that increase risk for disease and mortality.

In earlier work (Cohen & McKay, 1984; Cohen & Wills, 1985), we proposed that there are two major points at which social or personal resources may influence the effects of psychosocial stress on health (also see Gore, 1981; House, 1981).<sup>2</sup> These stress-buffering mechanisms are depicted in Figure 7.1.

First, resources may intervene between stressful events (or event expectations) and a stress reaction by attenuating or preventing a stress appraisal. For example, the perception that necessary resources are available may reduce the threat posed by a situation and/or bolster perceived coping efficacy, thereby preventing a particular situation from being appraised as highly stressful. Second, resources may intervene between the experience of stress and the onset of the pathological outcome by influencing coping ability or effort in a way that facilitates successful coping with either the stressor itself (problem focused) or with the stress reaction (emotion focused), or by facilitating healthful behaviors that counteract the effects of stress reactions.

Thus far, we have indicated that personal characteristics may short-circuit threat appraisal or facilitate coping. In some cases, however, stress-buffering effects may be attributable to the *absence* of a personal characteristic (or the presence of an opposite characteristic) resulting in increased susceptibility to stress-induced pathology rather than the presence of a characteristic resulting in resistance (buffering). Let us consider type A behavior pattern as an example. Presumably, individuals with type B behavior pattern (the lack of the type A pattern) are buffered from the pathogenic effects of stressful events. This implies that there is something about being a type B that either short-circuits stress appraisal or facilitates coping with events appraised as

<sup>2</sup> A social or personal resource may also prevent the occurrence of objective stressful events. We view this as independent of the hypothesis that a resource protects [buffers] people from the potentially pathogenic effect of experiencing stressful events.

**Matching Stressors and Resources.** In our earlier work, we proposed that buffering effects occur when there is a reasonable match between the needs elicited by stressful events and available resources (Cohen & McKay, 1984; Cohen & Wills, 1985; also see Hobfoll, 1985). We have also argued that a common effect of stressors is to threaten feelings of self-esteem and personal control. Therefore, resources that enhance these feelings are likely to match up with a broad range of stressful events. The adequacy of the match between stressor and resource may also be influenced by the specificity of the resource. For example, elevated self-esteem or control in a specific domain (e.g., academics) is more likely to operate as a buffer in that domain than global measures of esteem or control. In theory, global feelings are only useful to the extent that they generate stressor-specific cognitions (cf. Folkman, 1984).

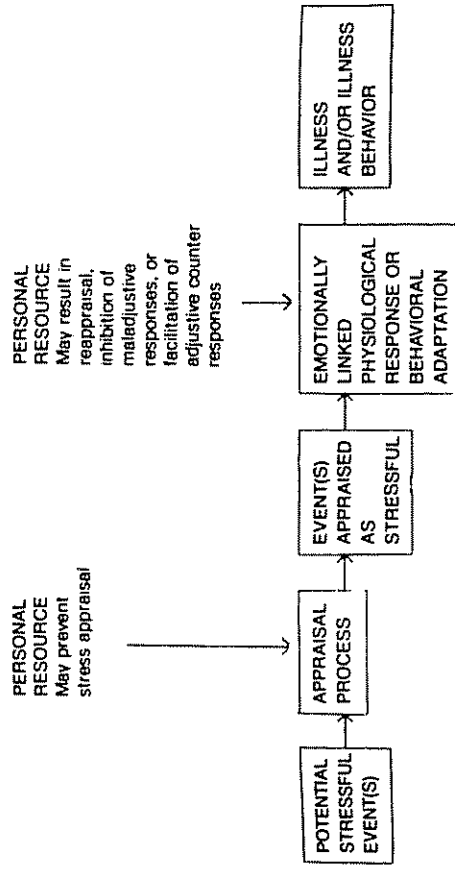
**METHODOLOGICAL ISSUES**

A minimum condition for testing the buffering hypotheses is a factorial design including at least two levels of stress and two levels of the personal resource under examination. (Studies reviewed in this article will be limited to those that meet the above criterion.) A buffering effect is indicated when the resource reduces (Figure 7.2a) or eliminates (Figure 7.2b) the effects of stress on symptomatology. In either case, if the sample is large enough (allowing for sufficient statistical power), there would be a significant stress x resource interaction.

**Statistical Analyses**

Common statistical procedures used in stress-buffering studies include two-way analysis of variance with stress and the personal resource as factors, or equivalently, multiple regression analysis with the cross-product term (stress x resource) forced into the equation after the main effect terms for stress and the resource. When appropriate data are available, the regression analysis is preferred because it treats the predictor variables as continuous. Using this procedure, the stress x resource interaction term represents an index of the difference between the slope of the stress-symptom relationship for persons high on the resource and the slope of the stress-symptom relationship for persons low on the resource (cf. Arnold, 1984; Cohen & Cohen, 1975). Also, given certain assumptions are met, both regression and analysis of covariance models provide a means of control for initial symptom level in prospective data analyses.<sup>3</sup>

<sup>3</sup>For a discussion of use of covariance in prospective models see Byrck and Weisberg (1977) and Weisberg (1979).



**FIGURE 7.1.** Two points at which personal resources may intervene with the hypothesized causal link between stressful events and illness (Adapted from Figure 1, Cohen & Wills, 1985). Stress social support and the buffering hypothesis (*Psychological Bulletin*, 98, 310-357. Copyright 1985 by the American Psychological Association).

stressful. Alternatively, it is possible that persons with the type A behavior pattern are more likely to appraise a situation as stressful and to cope inappropriately once a stress appraisal is made. Hence type B individuals may be better off, not because they possess some beneficial personal characteristic, but merely because they are not type A.

**Dynamics of Model.** Although it is convenient to think of transactions with stressors as static, cross-sectional occurrences, many common stressful events are chronic or repetitious. It is likely that the stress-buffering effectiveness of some resources may vary over the course of a stressful event or series of events. For example, as we continue to draw on a resource, the appropriateness and/or availability of that resource may change; some resources may be depletable and others increase with practice or use (Gore, 1985). Of particular concern when discussing personal resources is that continued transactions with a stressor may alter the resource itself. For example, self-esteem and feelings of personal control may increase when coping is successful and decrease when it is unsuccessful. Wheaton's (1982; also see Gore, 1985) distinction between resources that influence ability and those that influence effort may be especially useful in this context since resources that affect effort may be more susceptible to success-failure induced change than those that affect ability. In addition, different coping resources may be appropriate at different phases of a stressful event (Lazarus & Folkman, 1984). For example, avoidant strategies may be more effective in the initial stages of encounter and nonavoidant strategies in later stages (see review by Suls & Fletcher, 1985b).

Another common statistical procedure used in this literature is subgrouping analysis of correlations. In this analysis, correlations between stress and symptoms are examined separately for persons high (above the median) and low (below the median) on the personality moderator under consideration. (For the purpose of this discussion, we assume that the variable is scored so that the higher the resource level, the greater the stress-buffering.) In general, results have been deemed supportive of stress buffering if (1) there is a significant positive relationship between stress and symptoms for persons with low scores on the coping resource; (2) the relationship between stress and symptoms for persons with high scores on the coping resource is positive or zero; and (3) the correlation between stress and symptoms for persons with low scores on the coping resource is significantly greater than the same correlation for persons with high scores on the resource.

Unfortunately, inappropriate use of the subgrouping of correlations procedure and the inadequate provision of information regarding the form of observed relationships render many of the stress-buffering studies using this procedure uninterpretable. Because the subgrouping of correlations procedure tests differences in the amount of variance explained rather than differences between slopes, it does not provide a test of stress buffering. Moreover, because of a common and mistaken belief that just the presentation of the correlations (or slopes) is sufficient evidence for interpreting the form of the stress x resource interaction, most of the studies in this literature using subgrouping analyses are technically uninterpretable.

Why is it that subgrouping of correlations does not provide an appropriate test of stress buffering? As discussed earlier, a test of stress buffering depends on a significant difference between the slope of the stress-symptom relationship for persons low on the resource and the slope of the stress-symptom relationship for persons high on the resource (see Figure 7.2). Subgrouping analysis of correlations does *not* test the difference between slopes (regression coefficients), but rather the difference in amount of variance explained (correlation coefficients). Slopes and correlations are only identical if the ratio of standard deviations of both variables (stress and symptoms) are the same in both subgroups (high and low resource groups) (see e.g., Arnold, 1982; Tukey, 1969). However, equality of ratios will seldom hold when the pattern of data is supportive of stress buffering. For example, given the standard deviation for stress is equal across subgroups, a steeper slope for one subgroup implies (assuming a normal distribution of scores) a greater standard deviation for symptom scores in that group (see Arnold, 1984, p. 147). Assume, for example, that all points in Figure 7.2b lie very close to the plotted lines. In this case, the standard deviation of symptoms for the high resource group would be close to 0, while the standard deviation for symptoms of the low resource group would be some positive value. In short, if we hold the variance of stress constant across groups, a flatter regression line is generally associated with a smaller variance in symptoms than a

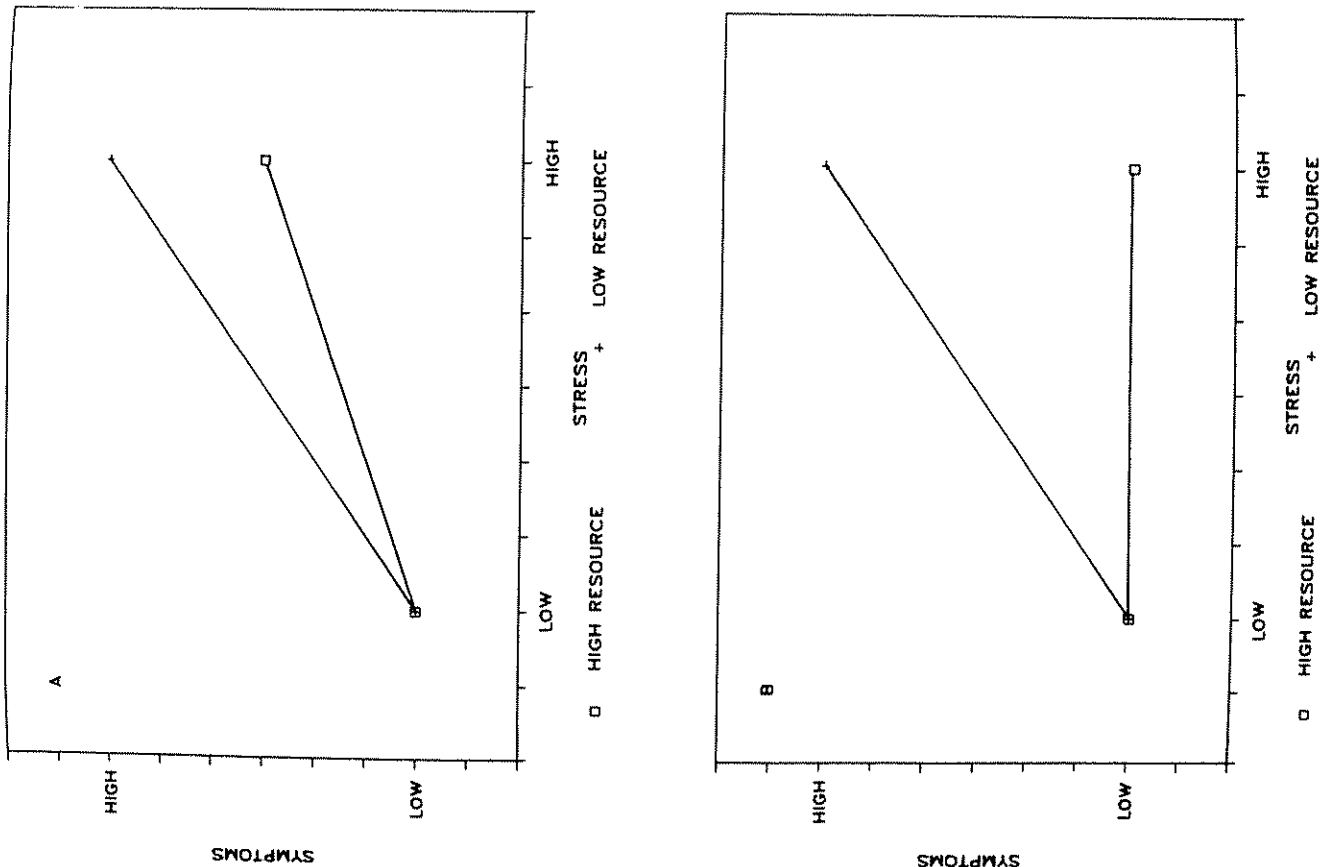


FIGURE 7.2. Depiction of the two forms of the stress x resource buffering interaction supportive of stress-buffering.

steeper regression line. Because of this inequality of standard deviations, subgrouping of correlations is an inappropriate statistical test of stress buffering or of any theory predicting differences in absolute values of slopes across subgroups. A cursory examination of Figure 7.2a suggests the fallacy in the subgrouping of correlation approach. Although the slopes of the two subgroups are different, the correlations could be identical, larger for the steeper slope, or smaller for the steeper slope. A subgrouping comparison of the slopes of high and low resource groups, instead of the correlations, avoids this problem (e.g., studies by Krause & Stryker, 1984; Suls & Fletcher, 1985a).

Why are the data patterns from most of these studies uninterpretable? In all but one of the subgrouping (of both correlations and slopes) studies, information is not provided (means, description of mean patterns, or regression slopes and intercepts) to allow discrimination between stress-buffering patterns (Figure 7.2a & 7.2b) and forms of the stress x resource interaction in which persons high on the personal coping resource have higher symptom scores than some or all of those who are low (e.g., Figure 7.3a & 7.3b). Although all of the patterns depicted in Figures 7.2 and 7.3 are consistent with the differences in slopes as tested by subgrouping of slopes analysis, only those depicted in Figure 7.2 are supportive of the stress-buffering hypothesis.<sup>4</sup>

It would be justifiable to exclude most of the subgrouping studies as totally uninformative. However, because of the common usage of this technique, and the controversy this critique is sure to raise, we take a middle ground. We present the authors' interpretation of the analysis as well as our own, and interpret the reported conclusions as speculative guesses as to the nature of the data.

### Sample Size

The interaction depicted in Figure 7.2b, a *monotone* interaction, is difficult to demonstrate statistically, because the buffering effect (a discrepant mean in only one cell of a 2 x 2 matrix) is divided between main effect terms and the interaction term in the analysis of variance or regression (Dawes, 1969; Reis, 1984). As a result, reasonably reliable measurement and a large number of subjects are required to detect a significant monotone interaction. Thus in studies where measurement procedures or sample size are suboptimal, it is common to find a significant main effect and a pattern of means consistent with a buffering effect without a significant interaction (cf. Kessler & McLeod, 1985).

<sup>4</sup> All of these patterns are also consistent with a stress x resource interaction in analysis of variance or regression. However, investigators using these techniques have typically reported the information required to determine the form of the interaction, that is, group means or slopes and intercepts.

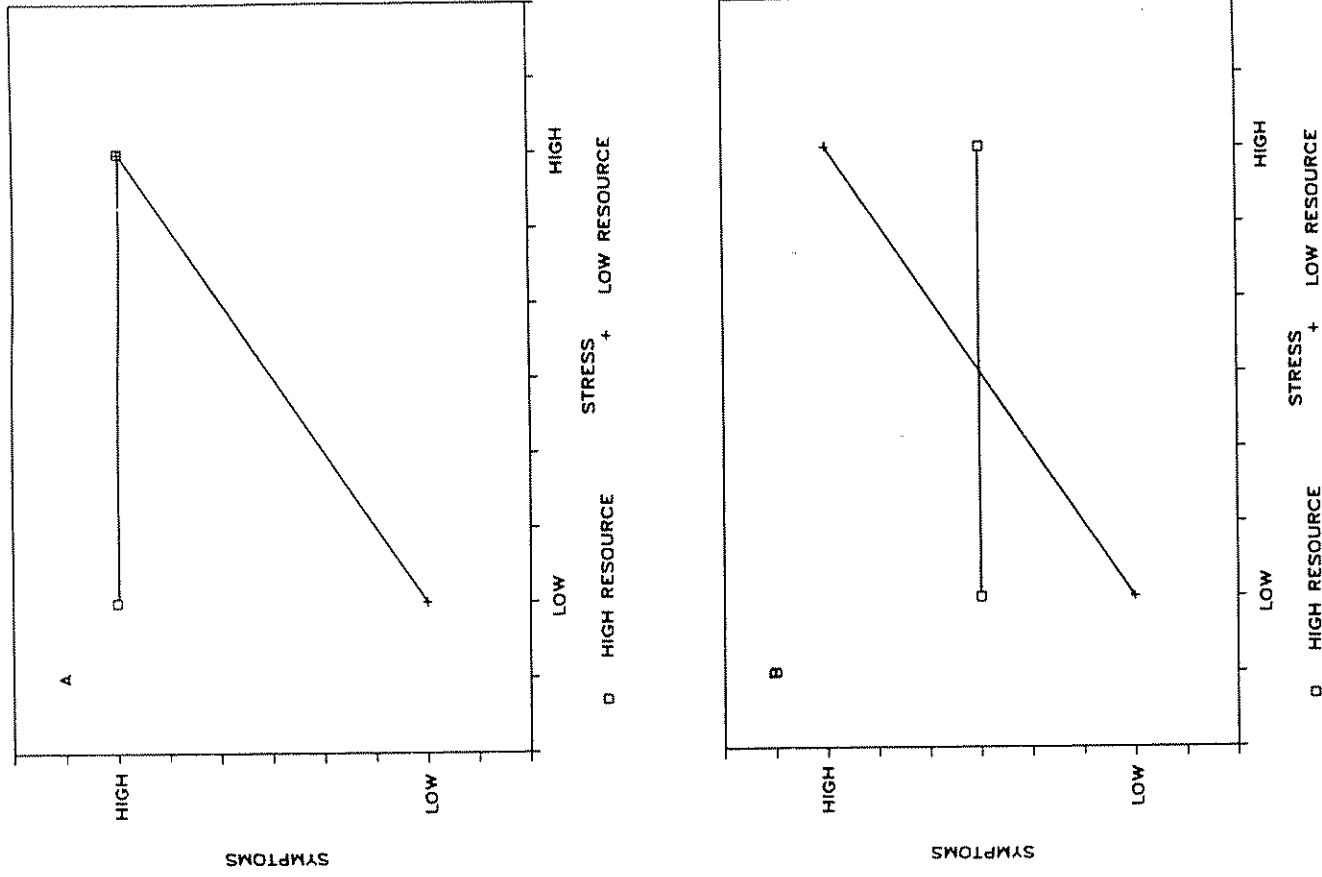


FIGURE 7.3. Depiction of stress x resource interactions consistent with a significant difference between slopes as indicated by subgrouping analysis but not supportive of stress-buffering.

### Common Errors in Setting Alpha Levels

A common problem in the stress-buffering literature is the failure to adjust alpha levels to take into account the number of tests conducted in a study (experimental wide error). For example, the commonly accepted alpha level of  $p < .05$  indicates that if *one* statistical test is run, then the probability of the result occurring by chance is 1 in 20. Unfortunately, many of the studies in the literature run multiple tests (e.g., separate interactions are conducted to test the possible buffering effects of life events x resource for several different outcomes, for life events x several resources, etc.). (The same issue applies to reanalysis of the same data set or subset of the data set even if that reanalysis is reported in a different paper.) Using an uncorrected alpha of  $p < .05$ , the actual probability of any one of *two* tests appearing to be significant when the sample difference does not actually represent a population difference is  $p < .10$ , for one of three tests the probability is  $p < .14$ , for one of four  $p < .18$ , etc.<sup>5</sup> In these cases, sample differences are treated as if they represent population differences when they actually do not (type I error).

There are also cases of setting alpha levels too conservatively. Because only one form of the stress x resource interaction is acceptable as evidence for stress buffering (negative signed beta; see Figures 7.2a & 7.2b), the stress x resource interaction can be tested with a one-tailed test. That is, for a single test, a two-tailed level of  $p < .10$  is acceptable. In short, we are arguing that because fewer than half of all possible stress x resource interactions support stress buffering, the usual two-tailed alpha does not provide an accurate estimate of the probability of a confirmatory result occurring by chance. As a result, sample differences are sometimes treated as if they do not represent population differences when they actually do (type II error).

The two issues raised above are not entirely independent. If we accept a two-tailed alpha of  $p < .10$  as significant, then it is possible to interpret two tests using unadjusted two-tailed alphas of  $p < .05$  as accurately reflecting a one-tailed  $p < .05$  alpha. Because the problem of more than one statistical test without alpha adjustment occurs so often in the literature, we limit specific criticisms of studies to places where the violation is extreme, that is, *multiple* tests without adjusted alphas.

### Causal Interpretation

Finally, we should note the importance of using causal analytic models for data on stress buffering when possible. Concurrent interactions between

stress and a buffering resource in the prediction of well-being are amenable to three alternative causal interpretations. They may reflect the predicted stress buffering of the resource, or illness causing changes in stress and resource levels (reverse causation), or a third factor, for example, social class, causing changes in stress and resource levels and in illness (spuriousness). Clearly, work employing methodological and statistical models that aid in distinguishing between these alternative interpretations is imperative. A discussion of the methodological and statistical techniques available to aid in causal inference from stress-buffering data exceeds the scope of this chapter. The reader is referred to an overview of available statistical techniques and their limitations provided by Dooley (1985) and discussions of prospective data analysis and its limitations by Kasl (1983) and Kessler (1985).

### REVIEW

As noted earlier, the following review is limited to studies including both stress and a personal resource presumed to act as a stress buffer. We include studies published through January 1986 as well as several in-press articles available to us at that time.<sup>6</sup> The review is organized into three sections: Composite indices of stress-protective resources; interpersonal predispositions; and intrapersonal predispositions. For the sake of brevity, we often refer to a main effect for stress or a main effect for a personal resource without indicating direction of the effect. Unless otherwise noted, a main effect for stress refers to higher stress associated with *increased* symptomatology, and a main effect for personal coping resource refers to greater resource levels associated with *decreased* symptomatology.

### Composite Indices of Stress-Protective Resources

In this section, we discuss studies that use measures that combine various personal and social resources into composite indices. These studies can be divided into those using what have traditionally been termed 'psychosocial asset' measures and those using 'hardiness' measures. Psychosocial asset measures usually include personal characteristics, health, and social support. Hardiness measures include scales assessing personal control, commitment, and challenge. In both cases, these combined resources are presumed to aid persons in the face of stressful events by providing increased ability or motivation to cope with events or their consequences.

<sup>6</sup>Recent published studies that are relevant to past work have been inserted or footnoted in appropriate sections. Other work published since January 1986 reports stress-buffering properties for self-complexity (Linville, 1987), sex-role orientation (Roos & Cohen, in press), and the joint operation of a number of personality and social factors (Holahan & Moos, 1986).

<sup>5</sup> $1 - (1 - \alpha)^k$  where  $k$  = number of uncorrelated tests. See Miller (1966) for discussion of this problem and alternative solutions for both correlated and uncorrelated tests.

**Psychosocial Assets.** In a study reported by De Araujo, van Arsdel, Holmes, and Dudley (1973), 36 asthma patients completed a life events checklist (the SRE), and the Berle Psychosocial Assets Index, which provides a score based on three subscales. The first subscale included age, social status, and past medical history; the second subscale tapped the patient's perceptions of family and interpersonal relationships; and the third was based on a physician's rating of the patient's personality structure and attitudes toward illness. The total score was based on a weight of 20 for the first subscale, 28 for males and 20 for females on the second, and 40 points for the third. Hence the overall score is heavily weighted for the physician ratings of patient personality and beliefs. One year after administration of the scales, patients' medical records were reviewed and the mean daily dosage of adrenocorticosteroids (medication used to control asthma) was calculated.

The results of this study suggested a buffering effect. The mean dosage for patients with low life events scores was relatively low irrespective of the psychosocial assets score. Patients with high life events scores had a relatively high dosage of medication if their psychosocial assets score was low, but had a level equivalent to the low life events groups if their assets score was high. T-tests of all possible pairs of cells indicated that the high stress, low psychosocial asset group had higher steroid intake than any of the other three groups, while these three groups were not different from one another. (These analyses use inappropriate error terms, but they are at least suggestive.) Although a prospective design was employed, there was no control for initial steroid dosage. One problem in interpreting these results is that physician ratings of patient personality make up most of the psychosocial asset scale and the outcome is physician-prescribed drug dosage. Hence the physician's behavior may have been influenced by his or her interpretation of patients' personal abilities to cope.

An oft-cited study by Nuckolls, Cassel, and Kaplan (1972) examined the role of a psychosocial assets score as a moderator of the relationship between life change and medical complications during pregnancy in a sample of 170 women. Measures of stressful life events (the SRE) and of psychosocial assets were obtained during the twenty-fourth and thirty-sixth week of pregnancy; a measure of medical complications was obtained from medical records after delivery, and cases were scored as either complicated or uncomplicated. The psychosocial assets scale was a composite measure including equally weighted scores for self-esteem, marital adjustment, family relationships, friendship patterns, and feelings about pregnancy.

Subjects were cross-classified on the basis of (1) stressful life events (non-maternal weighted score) in the two years before pregnancy, (2) stressful life events during pregnancy, and (3) psychosocial assets. Although no statistical test of the stress x psychosocial assets interactions were reported, there was a substantial elevation in medical complications for subjects with high stress both before and during pregnancy and low psychosocial assets in comparison with all other groups. However, because of the multiple cross-classifications,

this result was based on very few subjects ( $n = 11$  in the high stress before pregnancy/high stress during pregnancy/low assets cell). The lack of appropriate statistical analysis, lack of a buffering-like effect for persons who had low stress scores before pregnancy and high stress during pregnancy, and small sample size render the support for stress buffering reported in this study suggestive at best.

In a study reported by Norris and Murrell (1984), a community sample of 1402 older (55 and over) adults were tested five times separated by six-month intervals. Only data from the first two waves are reported in this article. A measure of depressive symptoms (CES-D) and a psychosocial assets scale were administered at the first interview session. Depressive symptoms were measured again during the second interview along with undesirable life events (56 items designed for older adults) and a global (perceived) stress question about how stressful life had been during the last six months. The psychosocial asset scale was the equally weighted sum of the standardized scores from scales measuring social support, functional health, self-esteem, education, and urbanicity (life in urban or rural area). Regression analysis examined the role of time 2 life events and time 1 assets in predicting time 2 depressive symptoms (traditional buffering interaction) and also in predicting time 2 perceived stress. A similar analysis examined the roles of perceived stress and assets in predicting depressive symptoms. Hence, this study provided separate tests of whether personal coping resource influences appraisal of stressful events (life events and assets predicting perceived stress) and/or influences the relationship between appraised stress and symptomatology (perceived stress and assets predicting depression). In regressions that provided additional controls for sex, age, and depression at the first panel, these authors found support for psychosocial assets buffering the relationship between perceived stress and depression but not for either the traditional buffering test or for buffering of the relationship between life events and perceived stress. In short, the study provides support for assets operating as buffers only *after* stress appraisal.

In another article, Murrell and Norris (1984) examined the relationship between undesirable life events (as measured at time 1 and 2) and changes in depression from the first to third interview waves of the *same* study. Multivariate analyses of variance indicated a significant interaction between resources and undesirable events on depression. As predicted by a stress-buffering hypothesis, increases in depression over time were limited to the combined condition of weak resources and high levels of undesirable events. However, weak resource persons with low or moderate undesirable events showed modest (and unpredicted) improvements in depression. In a regression analysis of the same data (resources and events treated as continuous variables), the undesirable event x resources interaction did not reach significance.

In sum, all of these studies provide some evidence suggesting a buffering role of psychosocial assets. However, scale differences and problems in the

statistical analysis and interpretation of the two earlier studies make it difficult to interpret the significance of these results. In all of these cases, separate analyses with each subscale would have helped determine whether the entire complex of assets is necessary for buffering to occur or a specific aspect or aspects of these composite measures were responsible.

**Hardiness.** Hardiness is defined as a personality construct composed of three characteristics: (1) *control*, which refers to believing in one's ability to influence the course of events; (2) *commitment*, which refers to approaching life with curiosity and sense of meaningfulness; and (3) *challenge*, which refers to the expectation that change is normal and stimulates development (Kobasa, Maddi, & Courington, 1981).

In a prospective study, Kobasa, Maddi, and Courington (1981) collected three sets of data separated by one-year intervals from a sample of 259 executives. Stress was measured using the Schedule of Recent Life Events (SRE; Holmes & Rahe, 1967), and self-reports of recent illness by the Seriousness of Illness Survey (SIS; Wyley, Masuda, & Holmes, 1968). At time 1, hardiness was measured by six scales, with commitment measured with the alienation from self and work scales of the Alienation Test (Maddi, Kobasa, & Hoover, 1979), control measured with Rotter's locus of control scale (Rotter, Seeman, & Liverant, 1962) and the control scale of the Alienation Test (Maddi et al., 1979), and challenge measured with the security scale of the California Life Goals Evaluation Schedule (Hahn, 1966) and the cognitive structure scale of the Personality Research Form (Jackson, 1974). Factor analysis revealed that five of the six subscales (all but cognitive structure) loaded on a single factor. These five scales were combined (sum of equally weighted standard scores) into a composite hardiness score. Because only these five scales are included in the composite score, this hardiness measure (used in all reviewed studies employing a composite measure) assigns weights of 2 to both control and commitment, and 1 to challenge. Using reported illness summed over time 2 and 3 as the dependent variable and time 1 stressful life events, hardiness, and constitutional predisposition (a measure of parents' illness) as predictors, analysis of variance indicated significant main effects for stressful life events, hardiness, and constitutional predisposition. After controlling for time 1 illness, only the main effects for hardiness and constitutional predisposition remained significant. Although no interactions were significant in either analysis, the pattern of group means were consistent with a buffering effect for hardiness.

Kobasa, Maddi, and Kahn (1982) report further prospective analyses of the *same data* just described, again using reported illness summed over time 2 and 3 as the dependent variable. After dropping constitutional predisposition from the model and controlling for time 1 illness, the main effect for time 1 stressful life events was not significant, but the interac-

tion of stress and time 1 hardiness reached significance. Similar results were obtained in a cross-sectional analysis of these *same data* using concurrent stressful life events (summed over time 2 and time 3) rather than stressful life events from time 1. Significant main effects were found for both stress and hardiness, as well as an interaction consistent with the operation of hardiness as a stress-buffer.

In three subsequent articles, Kobasa and her colleagues report the impact of hardiness and several other factors (exercise, social assets, type A behavior pattern) on the relationship between life events stress and reported illness. (Only the results pertaining to hardiness are discussed here.) In each of these cross-sectional studies, stress, illness, and hardiness (5 scales) were measured with the same instruments used in the Kobasa, Maddi, and Courington (1981) study. Two articles report analyses from the *same sample* of 204 managers of a large utility company, differing by the inclusion of either exercise (Kobasa, Maddi, & Puccetti, 1982) or social assets (Kobasa & Puccetti, 1983) as an additional moderator and by final sample sizes due to incomplete protocols. In both cases, results indicated main effects for both stressful life events and hardiness and a buffering effect for hardiness. The third report (Kobasa, Maddi, & Zola, 1983) involved a sample of 140 managers and included type A behavior as an additional moderator. Again, main effects were found for both stressful life events and hardiness. Though an interaction was not found between hardiness and total life events stress, a marginally significant buffering effect was found when only work-related life events were considered.

Rhodewalt and Agustodtirtir (1984) used the same hardiness scales used by Kobasa and her colleagues. Six-hundred undergraduates completed the hardiness scales, the JAS (see section on type A), the 22-item Langner Psychiatric Impairment Scale, and the College Schedule of Recent Life Events. For each life event, subjects indicated the degree to which the event was desirable (yes, no), controllable (high, moderate, low), and expected (yes, no). Only data from subjects scoring in the upper or lower third of *both* the hardiness and type A scales were used for analysis, yielding a final sample of 339. Subgrouping analyses of correlations indicated that, for low hardiness subjects, life events which were either undesirable or not totally controllable were significantly related to psychological distress. For high hardiness subjects, only life events which were moderately controllable were related to psychological distress. Differences between correlations were not tested. The authors interpret these results as consistent with the buffering hypothesis. As discussed earlier, the subgrouping analysis does not provide an appropriate test of stress buffering. Moreover, neither group means nor slopes and intercepts were reported to clarify the form of the observed interaction.

A final study, reported by Ganellen and Blaney (1984), used a hardiness measure that differs from the five scales described above. In this study, a



revised version of the locus of control scale (Levenson, 1974)<sup>7</sup> and five of the original 18 hardiness scales were used to measure hardiness. The five scales were drawn from the Alienation Test (Maddi et al., 1979) and included dimensions of control (powerlessness, nihilism), commitment (alienation from self), and challenge (vigorousness and adventurousness). Instead of combining these scales into a single measure, however, each was used separately in a series of ANOVA's (along with stress and social support) to test their individual contribution to the prediction of depression. Main effects were found for stressful life events, social support, two of the hardiness scales, alienation from self (commitment) and vigorousness (challenge). A buffering effect was found for alienation from self, but not for any of the other five scales.

If unique samples rather than number of articles are counted, five independent studies of hardiness as a moderator of stress and symptoms have been conducted. Of the four studies which used a composite measure of hardiness, one found a significant buffering effect, one found a buffering effect in one analysis of the data but not another, one found no buffering effect for total life events and a marginal (unpredicted) effect for work related events, and one was uninterpretable. (Also see recent failures to find buffering effect of hardiness by Funk & Houston, 1987; Schmied & Lawler, 1986; and Wiebe & McCallum, 1986; and failure with similar construct by Zika & Chamberlain, 1986.) In short, the evidence that the hardiness construct operates as a stress buffer is weak at best. This may be partly attributable to the poor internal consistency of the hardiness measure. Indeed, Kobasa, Maddi, and Courington (1981) report surprisingly low correlations between pairs of scales used to measure each of the three components of hardiness (ranging from .15 to .53), and a factor analysis of the five scales reveals a single dimension accounting for only 46.5% of the variance. When separate dimensions of hardiness were tested, only lack of alienation from self was found to buffer the effects of stress (Ganellen & Blaney, 1984). Because Kobasa and her colleagues did not analyze these dimensions separately, we do not know whether the composite is a more effective buffer than any of the components. Thus, though some components of hardiness may ameliorate the negative effects of stressful life events, it is unclear what these components are and whether they should be considered separately or grouped together as a single meaningful construct (cf. Funk & Houston, 1987; Ganellen & Blaney, 1984; Hull, Van Treuren, & Virnelli, 1987; Scheier & Carver, 1985).

<sup>7</sup> Recall that Kobasa and her colleagues used the Rotter scale and the control scale from the Alienation Test. The effectiveness of different locus of control scales is discussed later in this chapter.

### Interpersonal Factors

The studies reviewed in this section all focus on personal differences in abilities, attitudes, and feelings about others. They include social skills, social interests, and alienation.

**Social Skills.** Social skills refer to stable individual differences that contribute to abilities to form and maintain interpersonal relationships, and to obtain desired rewards from the social environment. These skills are presumed to operate as stress buffers because socially skilled persons would be more capable of coping with stressful events (especially interpersonal events) and more able to mobilize and maintain available social resources when actively coping with stressful events.

The buffering effectiveness of three social skills—social anxiety, self-disclosure, and social competence—were studied in 483 college freshmen by Cohen, Sherrod and Clark (1986). Instruments assessing these skills included the social anxiety subscale of the Self-Consciousness Scale (Fenigstein, Scheier, & Buss, 1975), Jourard's (1971, appendix 12) self-disclosure questionnaire, and a modified version of Levenson and Gottman's (1978) social competence scale. The perception of cumulative stress was measured by the Perceived Stress Scale (Cohen, 1986; Cohen, Kamarck, & Mermelstein, 1983) and depressive symptoms by the CES-D. Three separate hierarchical regressions indicated a stress-buffering effect only in the case of social anxiety; accounting for a mere .57% increment in variance. A relatively smaller sample size for the social competence analysis ( $n = 130$ ; because of missing data on that variable) led the authors to suggest that their failure to find a stress  $\times$  social competence interaction could be attributable to insufficient power.

**Social Interests.** Social interest refers to interest in developing and maintaining interpersonal relationships. Two rather different measures of this concept were used in the only published work examining social interest as a stress moderator (Crandall, 1984); the Social Interest Scale (SocIS; Crandall, 1975) and the Social Interest Index (SII; Greever, Tseng, & Friedland, 1973). The SocIS measures the desire for traits that reflect an interest in and concern for others, such as helpfulness, sympathy, generosity, and so on. The SII measures the desire to contribute, cooperate, and develop in four life areas, including work, friendship, love, and self-significance. Thus, while the SocIS measures concern for others in an altruistic sense, the SII measures involvement in and integration with society. Social integration (traditionally considered a structural [latent] measure of social support rather than a personality factor) could buffer stress because it implies the availability of others to aid. Sensitivity and concern for others

may act as a buffer because such feelings may imply social skills that allow persons to draw from their social networks.

Crandall (1984) administered both of these scales, along with the 43-item stressful life events scale (SRRS) and an affect measure (MAACL), to 87 undergraduates. Subgrouping of correlations analyses were performed, with separate correlations between life events and anxiety, depression, and hostility computed for high and low social interest subjects. Results indicated positive correlations between life events and both anxiety and depression only for subjects low in social interest. However, the difference between correlations for high versus low social interest subjects was significant only for subjects classified according to the SocIS. As discussed earlier, this analysis does not provide an appropriate test of the stress-buffering interaction. Moreover, neither means nor slopes and intercepts were reported making it unclear whether the form of the results are consistent with stress buffering.

**Anomie.** In a prospective study, Jenkins (1979) examined the moderating effects of anomie in the relationship between stressful life events and psychiatric symptoms among air traffic controllers. A lack of anomie or alienation from society could operate as a buffer because the nonalienated have stronger support networks or are more capable of maintaining and drawing on these networks. Anomie could also result in persons caring less about their own welfare and hence putting less effort into coping with stressful events. At time 1, the Psychiatric Status Schedule was used to identify subjects who were free from clinically significant psychological problems. The 348 subjects who met this criteria were administered a 100-item life event scale and an anomie scale designed to measure alienation from society. Approximately 27 months later, psychiatric symptoms were again assessed. Chi-square analyses were calculated with incidence of impulse control problems at time 2 as the dependent variable. The pattern of results were not supportive of stress-buffering.

**Summary.** In short, the evidence for differences in abilities, attitudes, and feelings about others acting as buffers of life stress is, at best, mixed. Evidence for buffering is reported in only two cases: for persons relatively low on social anxiety and for those relatively high in social interests (when defined as concerns about others). There are no replications of this work at this time and the size of the effects appear small. Stress-buffering effects were not found for social competence, self-disclosure, social interests (when defined as social integration), or lack of anomie (not being alienated). Finally, the inappropriate use of subgrouping analysis in the social interest study renders both the confirming and nonconfirming results reported in this study questionable.

### Intrapersonal Factors

This section reviews a range of individual differences that are nonsocial in nature. We have categorized these variables into sections on personal control, type A behavior, coping styles, coping flexibility, self-esteem, and private self-consciousness.

**Generalized Expectancies of Control.** If persons believe that their outcomes are within their own control, it follows that they should be active (effortful) copers. Because effortful coping increases the likelihood of successful coping, feelings of control are presumed to operate as a stress buffer (Lefcourt, 1985; Wheaton, 1982).

Generalized expectancies regarding control are variously referred to as locus of control, fatalism, mastery, and personal competence. These terms seem to be similar descriptions of the same concept deriving from different traditions or disciplines. Locus of control is the term used most often in the stress-buffering literature. Rotter (1966) defines locus of control as a generalized belief concerning personal control over important outcomes. An *internal* locus of control refers to a generalized belief that events are contingent upon one's own behavior, whereas an *external* locus of control refers to a generalized belief that events are contingent upon external factors, such as fate, luck, chance, or powerful others.

A number of different measures of locus of control have been used in studies of generalized control as a stress buffer. The most popular is the Rotter scale (Rotter, 1966) which was designed to measure a unidimensional, generalized expectancy of control over a wide variety of life domains. Subsequent factor analyses, however, support a multidimensional interpretation of the scale. For example, Mirels (1970) uncovered two meaningful dimensions, one concerning control over personal goals, achievements, and outcomes, and the other concerning control over social-political systems. Reid and Ware (1973) describe the former factor as fatalism and the latter as social systems control (SSC). Reid and Ware (1974) elaborated these dimensions in the development of a three-factor locus of control scale, which, in addition to subscales concerning fatalism and SSC, contains a self-control (SC) subscale that reflects beliefs concerning the ability to regulate one's own responses. The fatalism and SSC dimensions of this scale are highly related to the corresponding dimensions in the Rotter scale, while the SC dimension appears to be fairly distinct from the dimensions identified in the Rotter scale.

Lefcourt, von Baeyer, Ware, and Cox (1979) also expanded upon the multidimensional nature of locus of control in their development of the Multidimensional-Multiattributational Causality Scale (MMCS). This measure contains two subscales, one pertaining to locus of control concerning personal achievement and one pertaining to locus of control concerning affiliations with others. Both MMCS subscales are positively correlated with the Rotter (1966) scale, with correlations ranging from .23

to .62 for the achievement scale and .37 to .55 for the affiliation scale (Lefcourt et al., 1979).

Several studies have examined the moderating effects of locus of control as measured by each of the instruments just described. The majority of this work used the Rotter scale, and evidence for internal control operating as a stress buffer derives primarily from studies using this scale. In the earliest published study, Johnson and Sarason (1978) collected concurrent data on stressful life event (LES), locus of control (Rotter Scale), and symptoms of anxiety (STAI) and depression (BDI) from 124 college students. Subgrouping of correlations analyses indicated that only negative life events experienced by externals were significantly (and positively) related to both depression and trait anxiety. The authors interpret these findings as supportive of the hypothesis that internal control acts as a stress buffer. However, the appropriateness of the subgrouping analysis is in question. Moreover, neither group means nor slopes and intercepts were reported to clarify the form of the observed relationship.

Wheaton (1982) used a six-item version of the Rotter scale in a study in which locus of control is referred to as fatalism—accepting personal outcomes as inevitable, predetermined, and unalterable. Wheaton tested a random sample of 132 Anglo Americans and 108 Mexican Americans living in El Paso, Texas. Two measures of stress were used, including a life event inventory designed to measure acute stressors and a nine-item measure tapping the number of chronic sources of stress, such as separation or divorce, excessive marital problems, and feelings of being a failure in one's work. Depressive symptoms were measured using a self-report scale concerning the frequency of occurrence of 40 symptoms. Regression analyses indicated that, after controlling for sex, church attendance, education, physical problems, and social desirability, low fatalism (internal locus of control) buffered acute (life events) but not chronic stress. In an analysis of a subsample (132 Anglos) from the same data set, Wheaton (1983) examined two additional outcomes, symptoms of schizophrenia and anxiety, as well as reanalyzing the data on depressive symptoms. As in the larger version of the data set, low fatalism (internal control) buffered acute stress in the prediction of depressive symptoms. In the new analyses, low fatalism buffered both acute and chronic stress in the prediction of schizophrenic symptoms but neither acute nor chronic stress in the prediction of symptoms of anxiety.

Lefcourt, Miller, Ware, and Sherk (1981) reported three cross-sectional studies examining the impact of various measures of locus of control on the relationship between life events and psychological strain. Only the first used the Rotter scale. In this study, 59 undergraduates completed a life events scale focusing on high school years, both the Rotter and MMCS locus of control scales, and an affect measure (POMS). Separate hierarchical regression analyses, each using total mood disturbance as the dependent variable, were performed for each measure of locus of control. Main

effects were found for negative life events and Rotter's locus of control (favoring internals). The interaction between these two variables was also significant and consistent with the hypothesis that internal locus of control operates as a stress buffer. The interaction accounted for 7% of the variance in mood disturbance. A similar stress buffering effect was found for the MMCS affiliation scale, though it reached only marginal significance (4% variance accounted for).

Krause and Stryker (1984) examined the moderating effects of locus of control in a longitudinal study of 2090 middle-aged men. A shortened version of the Rotter scale and two items measuring global health status were administered at time 1. Two years later (time 2), the shortened version of the Rotter scale was again administered, along with a six-item index of recent job and economic events and a seven-item measure of psychological and physical distress. Cases were divided at the mean of the locus of control scale, and only men with the same locus of control orientation at both panels were retained for analysis ( $n = 1763$ ). Subgrouping analysis of slopes indicated that, after controlling for time 1 distress and demographic information, the slope representing the relationship between time 2 stress and time 2 distress was significantly greater for externals, though significant for both groups. Further analysis involved four groups formed by dividing the two earlier groups at plus and minus one standard deviation from the mean (extreme externals, moderate externals, moderate internals, extreme internals). Multiple comparisons indicated that the slope representing the relationship between stress and time 2 distress was steepest for moderate externals and flattest for moderate internals (differences significant at the  $p < .05$  level), though the slopes were significant for all four groups. Unfortunately, neither intercepts nor group means were reported to clarify the form of these relationships. Nonetheless, this study suggests the possibility of a curvilinear moderating effect of locus of control.

In a later article, Krause (1985) noted that persons high in need for social approval may under report socially undesirable experiences such as negative life events (e.g., divorce, financial, and legal problems) and depressive symptomatology. To control for this, a measure of social desirability (Crowne & Marlowe, 1964) was included in a study of life events (12-item scale), locus of control (Rotter scale), and depression (CES-D) among 300 married women. Before controlling for social desirability, main effects for negative life events and locus of control were significant, while their interaction was not. After controlling for social desirability, however, the main effect for negative life events remained significant and the stress  $\times$  control interaction attained significance, accounting for 1.2% of depressive symptom variance. The interaction was consistent with the hypothesis that internal locus of control acts as a stress buffer. These results indicate that controlling for social desirability response bias may aid the detection of control as a stress buffer.

In a study by Sandler and Lahey (1982), undergraduates were classified as internals (52 subjects) or externals (41 subjects) according to their scores on

the fatalism dimension of the Rotter scale (Mirels, 1970). Those whose scores range from 0-3 were classified as internals and those with scores of 5-9 as externals. These subjects were administered a 111-item life event scale in which they were asked to rate each event for personal control over occurrence and consequences, an anxiety measure (STAI), and a depressive symptom scale (BDI). Subgrouping of correlations analyses indicated positive relationships between negative life events and both depression and anxiety for all subjects, with stronger relationships for subjects with an external locus of control. These data were interpreted by the authors as supportive of stress buffering. Unfortunately, the analyses provided an inappropriate test of the buffering hypothesis. Moreover, because group means were not reported, it is not possible to determine whether the pattern of data were supportive of stress buffering. In the case of personal control over life event occurrence and consequences, the patterns and magnitudes of correlations were clearly not consistent with stress buffering. Furthermore, locus of control and personal control over life events were not correlated, which is contrary to the assumption that an internal locus of control leads to more effective coping due to greater personal control over life events.

Turner and Noh (1983) also examined the stress buffering effects of locus of control as measured by the fatalism dimension of the Rotter scale. A sample of 312 women completed a 22-item life events scale, a 9-item version of the fatalism dimension of the Rotter scale, and a psychological distress measure focusing on anxiety (7 items), depression (6 items), and anger/aggression (6 items). Regression analysis using the summary psychological distress measure as the dependent variable indicated significant main effects for life events and locus of control. The interaction between life events and locus of control was not significant for the overall sample. However, separate analyses for lower, middle, and upperclass women suggested a buffering effect for locus of control specifically among middle-class women (neither statistical test nor significance level of this effect was not reported).

Two studies using the Rotter scale failed to find any stress-buffering effects. In a prospective study, McFarlane, Norman, Streiner, and Roy (1983) interviewed 428 subjects at three points in time separated by six-month intervals. At each interview, subjects completed a psychological distress scale (Langner, 1962) and a 42-item life events scale (SRE) with each event assessed for desirability, expectedness, and personal control over occurrence. During the first and third interviews, subjects also completed the Rotter scale and a measure of social support. Other health measures included a health diary in which symptoms were recorded for consecutive three-day intervals every two weeks and a diagnosis and treatment form completed by family physicians after each visit. Prospective analyses indicated that uncontrollable events evaluated as either undesirable or neutral were most strongly related to all symptoms, and further analyses involved only these life events. Moderating effects were

tested cross-sectionally, using time 2 psychological distress scores and time 2 number of symptoms reported in the health diaries as dependent variables in separate regression analyses. After controlling for time 1 symptom scores, stressful life events as assessed at time 2 were significantly related to psychological distress, but neither the main effect for locus of control nor its interaction with stressful life events reached significance. Similarly, stressful life events were significantly related to reported physical symptoms after controlling for previously reported symptoms, while locus of control exhibited neither main nor moderating effects.

Nelson and Cohen (1983) collected longitudinal data from 110 undergraduates at two times separated by an eight-week interval. Measures collected at both time 1 and time 2 included a 57-item life events scale (LES) with each event rated for personal control over the outcome of the event, an anxiety scale (STAI), a psychological discomfort scale, and Rotter's locus of control scale. Depressive symptoms (BDI) was measured only at time 2. Cross-sectional analyses at both times 1 and 2 indicated the expected main effects on anxiety and discomfort for both negative life events and locus of control (externals have more symptoms). There were no stress x locus of control or stress x personal control interaction in either analysis. A similar lack of buffering interactions was found in a reanalysis of time 2 data controlling for time 1 anxiety and discomfort. As in the Sandler and Lahey (1982) study, ratings of personal control over life events were independent of locus of control orientation.

Unlike studies using the Rotter scale, those using the MMCS and Reid and Ware scales have not generally found internal control acting as a stress buffer. Two studies reported in Lefcourt et al. (1981) measured locus of control with the Reid and Ware scale and the MMCS. In the first, 102 undergraduates completed a life events scale (LES), an affect measure (POMS), and the Reid and Ware (1974) SC subscale. Results indicated no main effect for life events but a significant main effect for self-control (favoring internals). A significant interaction between negative life events and self-control was also found. However, rather than representing a buffering effect, plot means indicated a positive relationship between negative life events and mood disturbance only for internals, while externals experienced high levels of mood disturbance regardless of life event scores (Figure 7.3a).

In the second study, 55 undergraduates were administered the LES, the POMS, the MMCS, and all three subscales of the Reid and Ware three-factor locus of control scale. Main effects were found for negative life events and control over affiliations with others (marginal), as well as interactions between negative life events and both control over affiliations with others and control over achievements. The form of the interaction between life events and control over affiliation with others was not consistent with a locus of control buffering hypothesis. Control over achievements demonstrated a buffering effect favoring internals (accounting for 7% of the

variance), though strong positive relationships between negative life events and mood disturbance were found for both internals and externals.

Generalized feelings of control were also studied under the rubric of "personal competence" in a study reported by Husaini, Neff, Newbrough, and Moore (1982). White married adults ( $n = 965$ ) from rural areas in Tennessee, Oklahoma, and Ohio were randomly sampled. Personal competence was measured with a seven-item scale developed by Campbell, Converse, Miller, & Stokes (1960) designed to measure an individual's sense of competence or instrumental efficacy. Stressful life events were measured with a 52-item modified version of the Holmes and Rahe scale, and depressive symptoms were measured with the CES-D. Respondents also completed an eight-item scale tapping eight dimensions of social support. Eight separate hierarchical regression analyses were performed, each controlling for demographics and including a different measure of social support. All eight analyses indicated a significant main effect for life events and, in seven of eight analyses, a significant interaction between life events and personal competence. Results were consistent with the hypothesis that internal locus of control operates as a stress buffer. When these analyses were recalculated separately for males ( $n = 335$ ) and females ( $n = 624$ ), the control buffering effect was not found in any of the analyses of male data and occurred only in two of eight analyses of female data. These results may indicate that locus of control is more important for females, or alternatively may reflect the lower statistical power in the smaller sample of males.

Finally, a study of the stress-buffering properties of "mastery" is reported by Hobfoll and Walfisch (1984). In this study, 68 Israeli women were interviewed immediately prior to undergoing biopsy for suspected cancer ("acute" stress) and again three months later ("everyday" stress). Mastery was measured (prebiopsy) with the sense of mastery scale used by Pearlman and Schooler (1978). Measures of psychological distress collected both pre- and postbiopsy included state anxiety (STAT) and depressive symptoms (CES-D). Data from women diagnosed as having cancer at prebiopsy were omitted, and the remaining group was assumed to be under high stress at time 1 (prior to biopsy) and low stress at time 2 (3 months postbiopsy). An inappropriate subgrouping of correlations analyses did not support stress buffering for mastery. Enough information was available to determine that data for anxiety was probably not supportive of buffering. The reported data were insufficient to make any estimate in the case of depression.

Overall, the detection of internal locus of control as a stress buffer appears to depend upon the instrument used to measure locus of control and the dependent variable under consideration. In particular, most studies reporting a moderating effect measured locus of control with the Rotter scale (or a subset of its items) and used psychological symptomatology as the dependent variable (Johnson & Sarason, 1978; Krause, 1985; Krause & Stryker, 1984; Lefcourt et al., 1981, study 1; Turner & Noh, 1983; Wheaton, 1982, 1983).

However, inappropriate statistical analysis (Johnson & Sarason, 1978), and failure to provide sufficient data to determine the form of the interaction (Johnson & Sarason, 1978; Krause & Stryker, 1984) raise questions regarding the results of two of these studies.<sup>8</sup> With the exception of Husaini et al. (1982), the few studies using locus of control measures other than the Rotter scale produced inconsistent and inconclusive results (Ganellen & Blaney, 1984 [discussed in composite index section]; Hobfoll & Walfisch, 1984; Lefcourt et al., 1981, studies 1, 2, & 3). It is not clear that the facets of locus of control measured by these scales (particularly the affiliation, achievement, and social-systems control scales) are relevant for the attenuation of stress-related outcomes.

The relative success of the Rotter scale may be attributable to its generality and its emphasis on control of external events (as opposed to self-control). Because stressful life events scales assess the occurrence of a range of different stressors, eliciting needs in different domains, a global control scale like the Rotter instrument may provide a good match of stressors and resources. Moreover, life events are generally conceptualized as external occurrences requiring personal control of the environment. In sum, the studies reviewed offer tentative support for locus of control (as measured by the Rotter scale) as a buffer of the relationship between life events stress and psychological strain.

**Type A Behavior Pattern.** Type A behavior pattern is characterized by excessive competitive drive, impatience, hostility, and accelerated speech and motor movements, while the type B pattern is defined as the relative absence of these characteristics (Friedman & Rosenman, 1959; Glass, 1977; Matthews, 1982). Epidemiologic studies have established that type A individuals are more likely than type B individuals to develop coronary heart disease. According to Glass (1977), challenging, competitive, or uncontrollable environmental conditions tend to trigger the type A pattern in susceptible individuals, which in turn intensifies their psychophysiological reactions to these conditions. Hence, one might predict that the type B pattern would act as a stress buffer, either because type B behavior helps protect people from stress-induced pathology or because the type A behavior enhances stress-induced pathology (Krantz & Manuck, 1984; Manuck & Krantz, 1984).

The two measures of type A behavior pattern used most often in this literature are the Structured Interview (SI; Rosenman et al., 1975) and the Jenkins Activity Survey (JAS; Jenkins, Rosenman, & Zyzanski, 1974). While both of these measures exhibit acceptable reliability, the overlap between measures is only moderate. Several studies have indicated that the JAS produces the same type A/B classification made by the Structured Interview in

<sup>8</sup> A recently published study by Caldwell, Pearson, and Chin (1987) failed to find a stress-buffering effect of a version of the Rotter scale.

only about 60 to 70% of the cases examined (see review by Matthews, 1982). Thus, while each of these measures may reliably tap some dimension of the type A pattern, it is doubtful that the same dimensions are addressed by each.

Though laboratory research has demonstrated the heightened reactivity to stressful conditions of type A individuals (Houston, 1983), most field research has examined type A behavior pattern as a main effect in the prediction of pathology (Haynes, Feinleib, & Kannel, 1980; Rosenman et al., 1975). We located seven published field studies that examined the differential reactivity of type A and type B individuals in reaction to stressful conditions. At best, these studies provide only suggestive evidence that type B individuals are relatively protected from stress-induced pathology.

In the earliest study, Caplan and Jones (1975) examined the impact of type A behavior pattern on the relationship between stress associated with a campus computer shutdown and symptomatology in college students. During the three days before the announced shutdown, 122 male computer users were administered a questionnaire including measures of subjective stress (workload and role ambiguity); a self-report type A behavior questionnaire (Vickers, 1973), and scales measuring anxiety, depression, and resentment. Heart rate was measured after completion of the questionnaire. Five months later, all measures were again collected from 73 (60%) of the original respondents. All data were converted to change scores by partialing out the time 1 value of each variable. Path analyses involving the entire sample indicated a positive relationship between change in workload and change in anxiety, positive relationships between change in role ambiguity and changes in both depression and resentment, and positive relationships between changes in both anxiety and resentment and change in heart rate. Subgrouping of correlations analyses were used to test differences between type A and type B students in the relationship between stressors and symptoms. Of the nine analyses performed (2 stressors  $\times$  3 psychological outcomes as well as 3 psychological outcomes as predictors of heart rate), the only difference between type A and type B students was interpreted as consistent with stress buffering and involved the association between change in workload and change in anxiety. The correlation was significant only in the case of type A individuals, and the magnitude of the correlations were significantly different. A similar but nonsignificant difference was found for the relationship between change in anxiety and change in heart rate. Unfortunately, the alpha level (set at  $p < .10$ ) was not appropriately adjusted to account for the number of analyses performed. Moreover, although slopes were presented (greater slope for type A individuals as predicted by buffering), failure to report intercepts or group means results in uncertainty regarding the exact nature of the stress  $\times$  type A interaction.

Suls, Gastorf, and Witenberg (1979) examined the relationship between life events and psychological distress in a sample of 125 undergraduates classified as extreme type A or type B according to a version of the JAS

adapted for college students (Glass, 1977). Life events were measured using a version of the SRE modified for college students with each event assessed in terms of desirability, personal controllability, and expectedness (yes, no, unable to determine). Psychological distress was measured using Langner's anxiety scale. Subgrouping analyses were performed, with data divided according to the 3 (desirability, controllability, expectedness)  $\times$  3 (yes, no, unable to determine) categorization of life events just described and the type A/type B classification. These matrices result in 9 possible subgrouping of correlations comparisons. If type A behavior is only triggered by unpredictable and uncontrollable events, buffering effects would only be expected for comparisons involving undesirable, uncontrollable, and unexpected life events. Data interpreted by the authors as consistent with the buffering hypothesis were found for two of these comparisons: undesirable and unexpected events, and also for events for which degree of personal control was indeterminable. Unfortunately, the subgrouping of correlations analysis used in this study is inappropriate for testing stress buffering. Moreover, neither group means nor slopes and intercepts were reported, making any interpretation of the form of the observed relationship speculative at best.

Controllability, desirability, and predictability of life events were also assessed in two studies of the stress-buffering role of the type A behavior pattern reported by Rhodewalt and his colleagues. In the first study (Rhodewalt & Agustodottir, 1984), 600 undergraduates completed the hardness scale, the JAS, the Langner psychological distress scale, and a college student life events scale. The details of this study are discussed in the section on hardness. Subgrouping analyses of correlations indicated that, for type A subjects, life events which were either undesirable or not totally controllable were significantly related to psychological distress. For type B subjects, only life events which were undesirable were related to psychological distress. As indicated earlier, an inappropriate analysis as well as a failure to report group means or slopes and intercepts renders this study uninterpretable.

Rhodewalt, Hays, Chemers, and Wysocki (1984) report a study in which 49 university administrators completed the JAS, a 24-item job stress scale, a life events scale (SRE), a 26-item physical symptom and illness checklist, and the Langner 22-item psychiatric impairment scale. Each applicable item in the life events scale was rated by the respondent for desirability, predictability, and controllability. Six multivariate analyses of variance were conducted. Analyses involving job stress scores indicated significant main effects for both job stress and type A scores and a stress-buffering effect (favoring type B subjects). Further univariate analyses of variance indicated that the buffering effect corresponded to scores on the Langner scale but was not significant for overall physical symptoms. However, when only symptoms pertaining to cardiovascular health were included, a significant buffering effect (favoring type B subjects) was found. Findings for life

events rated as both undesirable and moderately controllable were consistent with those for job stress, indicating a buffering effect (favoring type B subjects) in the prediction of psychological distress and cardiovascular symptoms.

In two cross-sectional studies, Ivancevich, Matteson, and Preston (1982) assessed the relationship between job stress and various psychological and physiological outcomes for type A and type B managers and nurses. In the first study, 339 managers completed the job stress measures (quantitative and qualitative workload, lack of career progression, family situation, supervisor relations, and role conflict), a type A scale similar to the JAS, and a job satisfaction measure. Physiological measures included serum cholesterol and triglycerides, systolic and diastolic blood pressure, and percent body fat. Subgrouping of correlations analyses looked only at persons in the extremes; classifying persons as type A if they were in the top third of scale scores and as type B if they were in the bottom third. Of the 30 subgrouping analyses performed (6 stress measures  $\times$  5 outcomes), three were interpreted by the authors as consistent with a type B stress-buffering hypothesis; indicating insignificant correlations for type B managers and significantly greater relationships for type A managers. These included the relationship between quantitative workload and both systolic and diastolic blood pressure and the relationship between role conflict and systolic blood pressure. Unfortunately, this subgrouping analysis was inappropriate and group means or slopes and intercepts clarifying the nature of the observed relationships were not reported. In a follow-up study involving 57 female registered nurses, job stress (same as above except that family situation and lack of job progression were replaced with physician relations and time pressure) and the psychological and physiological criterion variables were measured as before, but the type A behavior pattern was assessed using the structured interview. Of the 30 subgrouping of correlations analyses performed, four were interpreted by the authors as consistent with type B stress buffering; indicating nonsignificant relationships for type B subjects and significantly greater relationships for type A nurses. These included the relationships between time pressures, role conflict, and quantitative workload and serum cholesterol, and the relationship between quantitative work overload and systolic blood pressure. Group means suggest that the form of these interactions were consistent with the stress-buffering hypothesis. Overall, even if the authors' interpretation of statistical significance were accepted, these data are suggestive at best with only 7 of 60 analyses supporting type B buffering.

Two studies failed to find even suggestive evidence that type B subjects are less affected by stress than type A subjects. In the first, Simes, Garrity, and Marx (1981) examined differences in the relationship between life events and physical and psychological symptomatology among 145 type A and type B undergraduates. The life events instrument was a 47-item scale, and measures of symptomatology included four physical health scales and

Langner's index of mental health. Structured interviews categorized 41 students as extreme type A (type A<sub>1</sub>) and the remaining 104 students as either type A<sub>2</sub> or type B. Due to difficulty in making a reliable distinction between type A<sub>2</sub> and type B students, the latter two groups were combined for analysis. Analyses involving the entire sample indicated positive relationships between life events and both physical and psychological symptoms. Results of subgrouping of correlations analyses were not supportive of type B buffering in either the entire sample or in separate analyses for males and females.

Finally, Kobasa, Maddi, and Zola (1983) examined the moderating effects of type A behavior and hardiness on the relationship between stress and illness. Managers ( $n = 140$ ) completed the 58-item life events list (SRE), a self-reported illness scale (SIS), and the JAS. Analysis of variance revealed a main effect for stressful life events (more events resulting in more illness), but neither a main effect nor an interaction were found for type A behavior.

Overall, the evidence for persons with type B patterns being relatively protected from stress-induced pathology is at best suggestive. Although some supportive effects are reported by Caplan and Jones (1975), Ivancevich et al. (1982), Suls et al. (1979), and Rhodewalt et al. (1984), there is a distinct possibility of type I error, with only 13 of 83 analyses (16%) reaching significance: 13 of 89 of the remaining two studies are also included.<sup>9</sup> Moreover, the majority of these studies may be uninterpretable in terms of their implications for stress buffering because of statistical shortcomings. Only Kobasa, Maddi, and Zola (1983) and Rhodewalt et al. (1984) used appropriate analytic techniques. Moreover, among the studies using subgrouping of correlations, only Ivancevich et al. (1982) reported sufficient information to allow determination of whether the difference in reactivity between type A and type B individuals is indicative of a buffering effect.

This is clearly an area where better conceptualization of the process would help clarify the possible role of type B behavior pattern in stress buffering (or type A in stress enhancing). Recall that type A individuals are expected to exhibit greater reactivity to stressors characterized by challenge, competitiveness, or uncontrollability (Glass, 1977). Unfortunately, only Suls et al. (1979), Rhodewalt and Agustdottir (1984), and Rhodewalt et al. (1984) assessed any of these characteristics. The results of the Rhodewalt et al. study are statistically flawed and uninterpretable, while the remaining two studies offer partial support for Glass' proposition. Further research is needed to determine whether type B behavior actually buffers the effects of stress and whether the characteristics of the stressor are important in eliciting type A behavior.

<sup>9</sup> A study of a large sample of working men reported by French, Caplan, and Van Harrison (1982) similarly found support for type A as a buffer in only one of 128 tests.

**Coping Styles.** The following section reviews the roles of stable (as opposed to situation specific) coping styles in stress buffering. Although there is substantial literature on the effectiveness of coping styles in response to stress (e.g., review by Suls & Fletcher, 1985), few of these studies include the low or no stress controls required for a test of the stress-buffering hypothesis. Hence it is unclear whether the effects of these personal coping styles occur only under stress. Of the studies we review, one examines the roles of avoidant (emotional focused) and approach (problem focused) coping, and the other of an index of two styles said to influence stressor appraisal, positive comparison, and stressor devaluation. Coping measures in both studies appear to assess stable person variables rather than situational specific coping.

Cronkite and Moos (1984) suggest that approach coping—dealing directly with a problem, may be more effective than avoidance coping—avoiding the problem or dealing with the emotional reactions it elicits. However, it seems likely that approach coping styles would be more effective when persons are faced with controllable stressful events, while avoidant styles would be more effective if the events are uncontrollable (Cohen, Evans, Stokols, & Krantz, 1986; Lazarus & Folkman, 1984).

We found only one published study examining the stress-buffering roles of active and avoidant coping styles. Cronkite and Moos (1984) conducted a longitudinal study of the relationship between life stress and indices of depression, physical symptoms, and alcohol consumption among 247 married couples. Time 1 measures included depression and physical symptoms (Health and Daily Living Form [HDL]), and alcohol consumption—the amount of beer, wine, and liquor consumed on a typical drinking day. Time 2 measures included depressive and physical symptoms, alcohol consumption, and two stress scales (respondent's undesirable life events, and a scale combining spouse's depression, physical symptoms, and alcohol consumption), and indices of self-esteem, family support, and approach and avoidance coping responses. To assess coping style, respondents were asked to recall a recent stressful life event and indicate the frequency with which they used each of 17 different coping responses. These responses were then classified according to which referred to approach and which to avoidance coping.

Hierarchical regression analysis was used to examine buffering effects, with separate analyses conducted for husbands and wives (2), for each stressor (4), each coping style (2), and each dependent variable (3). When including additional variables examined in this study (family support and self-esteem), 96 possible interactions were tested and only one (involving approach coping) reached significance ( $p < .01$ ). Since one interaction should have reached significance by chance alone, these results cannot be interpreted as offering support for the role of any of the assessed coping strategies in stress buffering. Because coping strategies used in response to a single arbitrarily chosen stressor may not be representative of the range

of coping responses available for coping with other stressors, this study may not have provided a fair test of the stress-buffering role of these coping styles.

Positive comparison refers to comparing one's own situation to that of persons who are worse off, and stressor devaluation refers to devaluating the importance of a stressor. Both of these coping strategies are presumed to lessen the impact of stressors by influencing the appraisal process; that is, by attributing benign meaning to them. In a longitudinal study of job disruption in a large community sample, Pearlman, Lieberman, Menaghan, and Mullan (1981) combined measures of positive comparison and devaluation of monetary success into one index. Respondents were interviewed twice with a four-year interval. Interview questions included four-event measure of job disruption (being fired, laid off, downgraded, or leaving work because of illness), economic role strains such as difficulties in acquiring life necessities and extras, the coping index, self-esteem, mastery, and depressive symptoms. Job disruption at the initial interview was treated as a stressor and coping as measured at the second interview as a potential stress buffer in the prediction of second interview measures of economic strain, self-esteem, mastery and depression. Economic strain as measured at the first interview was treated as a stressor and coping as measured at the second interview as a stress buffer in the prediction of second interview measures of self-esteem, mastery, and depression. Regression coefficients indicated interactions consistent with coping operating as a stress buffer of job disruption in the prediction of economic strain, self-esteem, and depression. None of the interactions between economic strain and coping were significant. Because positive comparison and devaluation are presumed to influence appraisal, it is not surprising that they operated to reduce the influence of objective events, but were not operative after the events were appraised as stressful.

In sum, the limited work on the stress-buffering role of coping strategies fails to find any evidence for a stress-buffering role of approach or avoidant coping and finds some evidence for a stress-buffering role of coping strategies that influence the interpretation of an event (positive comparison and devaluation). However, given the number of interactions tested, even these results must be viewed as merely suggestive.

**Coping Flexibility and Complexity.** Coping flexibility refers to a predisposition to use a wide range of coping situations in dealing with stressful events. An inflexible person would be less likely to use different coping strategies even if these strategies were within their repertoire. Complexity refers to the number of different coping resources in a person's repertoire, that is, the number that could theoretically be brought to bear in a stressful situation (Lazarus & Folkman, 1984). Both flexibility and complexity presumably operate through their effects on ability. That is, persons with a greater range of usable coping behaviors have a higher likelihood of effectively coping with any event or events.



The measure of inflexibility used in this work (Wheaton, 1982) is a seven-item scale in which subjects rated their similarity to persons with designated characteristics such as 'initial mistrust of others, believing that people are honest only because they are afraid of being caught if they are not . . . being 'on guard' with friendly people, a particular emphasis on neatness or cleanliness in the workplace or home, and believing in sticking rigidly to standards' (Wheaton, 1982, p. 301). The instrument assessed the personality trait of flexibility-rigidity (as well as aspects of interpersonal mistrust and susceptibility to conformity) and does not provide a specific assessment of coping flexibility.

Wheaton (1982) studied 132 Anglo Americans and 108 Mexican Americans from a randomly chosen sample of persons living in El Paso, Texas. Two measures of stress were used in an interview procedure: a life event inventory (acute stressors), and a nine-item measure tapping the number of relatively stable sources of stress (chronic stressors), for example, separation or divorce, excessive marital problems, feelings of being a failure in one's work. The outcome measure was the frequency of occurrence of 40 depressive symptoms. A series of regression equations controlling for sex, education, church attendance, physical problems, and social desirability, found that flexibility operated as a buffer of both acute and chronic stress.

In an analysis of a subsample (132 Anglos) of the *same* data set described above, Wheaton (1983) examined the roles of stress and flexibility in the prediction of symptoms of schizophrenia and anxiety as well as depression. As in the analysis of the larger form of this data set, flexibility was found to buffer both acute and chronic stress in the case of depressive disorder. A similar effect was found in the prediction of schizophrenia but not in the prediction of anxiety.

Billings and Moos (1984) examined the possible stress-buffering role of coping complexity (the number of coping responses typically used) in a sample of 424 patients entering treatment for depression. Coping responses were assessed by asking respondents to recall a recent stressful life event and to indicate on a four-point scale the frequency with which they used each of 32 different coping responses (Billings & Moos, 1981). The responses represented appraisal-focused, problem-focused, and emotion-focused coping strategies. These responses were combined into a summary index (number of strategies) for analysis. A stress index averaged the standardized scores of stress indices assessing negative life events, personal illness, children's illness, spouse symptoms, negative home environment, family strains, and work stress. Social resources and severity of depression were also assessed. Hierarchical regression was used to examine the buffering effects of social resources and coping responses, with separate analyses conducted for men and women and for each moderator variable. After controlling for sociodemographic factors, significant main effects were found for stress, social resources, and coping responses. No interactions were significant in any of the four analyses conducted. The assumption that the range of coping responses

used in response to one stressful event are representative of those available for other events may be flawed and result in an insensitive if not invalid measure of complexity.

In summary, the few existing studies on coping complexity and flexibility provide evidence for flexibility as a buffer in the case of both chronic and acute stressors and no evidence for either complexity, approach or avoidant coping styles as stress buffers. The dearth of studies in this area make any conclusions based on this work suggestive at best.

**Arousal and Sensation Seeking.** Sensation or arousal seeking can be thought of as preference for high or low stimulation. For example, sensation seeking has been described as the need for varied and novel complex sensations and experiences and the willingness to take risks for the sake of such experiences (Zuckerman, 1974). Persons relatively high on sensation or arousal seeking may be better able to cope with the increased arousal brought about by the stress experience and hence arousal or sensation seekers may be less affected by stressful events.

A study of the buffering potential of sensation seeking was reported by Smith, Johnson, and Sarason (1978). College students ( $n = 75$ ) were administered a 60-item life event scale (LES), the Zuckerman et al. (1964) Sensation-Seeking Scale (SSS), and a neuroticism scale. There were no significant main effects or interaction effects in analyses of variance involving either positive or total life change scores. However, there was a significant main effect for negative life change and a marginal ( $p$  unspecified) stress-buffering interaction of negative life events and sensation seeking; those high in sensation seeking were relatively protected from the increased neuroticism associated with increased stress.

A failure to replicate the Smith et al. (1978) results is reported by Cohen (1982). College students ( $n = 211$ ) completed the same scales (more recent revision of the SSS) as in the previously described study. Three separate analyses of variance using positive, negative, and total life change respectively all failed to indicate significant or near significant life stress by sensation seeking interactions.

In a study of 76 college students, Johnson, Sarason, and Siegel (1978; described in Johnson & Sarason, 1979) examined the potential buffering influence of arousal seeking on anxiety, depression, and hostility. Arousal seeking was assessed with the Mehrabian and Russell (1973) Arousal-Seeking Scale. This scale (like the Sensation-Seeking Scale) assesses the tendency of individuals to engage in or avoid activities and situations which might increase arousal. The LES was used to measure stressful life events, and subscales of the MAACL were used to assess anxiety, depression, and hostility. The positive life change score of the LES was not related to any of the outcomes. In the case of negative life change, correlations between stress and anxiety, depression and hostility ranged from  $-.04$  to  $.05$  when arousal seeking scores were high, and  $.23$  to  $.46$  when arousal

seeking scores were low. The anxiety and hostility correlations were significant, but the depression correlation was not. Unfortunately, the use of correlational subgrouping analysis is an inappropriate test of stress buffering. Moreover, the authors fail to provide information regarding the exact form of the stress  $\times$  arousal-seeking interaction.

**Self-Esteem.** A measure of self-esteem was included in the Cronkite and Moos (1984) study described earlier in the coping section and in the Hobfoll and Walfisch (1984) study described in the control section. In the former study, respondents indicated how well each of six adjectives (aggressive, ambitious, confident, successful, outgoing, energetic) described them on a five-point scale ranging from "not at all like me" to "very much like me" (Gough & Heilbrun, 1965). Recall that this longitudinal study examined the relationship between life stress and indices of depression, physical symptoms, and alcohol consumption among 247 married couples. Separate regression analyses tested the role of life events and self-esteem in each outcome. None of the life event  $\times$  self-esteem interactions were significant.

In the later study, women were tested both prebiopsy (high stress) and postbiopsy (low stress) (Hobfoll & Walfisch, 1984). Self-esteem was measured (prebiopsy) with the six-item Pearlman and Schooler (1978) adaptation of the Rosenberg (1965) self-esteem scale. Recall that measures of psychological distress collected both pre- and postbiopsy included state anxiety (STAT) and depressive symptoms (CES-D). Inappropriate subgrouping of correlations analyses did not provide support for stress buffering for self-esteem for either distress measure. Because the authors failed to provide either group means or slopes and intercepts, we view these data as uninterpretable.

In a later study (Hobfoll & Leiberman, 1987), 99 Israeli women, each experiencing various degrees of birth complications, were interviewed immediately after giving birth and again three months later. Self-esteem, anxiety, and depression were measured as in the previous study. Similar to the earlier study, women were assumed to be under high stress immediately after giving birth and low stress three months later. A repeated-measures ANOVA indicated main effects for both time (stress) and self-esteem, and group means suggested an interaction consistent with the buffering hypothesis. Unfortunately, the time  $\times$  self-esteem interaction was not reported.

Overall, the data from studies examining the possible moderating role of self-esteem is inconclusive. There is a suggestion in the study by Hobfoll and Leiberman (in press) that self-esteem operates as a buffer, disconfirming results in the Cronkite and Moos (1984) study, and uninterpretable results in the Hobfoll and Walfisch (1984) study.

**Private Self-Consciousness.** Suls and his colleagues have focused on private self-consciousness as a moderator of the relationship between life

events stress and physical illness (Mullen & Suls, 1982; Suls & Fletcher, 1985a). Private self-consciousness (PrSC) is defined as a focus on internal aspects of the self, for example, one's feelings, beliefs, and privately held attitudes. Suls argues that PrSC should ameliorate the effects of stress because persons high in self-consciousness are: (a) more aware of internal bodily states and hence more sensitive to stressful experiences; and (b) more likely to recognize discrepancies between desired and current states and as a result engage in coping attempts to reduce these discrepancies. He further argues that if people low in private self-consciousness fail to take action to reduce stress-induced physiological activity, continued activation could eventually result in lowered body resistance and increased susceptibility to illness.

Two studies examined PrSC as a moderator of the relationship between life events stress and physical symptomatology. In both studies, PrSC was measured using a 10-item scale which assesses the degree to which the respondent focuses on his or her own thoughts, moods, bodily states, etc. (Fenigstein et al., 1975). The first was a prospective study of 88 undergraduates (Mullen & Suls, 1982). At time 1, subjects filled out a 45-item life events scale adapted for college students, including assessments of event controllability and desirability, an open-ended illness scale referring to any illnesses in the preceding three weeks, and the PrSC scale just described. Three weeks later, the life events and illness scales were administered again. Analyses included subgrouped cross-lagged correlations and regression analyses controlling for time 1 illness. Data interpreted by the authors as consistent with private self-consciousness acting as a stress buffer was found in only one of the five subgrouping comparisons. When life events were perceived as both undesirable and uncontrollable, a larger correlation was found for the association between time 1 life events and time 2 illness for persons low in PrSC (.43) than for those high in PrSC (-.01). Similar results (same one of five interactions) were found in the regression analyses. Unfortunately, neither group means nor intercepts were presented, making exact interpretation of the reported interaction impossible.

In a two-month longitudinal study, Suls and Fletcher (1985a) administered a 65-item life events scale and the PrSC instruments described above to a sample of 120 undergraduates, substituting a physical symptom checklist for the open-ended illness measure. Separate path analyses examined the relationship between stress and symptoms for persons high and low on private self-consciousness, with a comparison of betas (slopes) used in subgrouping comparisons. Data interpreted as consistent with private self-consciousness acting as a stress-buffer was found in two of the five subgrouping comparisons. When life events were perceived as uncontrollable and undesirable, the beta for low PrSC was positive and significant and for high PrSC was nonsignificant. Similar results were found for uncontrollable, desirable events. Statistical comparison of betas were not reported.

and a failure to report intercepts or group means make interpretation of the form of this interaction speculative at best.

Taken together, these studies offer consistent evidence for a stronger relationship between uncontrollable life events and illness for subjects low in PrSC. However, due to a failure to report either means or slopes *and* intercepts, and to test the differences between slopes, the studies are uninterpretable in regard to stress buffering.<sup>10</sup>

**Summary of Intrapersonal Section.** As a whole, only the work on locus of control provides even tentative evidence for stress buffering, and even these effects are not entirely consistent and are primarily limited to control as conceptualized by the Rotter scale. There are hints of stress-buffering effects for persons high in arousal and sensation seeking, for those using coping strategies aimed at reappraising the stressfulness of an event, and for those high in private self-consciousness. There is also a possibility that a tightly conceptualized approach to type B behavior pattern as a buffer might be fruitful. At this point, there is just not enough research in any of the remaining areas to make even tentative conclusions.

## DISCUSSION

### What Person Variables Operate as Stress Buffers?

Only in the case of locus of control is there a large enough data base and consistent enough results to even tentatively suggest a stable effect in the prediction of psychological symptoms. In particular, when defined as a generalized concept applying only to control of things outside oneself, the data are consistent with the operation of internal control as a stress buffer. (As discussed earlier, this may also be attributable to external control as a stress enhancer). The weakness in this literature is that none of the studies use a prospective design or causal analytic techniques that allow for elimination of alternative causal explanations.

Arousal and sensation seeking, private self-consciousness, hardiness, and psychosocial assets each have at least two studies that provide some evidence for their operation as stress buffers. However, these literatures suffer from inconsistencies in results and statistical and methodological problems that make more definitive statements impossible. Moreover, in the case of both of the indices (psychosocial assets and hardiness), it is as yet unclear whether these measures represent unidimensional resources or merely operate because of one or more "active" components. For example, the hardiness scales used by Kobasa and her colleagues include the Rotter

<sup>10</sup> In a personal communication, the studies' author suggested that appropriate re-analysis of these data provided support for stress buffering.

locus of control scale and the psychosocial asset scales include subscales measuring social support.

In several cases, evidence that is either consistent or inconsistent with stress buffering was derived from a single study. Consistent evidence was reported in the cases of alienation from self, social interests defined as concern for others, and social anxiety, while inconsistent evidence was found in the cases of social competence, self-disclosure, social interests when defined as social integration, lack of anomie, and components of the alienation scale (powerlessness, nihilism, vigorosness, and adventurousness). The lack of a sufficient data base, as well as the serious statistical problems in one of these studies, precludes any conclusions in these areas.

Evidence for the stress-buffering properties of self-esteem derive from three studies; two reporting disconfirming results and one suggestive confirming evidence. However, the data analysis in one of the disconfirming studies was inappropriate and the confirming study's evidence was based on group means without analysis.

Finally, the studies on type A behavior provide an unconvincing view of the behavior pattern (type B) as a stress buffer. However, much of this work is uninterpretable because of inappropriate statistical analyses. Moreover, it is generally poorly conceptualized; lacking a sensitivity to the types of stressors that elicit behavioral reactions from type A individuals. Hence further work examining type A and B reactions to stressors characterized by challenge, competitiveness, and uncontrollability could help provide a clearer picture in this case.

### Do Stress Buffers Allow Us to Account for More Variance?

At the beginning of this chapter we suggested that it might be possible to improve the predictive validity of psychosocial stress by separately looking at those who are more or less susceptible to stress-induced illness. One approach to addressing this issue is to look at the percent of variance accounted for by stress x resource buffering interactions. Although variance accounted for (or even enough information to calculate it) is provided in few studies, the results are interesting. In the case of internal locus of control as a stress buffer, Krause (1985) reported accounting for an additional 1.2% in depressive symptoms, and Lefcourt et al. (1981) between 4 and 7% in total mood disturbance. Cohen, Sherrod, and Clark (1986) found the stress x social-anxiety buffering interaction accounted for a mere .57% of the variance in depressive symptoms. The small increment in variance accounted for by these buffering effects is consistent with what has been found in the social support literature (discussions in Cohen, Sherrod, & Clark, 1986; Kessler & McLeod, 1985) and may underestimate the role of this interaction because the variance in this monotone interaction is shared between main effects of stress and the buffering resource, and the interaction term (Dawes, 1969; Reis, 1984).

because they would be more likely to engage in coping or more likely to cope appropriately. Others have argued that some of these factors influence ability to cope, while others influence effort. Unfortunately, *not one* of the reviewed studies directly examined coping activities of their subjects leaving these hypotheses untested.

### Matching Resources with Stressors

The necessity of a match between stressor and resource is especially difficult to address given the nature of the reviewed studies. The work reviewed in this chapter is almost totally based on cumulative (global) measures of stress. The research on generalized and specific expectancies of control may, however, provide some insight into this issue. Recall that we argued that a common effect of stressors is to threaten feelings of *self-esteem* and *personal control*. Hence resources that increase these feelings are likely to match up well with a broad range of stressful events. Contrary to our hypothesis, control specific to the stressors under consideration did not operate as buffers (Nelson & Cohen, 1983; Sandler & Lakey, 1982). These data are subject to criticism, however, because of the questionable validity of the specific control measures (summed ratings of individual events). Moreover, generalized (global) feelings of control may in fact provide a better match with global stress than the specific measures used in these studies. As discussed earlier, there is some evidence that a generalized expectancy of control operates as a stress buffer.

Unfortunately, there is little interpretable data on self-esteem as a stress buffer. In the three published studies we reviewed, the results were mixed and analyses in two of the studies were lacking or inappropriate. Other work, however, using a social support measure that assessed "self-esteem" support in terms of feelings that the respondent is better than others and that others think highly of him or her does provide suggestive evidence that self-esteem may operate as a stress buffer (Cohen, Mermelstein, Kamarck, & Hoberman, 1985). Further work with different samples, stress measures, and self-esteem measures is necessary to determine what forms of self-esteem operate as stress buffers and under what conditions this occurs.

Wheaton (1982, 1983) argued that stress-resource matching is based on the dimensions of effort and ability. He derived a stability matching hypothesis that predicts that buffering of chronic stress occurs when a resource increases ability (stable stressor and stable resource) and that buffering of acute stress occurs when a resource increases effort (unstable stressor and unstable resource). Because control influences effort, he hypothesized that internal control buffering would only occur in the case of acute (life events) but not chronic stress. Moreover, because flexibility assesses coping ability, he predicted that persons with greater flexibility would be protected from chronic but not acute stressors. Wheaton's own data is not generally supportive of his hypotheses. For example, when acting as a stress buffer, flexibility

A more liberal estimate of the contribution of person moderators to understanding symptomatology can be obtained by examining the correlation between stress and outcome for persons low in the buffering resource under consideration. This provides an upper end estimate; that is, the most variance we are likely to account for in the stress-symptomatology relationship. These data are also disappointing. The correlations (as reported in studies using subgrouping analyses interpreted by the authors as supportive of stress buffering) range from .25 to .45. Hence, it appears that at best, the addition of these buffering resources allow us to account for a *total* of 20% of symptom variance.

In fairness, percent of variance accounted for may not provide an adequate test of the etiological importance of personality stress buffers. Arnold (1984) has argued that percent of variance accounted for is not an accurate measure of the importance of an interaction term, and Brown (1981) has pointed out that even small percentages of variance may account for substantial increases or decreases in risk of disorder.

### How Do Person Variables Influence Stress Coping?

Earlier, we proposed a model in which person variables may influence either the initial appraisal of potentially stressful events or the coping activity that occurs after they have been appraised as stressful (see Figure 7.1). Two studies provide evidence in regard to the point in this process at which a resource operates. In a direct test of the role of psychosocial assets both during and after appraisal, Norris and Murrell (1984) provided support for psychosocial assets operating as buffers only *after* stress appraisal. On the other hand, Pearlman et al. (1981) found that an index of coping strategies assumed to influence appraisal (positive comparison and devaluation) operated to reduce the influence of objective events, but were not operative in reducing stress-induced strain (after the events were appraised as stressful). It is also possible to view other studies that used perceived stress measures in their analyses as addressing at least the second stage of this model. For example, Cohen, Sherrod, and Clark (1986) found that social anxiety moderated the relationship between perceived stress and depressive symptoms, although there were no stress-buffering effects of social competence, or social anxiety. Although inconclusive at this point, the existing work focusing on the stage of the stress process in which a resource operates suggests that this distinction is worthwhile. Clearly, additional studies distinguishing between buffering effects as appraisal versus post appraisal processes would help clarify the processes by which different coping resources operate.

**Influence on Coping Processes.** In arguing for various personal factors as stress buffers, most authors based their hypotheses on the premise that persons with a particular characteristic (e.g., internal control, private self-consciousness) would be more successful in dealing with stressful events

seems to work in the case of both acute and chronic stress. None of the remaining studies provide a fair test of Wheaton's theory since none use both acute and chronic stress measures. Moreover, because most life event scales include chronic as well as acute events, existing research cannot even be viewed as a test of whether acute stressors are buffered by personal resources influencing effort. A more reasonable use of effort and ability in a matching scheme would suggest that ability should increase effective coping for *all* stressors, while effort may be most effective in the case of acute stressors. Because effort is influenced by experience with a particular stressor, it seems reasonable that resources influencing effort may be more important early on in the coping process or when the stressor is short-lived. It is unclear, however, why resources influencing "stable" ability wouldn't be important for both acute (unstable) and chronic (stable) stressors. Wheaton's data, in fact, are relatively consistent with this revised approach.

### Superordinate Moderators

It is possible that the scattered stress-buffering effects found in this literature occur because of a common influence on one or more superordinate mechanisms that reduce the impact of stress on illness. That is, some overriding mechanism that is common to a variety of measures. In light of the reviewed studies, the most likely possibility is feelings of personal control (Brown & Harris, 1978; Cohen & Wills, 1985; Pearlin & Schooler, 1978; Wheaton, 1982). Other possibilities include self-efficacy or self-esteem (Cohen & Wills, 1985; Husaini et al., 1982; Pearlin & Schooler, 1978); effort or ability (Wheaton, 1982, 1983), and optimism (Scheier & Carver, 1985).

Studies that measure both mechanisms that may operate at a superordinate level as well as other potential stress buffers would provide evidence to evaluate superordinate hypotheses. Appropriate analyses would first separately evaluate the moderating role of each resource and then examine the contribution of the stress  $\times$  resource interaction with the role of other moderators under study partialled out.

### Combined Resistance Resources

Should we expect resistance to stressors to increase with increased number of resources? In general, it is likely that whether or not additional resources increase stress resistance depends on the effectiveness of available resources, overlap with other resources, and whether additional resources are more closely matched to the stressful event or events.

Effectiveness could be supplemented if additional resources provided a wide coping repertoire, that is, provide a greater range of choices and hence a greater likelihood (and perceived likelihood) of having an appropriate response. Effectiveness could also be increased if additional resources additively increased the impact of existing resources on a specific process or

influenced a second relevant process unaffected by other resources. On the other hand, there might be a maximum possible impact of resistant resources on the stress appraisal process with increased resources having little or no additional impact. In that case, if a resource is very effective, additional resources may make little difference. We would also expect additional resources to be relatively ineffective to the extent that they redundantly influenced the same process, for example, operate as proxies for superordinate moderator such as control, self-esteem, or optimism or increase ability or effort. Finally, it is likely that the effectiveness of a resource depends on its match with the needs elicited by a stressful event or events. Hence additional resources would only increase resistance if they provide a similar or better match.

There are few studies in this literature that examine two or more personal resources (exceptions include Wheaton, 1982, 1983; Ganellen & Blaney, 1984; Cohen, Sherrod, & Clark, 1986). Only Wheaton (1983) examines the simultaneous (independent) contributions of the resources under study. Again, adequate understanding of such overlap requires examining both individual and simultaneous contributions to variance of the stress by resource interaction.

## CONCLUSION

From a practical perspective, research on personality factors as buffers of stress-induced pathology has not been very successful. As noted earlier, a liberal estimate of the impact of such moderators on total variance accounted for in the relationship between stress and symptomatology is rather small. From a theoretical perspective, the contribution of this literature is somewhat mixed. On the one hand, it has provided suggestive evidence in regard to a number of specific person resources that may influence the appraisal and/or coping process. On the other hand, statistical and conceptual problems, a lack of consistency of results across existing studies, and inadequate numbers of replications make much of the evidence difficult to interpret.

Clearly, the most impressive literature reviewed in this chapter is the work on generalized expectancies of control. A tentative finding that internal control operates as a stress buffer fits well with theoretical conceptions of the stress and coping process that view perceptions of control as essential components of stress appraisal.

Another interpretation of this literature is that there is just not enough methodologically competent, conceptually sophisticated research on personality factors as buffers of stress-induced pathology to make even tentative conclusions. We are not entirely in disagreement with this argument. This interpretation suggests that less emphasis be placed on the results of existing work, and more on learning from the mistakes of the past.

Where to go from here? In order for our understanding of personal resources as stress buffers to increase, future work needs to be designed to test theoretically based questions. What are the superordinate stress-buffering mechanisms? What overlap is there between established moderators? Do these moderators influence stress appraisal and/or coping activity, style or effort? Hopefully, by addressing issues central to process, results of studies will speak to the operation of a range of personal and social resources rather than to just the efficacy of the stress moderator under consideration.

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