

An Investigation of Ego Strength and  
Sensation Seeking as Moderator  
Variables in the Relationship  
Between Life Stress and Neuroticism

by

John Edward Naaykens

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## Abstract

Although life stress can be conceptualized as including both positive and negative life changes, multiple regression analysis of questionnaire data from 160 introductory psychology students showed that scores on two scales of neuroticism were significantly related only to the amount of negative life change. Following from previous research concerning moderator variables and life stress, it was hypothesized that subjects tending to be lower in sensation seeking would display higher levels of neuroticism under conditions of negative life change. It was further hypothesized that subjects scoring lower in ego strength would score higher on measures of neuroticism under negative life change conditions. The findings did not support either hypotheses that ego strength or sensation seeking function as moderator variables in the relationship between negative life stress and neuroticism. Instead, ego strength was inversely related to neuroticism as a significant predictor of scores for two neuroticism scales. Ego strength explained 28% and 26% respectively of the variance in the indices of neuroticism. Negative life change was found to be a significant predictor of scores for only one measure of neuroticism, contributing an additional 2% to the explained variance of this measure.

An Investigation of Ego Strength and  
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Variables in the Relationship  
Between Life Stress and Neuroticism

The last 30 years has seen a major increase in studies, primarily authored by investigators in the social sciences and medicine, relating social factors and life events to physical and psychological illness. According to Rabkin and Struening (1976), however, the impetus for the systematic study of these phenomena came in the 1930's. The concept of stress as the "general adaptation syndrome" was proposed by Hans Selye in 1936 as a set of nonspecific physiological reactions to various noxious environmental agents (Selye, 1956). During this same period, Franz Alexander and his colleagues were initiating a psychosomatic theory of illness by relating personality characteristics to selected organic syndromes (Alexander, 1950). The stress and psychosomatic models of illness have been gradually converging as they developed, and today the interest areas and assumptions of psychosomatic research and stress research overlap to a certain extent.

As well as in increasing general acceptance of the function of socially induced stress as a precipitating factor in many chronic diseases, the concept of stress as a component of "psychosomatic disease" has been broadened to include stress as a possible component of any disease.

In the formulation of a revised etiological model, illness onset is generally associated with a number of potential factors, including the presence of stressful environmental conditions, perception by

the individual that such conditions are stressful, the relative ability to cope with or adapt to these conditions, genetic predisposition to a disease, and the presence of a disease agent (Rabkin & Struening, 1976, p. 1014).

However, the stress concept in the etiological model proposed by Rabkin and Struening does not explain why some people are more prone to illness than others. This matter has received attention in the large body of research literature that has focused on the relationships between life event changes, stress, and illness onset.

Life events research stems from Cannon's (1929) observation of bodily changes related to pain, hunger, and the major emotions, and from Meyer's (1951) "life chart" investigations of the temporal sequence linking the occurrence of life events and symptoms. The field of life events research was first given formal recognition at the 1949 conference of the Association for Research in Nervous and Mental Diseases: Life Stress and Bodily Disease (Wolff, Wolf, & Hare, 1950). More recently, Holmes and Rahe's (1967) work concerning the extent of readjustment required by various environmental events has marked a further advance in the demonstration of a temporal association between a recent increase in the number of events that require socially adaptive responses by the individual and the onset of illness.

The Schedule of Recent Experiences (SRE), developed by Holmes and Rahe (1967), is the most widely used instrument in life stress research. Subjects indicate on this self-administered questionnaire any events from a list of 43 life events that they have experienced during the previous six months or one year. Holmes and Rahe (1967) used the SRE to construct the Social Readjustment Rating Scale (SRRS). This scale was based on a

large sample's magnitude estimations (Stevens, 1966) of the amount of social readjustment that the various life events required. Values termed "life change units" were calculated and taken to represent the average amount of social readjustment required by the events. A total life stress score for a given time span is obtained by summing the life change units of those events that have occurred during that period.

Using the SRE and similar schedules as a definition of stress, a large body of research literature has had as its focus the investigation of the relationship between life change (stress) and the occurrence and magnitude of illness. A number of studies have provided support for the existence of a relationship between life stress, defined in terms of self-reported life changes, and physical illness in general (Holmes & Masuda, 1974; Rahe, 1974a), and specific diseases such as eczema (D. G. Brown, 1972), acute glaucoma (Cohen & Hajioff, 1972), juvenile rheumatoid arthritis (Heisel, 1972), and myocardial infarction (Connolly, 1976; Lundberg, Theorell, & Lind, 1975; Rahe & Paasikivi, 1971; Theorell & Rahe, 1971). Stressful life events have been linked to sudden cardiac death (Rahe & Lind, 1971), major and minor health problems (Rahe, 1968), and seriousness of chronic illness (Wyler, Masuda, & Holmes, 1971). Other researchers have reported a relationship between life change and depression (G. W. Brown, 1974; Markush & Favero, 1974; Paykel, 1974; Paykel & Tanner, 1976; Vinokur & Selzer, 1975) attempted suicide (Paykel, 1974), neurosis (Cooper & Sylph, 1973; Tennant & Andrews, 1978); schizophrenia (G. W. Brown, 1974; Jacobs & Myers, 1976), and psychiatric symptomatology (Dekker & Webb, 1974; Dohrenwend, 1973, Dohrenwend & Dohrenwend, 1969; Leavitt, Garron, & Bieliauskas, 1980; Markush & Favero, 1974; Myers, Lindenthal, & Pepper, 1971, 1974, 1975; Myers, Lindenthal, Pepper, & Ostrander, 1972; Mueller, Edwards, & Yarvis, 1977; Wildman &

Johnson, 1977). In an explanatory model for the relationship between life change and health change, life change is viewed as a challenge to the individual's adaptive capacities which causes emotional and physiological strain. Subsequent alterations in the psychophysiological system of the individual lower resistance to illness, and the result is health failure in the stressed individual's most vulnerable areas (Rahe, 1974b). Indeed, many authors have interpreted the frequent findings of a relationship between life change and illness onset as confirmation of the etiological significance of life stress.

#### Methodological Concerns in Life Events Research

Rabkin and Struening (1976) expressed the concern that the findings and flaws of early studies on the relations of life events, stress, and the onset of illness were being repeated by many recent studies. These authors suggested the possibility that a hierarchical growth and development of knowledge in the field was being unduly delayed. In a comprehensive review article, Rabkin and Struening critically evaluated the research literature in this area. They covered issues of method as well as content, and recommended more comprehensive approaches to substantive issues.

Although the SRE and the SRRS (Holmes & Rahe, 1967) have advanced the investigation of life stress and illness concomitants, several deficiencies of these measures have been reported (G. W. Brown, 1974; Dohrenwend & Dohrenwend, 1978; Hough, Fairbank, & Garcia, 1976; Hurst, Jenkins, & Rose, 1978; Tennant & Andrews, 1978; Rabkin & Struening, 1976).

The first major criticism of research in this area is that life change has been conceptualized as a unidimensional measure (Holmes & Masuda, 1974; Rahe, 1974a). The Social Readjustment Rating Scale (Holmes & Rahe, 1967) and the Guttman-Lingoes method of smallest space analysis - I for symmetrical

matrices (Bloombaum, 1973; Guttman, 1968; Lingoes, 1968) were used in a study by Ruch (1977) who reported that life change has three dimensions. These dimensions are the degree of change, the desirability of the change, and the life area in which the event occurs. The author interpreted the data analysis as indicating that the quantitative dimension of degree of life change was more primary than the qualitative dimensions of desirability of life change and area of life change. This interpretation is open to criticism as the subjects in the study "were asked to evaluate what they thought would be the usual or typical intensity and length of time needed to adjust to the life event regardless of its desirability" (Ruch, 1977, p. 74). However, instructing the subjects to judge the events in terms of intensity may have affected the ordering of the dimensions, and an analysis of data that included subjective judgements of intensity and desirability would have been more appropriate. Ruch's analysis, by correlating life change units (events' social readjustment values) over raters, has produced findings which "pertain to only one of many potentially important domains of qualitative variations among events" (Redfield & Stone, 1979, p. 148).

A particular problem with the Schedule of Recent Experience was the basic assumption underlying Holmes and Rahe's (1967) tenet that life changes are stressful regardless of the desirability of the events experienced. Life stress scores were determined by combining both desirable and undesirable events. However, the logic of combining both positive and negative events has been questioned by several researchers (G. W. Brown, 1974; Mechanic, 1975; Redfield & Stone, 1979; Sarason, de Monchaux, & Hunt, 1975).

One study in particular which provided data showing separate values for positive and negative life change using a specially modified version of the SRE was that of Vinokur and Selzer (1975). Although the investigation



provided support for an association between life changes and several personality measures, this relationship was found only with a measure of undesirable events. Thus, positive change did not appear to be systematically related to the dependent measures under scrutiny. Similar results have been reported by a number of studies (Johnson & Sarason, 1978; Mueller, Edwards, & Yarvis, 1977; Myers, Lindenthal, & Pepper, 1971; Sarason, Johnson, & Siegel, 1978; Smith, Johnson, & Sarason, 1978). These studies all suggest that life stress be conceptualized primarily in terms of negative life change rather than in terms of change "per se".

Another criticism of the unidimensional concept of stress (life events) has been made by Redfield and Stone (1979), who identified three important dimensions of qualitative variation among life events using a three-mode factor analysis model (Tucker, 1966), and a 44-item life events inventory. The dimensions of change, desirability, and meaningfulness were found to represent independent reliable sources of variation among events, suggesting that ratings of the stressfulness of life events be multidimensional. Tennant and Andrews (1978) have also suggested the use of multidimensional scalings to facilitate further examination of the pathogenic quality of life events with respect to illness.

Individual perceptions of the desirability and impact of life events were not evaluated by most research investigations in the life stress area. This may have led to inaccurate appraisals of the effect of life stress on different individuals and subject groups. In a review of the research presented at the 1949 conference of the Association for Research in Nervous and Mental Diseases: Life Stress and Bodily Disease, Wolff stated that "regardless of the apparent magnitude, the capacity of a given stress to evoke a protective reaction is a function of its significance to the implicated individual" (Wolff, 1950, p. 1079). More recently,

Redfield and Stone (1979) made the statement that "individual differences are so potent a source of variance in life-events ratings that averages taken over large samples do not adequately represent individual perceptions of life events" (p. 152). These authors suggested that ratings be obtained from those persons under study as a result of their finding that events were differentially desirable, meaningful, and change producing for different subject groups.

Hurst, Jenkins, and Rose (1978) demonstrated that total life change scores obtained by summing published normative weights differed significantly from the total adjustment or distress indicated by those men who experienced the events. These investigators used the Schedule of Recent Experience (Holmes & Rahe, 1967) and the questionnaire devised by Paykel, Prusoff, and Uhlenhuth (1971) to obtain two different systematic measurements of life events. A sample of 416 air traffic controllers was used in this three-year prospective study of health change. The air traffic controllers gave adjustment ratings that were 50% higher on the average than the normative groups ratings for the SRE. The same subjects gave distress ratings averaging 50% lower than the normative ratings for the Paykel et al. questionnaire. As well, the results of the Hurst et al. study indicated that life change scores based on normative weights are highly influenced by the number of life events that are experienced. Similar results of group differences in mean social readjustment ratings both with and without rank order differences, have been reported by a number of investigators (Hough et al., 1976; Lundberg & Theorell, 1976; Wyatt, 1977). In addition to stable differences between groups, reliable individual differences within homogeneous samples may also influence readjustment ratings (Redfield & Stone, 1979). Considering the available evidence, it would appear that life change scores based on individual

ratings should be used to indicate the potential impact of life change.

One attempt to overcome some of the above criticisms is the Life Experiences Survey (LES; Sarason, Johnson, & Siegel, 1978) which allows for the separate assessment of positive and negative life experiences, as well as individualized ratings of the impact or meaningfulness of life events. Thus, in the authors' judgement, the LES appears at the present to be the best attempt at a multidimensional measure for the study of the pathogenic quality of life event stress.

#### The Life Experiences Survey

The Life Experiences Survey (Sarason et al., 1978) is a 57-item self-report measure of life stress composed of two sections. The first section contains a list of 47 specific events which refer to life changes that are common to individuals in a wide variety of situations, plus three blank spaces in which respondents can indicate other events that they may have experienced. The second section lists 10 events which have been designed primarily for use with students, as the events deal specifically with changes experienced in the academic environment. This section is used in combination with the first section to derive life change scores for a student population.

The LES lists 34 events which are similar in content to those found in the SRE, although certain items such as "pregnancy" were made more specific. The LES has dichotomized the item pregnancy, which may be endorsed by a woman but perhaps not by a man whose wife or girlfriend has become pregnant, in such a manner that it is readily apparent that the item can be endorsed by both men and women. The SRE item "Wife begins or stops work" fails to assess the impact on women whose husbands begin or stop work, so the LES lists this item for "married females" as

well as for "married males". The LES has included new events such as male and female items dealing with abortion and more general items such as engagement, breaking up with boyfriend/girlfriend, and serious injury or illness of close friend. Some of the SRE events were reworded in the LES to simplify responding, while others thought to be of relatively little consequence such as Christmas and vacation were not included.

Respondents are required to give separate ratings of the desirability and impact of events in the LES that they have experienced during the past year. As well, the interval of occurrence of an event can be indicated as 0-6 months or 7 months-1 year. The respondents indicate the desirability of an event as being positive or negative, and the perceived impact of the particular event on their life at the time of occurrence is rated on a 7-point scale ranging from extremely negative (-3) to extremely positive (+3). A positive change score is derived by summing the impact rating of those events designated by the subject as positive, and a negative change score is derived by summing the impact ratings of the negatively designated events. A total change score representing the total amount of rated change experienced by the subject during the past year can be obtained by summing the positive and negative change scores.

Sarason et al. (1978) have reported results from a number of studies they conducted using the LES to gather information on this new measure of life stress. In an initial study with the LES of 345 undergraduate students (174 males and 171 females), they found no significant difference between males and females on any of the three life change measures, and the positive and negative life change scores were essentially uncorrelated.

Two test-retest reliability studies of the LES were conducted with 34 undergraduate subjects in the first study, 59 subjects in the second, and a five to six week time interval between test and retest. Pearson

product-moment correlations were computed to determine reliability coefficients for the positive change score (.10 and .53,  $p < .001$ ), the negative change score (.56 and .88,  $p < .001$ ), and the total change score (.63 and .64,  $p < .001$ ). The authors reported results of another investigation of a small sample of 12 subjects who took two different administrations of the LES separated by an eight week interval. Reliability coefficients for these subjects were obtained for positive life change (.61,  $p < .05$ ), negative life change (.72,  $p < .01$ ), and total life change scores (.82,  $p < .001$ ).

The results reported by Sarason et al. (1978) suggest that although the findings of the test-retest studies vary to some extent, perhaps due to the relatively small sample sizes, the LES is a moderately reliable instrument especially when the negative and total life change scores are considered. It appears that the reliability of the measure of life change is likely to be underestimated by test-retest reliability coefficients found with instruments of this type. Responses given at the time of retesting may reflect the fact that subjects may actually experience a variety of positive and negative events during a time interval of five to eight weeks.

As subjects generally seem to report somewhat higher levels of positive than negative change on the LES, it seems possible that the lower reliability estimates found with the positive change measure may be due, in part, to the greater likelihood of positive changes occurring within the time interval between test and retest (Sarason et al., 1978, p. 936).

A comparison of the LES with the Schedule of Recent Experiences was accomplished by scoring only the 34 items of the LES that are common to

the SRE (Holmes & Rahe, 1967). As well as deriving LES positive, negative, and total life change scores from these events, a fourth measure was obtained by applying the life change units used with the SRE to each of the 34 items. The LES, the Beck Depression Inventory (Beck, 1967), and the State-Trait Anxiety Inventory (Spielberger, Gorsuch, & Lushene, 1970) were administered to 69 female subjects from undergraduate human sexuality courses in one comparative study. No significant correlations were found between any of the four life change measures and anxiety, but these results may be due to the rather select nature of the sample studied. Significant correlations were obtained between depression and negative (.37,  $p < .01$ ), and total (.24,  $p < .05$ ) LES scores. The correlations between depression and the positive LES score (.02), and the SRE life change unit score (.17) were nonsignificant. The difference between the correlations obtained with the SRE score and the LES negative change score was significant,  $t(66) = 2.31$ ,  $p < .05$ . In a second comparative study, the relationships between the LES and SRE measures and the scores on Lanyon's Psychological Screening Inventory (PSI; 1970) were investigated. The LES negative change score correlated significantly with Social Nonconformity (.26,  $p < .05$ ) and Discomfort (.25,  $p < .05$ ) when only 34 items were scored. However, no significant relationships were found between the two PSI adjustment measures ( $S_n$  and  $D_i$ ) and the SRE life change unit score. Although no significant differences were evidenced between these correlations, the pattern of results from this second comparative study, and the significant results reported in the first comparative study appear to support the validity of the LES measure of negative life change. Sarason et al. (1978) suggested that it is the negative change measure that should be used if the degree of "life stress" is to be assessed.

Paykel, Prusoff, and Uhlenhuth (1971) have reported evidence that

life change and distress are significantly associated. However, Tennant and Andrews (1978) demonstrated, by the use of matched scalings of a life events inventory, that the concepts of life change and distress are qualitatively distinct. These authors concluded that neurotic impairment is preceded by events that exert their pathogenic influence as a result of their "emotionally distressing nature" and not because of the number of life change events exhibited or the life change score produced. Other researchers have provided evidence supporting a significant relationship between neuroticism and negative life change events (Sarason et al., 1978; Smith et al., 1978).

Therefore, to determine if life stress should be conceptualized primarily in terms of negative life change rather than in terms of change per se, the present study examined the effects of both positive life change and negative life change on two dependent measures of neuroticism.

#### Neuroticism as a Dependent Measure

The Discomfort ( $\mathcal{D}\mathcal{I}$ ) scale of Lanyon's (1970) Psychological Screening Inventory was designed to assess the personality dimension of anxiety or perceived maladjustment (neuroticism). Individuals high on this dimension have been described as

readily susceptible to anxiety and to neurotic breakdown under stress, tending to get little enjoyment from life, complaining of varied somatic symptoms, and admitting to many psychological discomforts and difficulties. Persons low on this dimension are considered to perceive themselves as satisfied and subjectively comfortable, adaptable and resourceful, and able to meet new situations with flexibility (Lanyon, 1970, p. 3).

Evidence for the validity of the Discomfort scale involves relationships with other scales designed to measure the same construct, since the  $\mathcal{D}_i$  scale was designed to assess a construct rather than to make empirical discriminations. Lanyon reported that factor loadings of the Discomfort scale demonstrate a strong relationship to the first factor or dimension generally reported in factor analytic studies of personality data. The factor loadings show that the  $\mathcal{D}_i$  scale is highly related to this factor for both males and females, as are the Minnesota Multiphasic Personality Inventory (MMPI; Dahlstrom & Welsh, 1960) scales  $Sc$ ,  $F$ ,  $A$ , and  $Pt$  (all loadings  $\geq .75$ ). It appears evident from the preceding scales that the factor can be identified as one of anxiety and general emotional disturbance. The  $A$  factor scale of the MMPI, which was developed to assess this factor, was related to the  $\mathcal{D}_i$  scale with correlations of .75 and .72. The Discomfort scale has shown similar high correlations with a number of California Psychological Inventory (CPI) scales such as Tolerance ( $-.68$ ), Achievement via Conformance ( $-.67$ ), Self-Control ( $-.60$ ), Well-Being ( $-.67$ ), and Value Orientation ( $-.61$ ). The Value Orientation scale is a CPI measure corresponding in reverse to the "discomfort" factor (Nichols & Schnell, 1963). The correlation of the  $\mathcal{D}_i$  scale with the neuroticism scale of Eysenck's (1962) Maudsley Personality Inventory (MPI) was .73 for 81 male undergraduate college students. This finding supports the validity of Lanyon's measure of Discomfort as both the  $\mathcal{D}_i$  scale and Eysenck's neuroticism scale were designed to assess the same factor.

The internal consistency of the  $\mathcal{D}_i$  scale was found by Lanyon (1970) to be .85 using a group of undergraduates composed of equal numbers of males and females. The correlation between scores on two administrations of the test, four weeks apart, to 54 undergraduates (17 males, 37 females) was used as an estimate of the test-retest reliability ( $r = .92$ ) of the



Discomfort scale. The internal consistency, test-retest stability, and validity of the *Di* scale was considered by the author to be satisfactory, and thus will be one dependent measure of psychological distress of "neuroticism" used in the present study.

In a study by Baggaley and Riedel (1966), four variables were constructed from MMPI items. The variables, based on factor analytic studies, were poor physical health, neuroticism, psychotic tendencies, and paranoia. The authors administered an assembly of 100 items to three groups of neuro-psychiatric patients and a group of medical patients. Their sample consisted of 29 medical patients, 30 neurotics, 16 paranoid psychotics, and 17 "other psychotics".

The reliability of the 18-item measure of neuroticism as calculated by Kuder and Richardson's procedure was .83 (Baggaley & Riedel, 1966). Results of the study demonstrated a significantly lower neuroticism score for the medical patients ( $p < .05$ ) than for the other three groups. The neurotics scored significantly lower ( $p < .05$ ) than the paranoid psychotics. Baggaley and Riedel suggested that the assembly showed favorable discriminating power, and thus a second dependent measure of neuroticism will be assessed using their neuroticism scale.

#### Moderator Variables in Life Stress Research

Sarason et al. (1978) noted that although significant relationships between life change scores and dependent measures were found in their research, the magnitude of the correlations was generally low. This finding was consistent with the results of other life stress studies, and suggested that life stress accounted for a relatively small proportion of the variance reflected in the different dependent measures used. It has been hypothesized that people are probably differentially affected by life stress due to their individual characteristics (Dohrenwend & Dohrenwend,

1974). It is also possible that some individuals may be affected very little by high levels of life stress, while others may be greatly affected by even moderate levels of change. Considering this, correlations of the low magnitude that have typically been obtained would appear justified. Sarason et al. (1978) stated that "perhaps we can expect to find stronger relationships only as variables determining the effects of life change are taken into account" (p. 941). Those variables which determine the effects of life change may be mediating factors such as personality and/or situational variables.

Evidence of a variable mediating the effects of life stress was reported by Nuckolls, Cassel, and Kaplan (1972) who examined the relationships between life stress and pregnancy and birth complications. Expectant mothers in their thirty-second week of pregnancy were administered the Schedule of Recent Experiences (Holmes & Rahe, 1967), and a Psychosocial Assets Scale designed by the authors to assess the degree to which women possess support systems in their environment. A significant relationship between life stress and birth complications was found only for subjects who had low levels of psychosocial assets. Women showing high levels of both life change and psychosocial assets had only one-third the number of complications as those who displayed high levels of life change and low levels of psychosocial assets.

Another variable that might function as a moderator of life stress was suggested by the results of a study conducted by Johnson and Sarason (1978). The authors investigated the relationship between life change and measures of anxiety and depression as a function of locus of control orientation (Rotter, 1966). Internal locus of control refers to the disposition to attribute to oneself some control over environmental reinforcements. External control results from a belief of luck, fate,

powerful others, or that the world is too complex to understand and predict. As life change may have its most adverse effects on individuals who perceive themselves as having little or no control over environmental events, the authors predicted that life stress would be related to anxiety and depression only with subjects who were external in locus of control. The subjects (34 male and 90 female undergraduate students) were administered the LES, the State-Trait Anxiety Inventory (Spielberger et al., 1970), the Beck Depression Inventory (Beck, 1967), and Rotter's (1966) Locus of Control Scale. While no significant relationships were found between the measure of positive life change and any of the dependent measures, negative change was found to be significantly correlated with both depression (.32,  $p < .005$ ) and trait anxiety (.31,  $p < .005$ ). These results, however, were found only for subjects who were external in locus of control, supporting the hypothesis of Johnson and Sarason that locus of control orientation may be a moderator variable in the relationship between negative life change and anxiety and depression.

An additional moderator variable examined in the literature was the sensation-seeking motive. A study by Smith et al. (1978) investigated the relationship between life change and a measure of neuroticism in subjects differing in scores on the Sensation-Seeking Scale (SSS; Zuckerman, Kolin, Price, & Zoob, 1964). The SSS is a measure of the tendency to seek novel, risk-taking, and stimulating activities. High sensation seekers presumably have a high optimal level of stimulation, while low sensation seekers are thought to have a low optimal level. It was hypothesized by the authors that low sensation seekers, who might be expected to avoid change and arousing stimulus input, would be more negatively affected by life stress than would high sensation seekers. The subjects in this study were 75 college undergraduates (42 males and 33 females) who were administered

the 22-item SSS, the Life Experiences Survey, and the Discomfort (*Di*) scale of the Psychological Screening Inventory (Lanyon, 1970), which served as the dependent variable measure of neuroticism. Subjects with higher negative life change scores ( $M = 10.97$ ) had significantly higher scores on the *Di* scale,  $F(1,71) = 4.75$ ,  $p < .05$ , than low scores ( $M = 8.71$ ). No significant relationship between life change and neuroticism was found for high sensation seekers. However, when responses of subjects scoring low on the SSS were analyzed, a significant relationship between negative life change and the measure of neuroticism emerged. Low sensation seekers who were high in negative life change ( $M = 12.44$ ) had significantly higher neuroticism scores than did low sensation seekers who had experienced low levels of negative change ( $M = 9.00$ ). While a correlational analysis to determine the relationship between negative life change scores and Discomfort scale scores was not significant ( $r = .15$ ) for high sensation seekers, a significant relationship ( $r = .35$ ) was evidenced for subjects low in the sensation-seeking motive. The results provide support for the view that sensation seeking mediates the effects of life stress.

Thus, from the life stress literature reviewed, psychosocial assets, locus of control, and sensation-seeking tendency have been identified as significant moderator variables. Since Smith et al. (1978) have demonstrated that the sensation-seeking tendency is an important moderator variable in the relationship between life stress and neuroticism, the present study, which also examined this relationship, has included the sensation-seeking motive as one of the moderator variables under investigation.

#### The Sensation-Seeking Motive

A number of authors have proposed the concept of an optimal level of stimulation, excitation, or activation (Berlyne, 1960; Fiske & Maddi, 1961;

Hebb & Thompson, 1954; Leuba, 1955) in which too much stimulation leads to behavior directed at stimulus reduction, while too little stimulation leads to organism to increase stimulation. There are, however, great differences among individuals with respect to the level of "optimal" stimulation. These individual differences have been noted in response to perceptual isolation (Zuckerman, Albright, Marks, & Miller, 1962), preference for simplicity or complexity in visual stimuli (Bieri, 1961), and preference for complexity and asymmetry on a figure preference test (Holt & Goldberger, 1961). Zuckerman, Kolin, Price, & Zoob (1964) were able to develop a questionnaire scale to measure the postulated trait of "optimal stimulation" after confirming their hypothesis that a general factor of sensation seeking would emerge from responses to diverse items. These investigators determined that Sensation-Seeking Scale (SSS) scores distinguish individuals who are highly sensitive to internal sensations of various types. They accomplished this by demonstrating a positive relationship between the SSS and field independence as measured by the Embedded Figures Test since field independents are more responsive to internal sensations than field dependents. The SSS consists of separate scales for males and females and a common (MF) scale. The Sensation-Seeking (SS) tendency was significant for males on their respective scale ( $r = .54$ ,  $p < .01$ ) and on the MF scale ( $r = .49$ ,  $p < .01$ ), and for males and females combined on the MF scale ( $r = .36$ ,  $p < .05$ ). Although a tendency toward a positive relationship for females was evident, the correlations of .22 and .22 were not significant. The male scale of the SSS displayed moderate reliability ( $r = .68$ ,  $p < .01$ ) as did the female scale ( $r = .74$ ,  $p < .01$ ). The authors reported no sex differences on SS tendency as measured by the common (MF) scale.

Zuckerman, Kolin, Price, & Zoob (1964) found a significant correlation

of  $-.32$  ( $p < .05$ ) between SS tendency as assessed by the 22-item SS scale used for both sexes, and anxiety as measured by the Multiple Affect Adjective Check List (Zuckerman, Lubin, Vogel, & Valerius, 1964). This finding supported the hypothesized SS tendency involving an enjoyment of tension-raising situations, and along with the demonstrated positive relationship between SS tendency and field independence provide construct validity for the sensation seeking motive.

As well as sensation seeking, another variable which was hypothesized to be relevant with respect to the relationship between life stress and neuroticism was ego strength. This becomes clear if ego strength is considered as a measure of general adaptive abilities of successful coping.

#### The Concept of Ego Strength

Roessler (1973) suggested that one attribute of successful coping is reality-testing, which is the ability to accurately appraise the nature (desirability) and intensity (impact) of stimuli. The ability to respond to the need created by stimuli so as to fulfill the need is another attribute of successful coping.

These perceptual and behavioral abilities are probably largely learned and relatively stable. They are probably also relatively general, although many coping demands also require the highly specific skills, of course. The interpersonal coping abilities most relevant to psychiatry include the ability to accurately assess and respond to behaviour of others, while at the same time maintaining the integrity of the constellation of previously learned self-percepts called the ego.

The ability to maintain ego integrity is ego strength (Roessler, 1973, pp. 316-317).

A study by Barron (1953) provided evidence for the utility of an ego-strength ( $E_s$ ) scale "as an assessment device in any situation where some estimate of adaptability and personal resourcefulness is wanted" (p. 327). Although the scale was developed for the purpose of predicting response to psychotherapy, it appears to be a measure of effective personal functioning or "ego-strength" (Barron, 1953). The  $E_s$  scale was composed of 68 items from the MMPI (Dahlstrom & Welsh, 1960), selected from a total pool of 550 MMPI items. Test-retest reliability of the scale after three months in a sample of 30 cases was .72.

The  $E_s$  scale has been shown by Barron (1953) to correlate significantly with Vitality (.38), defined as general energy level, and with Drive (.41), defined as persistence, resolution, perseverance, and directed energy. As well, the scale showed low but positive correlations with Self-confidence (.24), Poise (.24), and Breadth of Interest (.25). Significant negative correlations that were found with the measures of Submissiveness, Effeminacy, and Intractiveness are -.40, -.34, and -.34, respectively. High scorers on the  $E_s$  scale emerged as more at ease socially, somewhat broader culturally, and more adequate physically. Low-scoring men tended to be submissive, effeminate, and inclined to turn inwards rather than to be emotionally outgoing. The scale has demonstrated positive correlations with tests indicative of general intelligence such as the Wechsler-Bellevue ( $r = .44$ ), the Primary Mental Abilities test ( $r = .36$ ), the Intellectual Efficiency scale of the California Psychological Inventory ( $r = .47$  in one sample and  $r = .52$  in another sample), and the Miller Analogies Test ( $r = .39$ ). The finding of these positive relationships is consistent with the belief that ego-determined behavior is intelligent behavior. The scale is related to lack of ethnic prejudice as it correlates with the Ethnocentrism Scale of Form 60 of the University of California Public

Opinion Study Questionnaire ( $r = -.47$  in one sample,  $r = -.46$  in a second sample, and  $r = -.23$  in a third sample), and it correlates  $-.35$  with the Prejudice scale of the MMPI. The scale also correlates  $.42$  with the Tolerance scale of the CPI. High negative correlations were found between the  $E_s$  scale and most of the MMPI measures of psychopathology such as Hypochondriasis, Depression, Hysteria, Psychastenia, Schizophrenia, and Paranoia in the clinical samples. Barron (1953) suggested that the scale is related to general elevation of the MMPI profile, regardless of the pattern.

Roessler (1973) stated that ego strength, if it is indeed a measure of general adaptive abilities, would likely be related to most other personality traits. This statement was supported by the author's finding of a number of significant correlations between ego strength and neuroticism ( $-.73$ ), repression-sensitization ( $-.75$ ), anxiety ( $-.76$ ), field dependence ( $-.37$ ), impulsivity ( $-.47$ ), and self-control ( $.50$ ). These results demonstrated the construct validity of the  $E_s$  scale.

It was hypothesized by Robbins, Tanck, and Meyersburg (1972) that individuals who had higher levels of tension and lacked the psychological means of effectively coping with tension would be most likely to experience somatic complaints. The hypothesis was tested using the  $E_s$  scale and tensions in the areas of achievement, sex, and autonomy. The authors reported that all three tests of this hypothesis were confirmed.

Since the  $E_s$  scale appears to be measuring constructive forces in the personality, "it may serve as a predictor in any situation in which an estimate of personal adaptability and resourcefulness is called for" (Barron, 1953, p. 333). Thus, the measure of ego strength provided by the  $E_s$  scale may be an important personality trait to consider in an investigation of the effects of life stress.



### Hypotheses

Smith et al. (1978) have demonstrated that the relationship between negative life change and psychological distress is a function of the sensation-seeking motive. The sensation-seeking scale (Zuckerman, Kolin, Price, & Zoob, 1964) used in this study is a self-report measure of an individual's "optimal level of stimulation". As well as considering the optimal stimulation level, it would appear to be necessary to consider an individual's level of adaptability or coping ability as another variable mediating between negative life change and neuroticism. The ego-strength scale (Barron, 1953) provides a valid measure of coping behavior, involving the ability to accurately assess and respond to environmental stimuli while maintaining the integrity of the ego.

The present study attempted to replicate the findings of previous researchers by predicting the following relationships between the variables life stress, neuroticism, and sensation seeking.

1. Subjects scoring relatively higher on the measure of negative life change should have higher scores on the neuroticism measures than subjects with lower negative life change scores.
2. Higher negative life change scores should be associated with higher neuroticism scores for subjects scoring lower in the sensation-seeking motive.

As well, it was hypothesized by the present author, that the association between negative life change and neuroticism could be more fully understood by evaluating the variable ego strength.

3. Higher negative life change scores should be associated with higher neuroticism scores for subjects tending to have lower scores on the measure of ego strength.

## Method

### Subjects

The subjects were 160 introductory psychology students enrolled in undergraduate courses at the University of Manitoba. Subjects received course credit for participation in the study. From an initial sample of 166 subjects, 6 subjects were not included in the data analysis due to incomplete data. The final sample of 160 consisted of 88 males and 72 females. The age range was from 16 to 32, with a mean age of 19 years, 5 months. Further inspection of the demographic data indicated that 154 subjects were single, 5 subjects were married, and 1 subject was separated. Concerning subjects' employment status, 8 were employed full-time, 55 were employed part-time, and 97 were unemployed. With respect to living arrangements, 103 subjects indicated that they lived with a parent or parents, 12 subjects indicated that they lived with a relative other than parents, 29 subjects reported living with a friend, and 16 subjects reported living alone. An analysis of data concerning socioeconomic status revealed that the average yearly salary of both subjects' parents was in the range from \$25,000. to \$29,999., and that this income supported an average of 4.4 people.

### Procedure

The subjects were instructed that this was an experiment concerning the relationship between life stress and a number of personality variables (see Appendix A).

Five test instruments were administered in a group setting. The instruments administered were the Life Experiences Survey (LES), the Ego-strength ( $E_s$ ) scale of the MMPI, the Sensation-Seeking Scale (SSS),

the Discomfort ( $\mathcal{D}\acute{i}$ ) scale of the Psychological Screening Inventory, and the Baggailey-Riedel Neuroticism scale of the MMPI.

The LES (Sarason et al., 1978) is a 57-item scale requiring respondents to indicate life events experienced during the previous year. Subjects also indicate whether they considered these events desirable or undesirable, and the degree of impact the events had on their lives. The scale yields both positive and negative life change scores (see Appendix B).

The  $\mathcal{E}s$  scale (Barron, 1953) is a 68-item self-administered measure of "ego strength" that provides an estimate of adaptability and personal resourcefulness (See Appendix C).

The SSS (Zuckerman, Kolin, Price, & Zoob, 1964) is a 22-item self-report measure which assesses a subject's "optimal" level of stimulation. The optimal level of stimulation concerns the tendency to seek out stimulation, risk-taking, and novel activities (see Appendix D).

The  $\mathcal{D}\acute{i}$  scale (Lanyon, 1970) is a 30-item self-report measure of psychological distress (see Appendix E).

The Neuroticism scale (Baggailey & Riedel, 1966) is an 18-item self-administered measure which assesses the general personality factor of neuroticism (see Appendix F).

Background information was obtained concerning sex, age, marital status, employment status, socioeconomic status, and conditions of residence (see Appendix G).

The order of presentation of the questionnaires was randomized to control for experimental bias. The LES was scored to yield both positive and negative life change scores, and the other measures were scored using standard scoring procedures. Subjects who failed to answer 5% or more of the total number of items on all questionnaires (with the exception of the LES) were not included in the data analysis.

### Results

The data was analyzed through the use of multiple regression/correlation (MRC) analysis with forward (stepwise) inclusion. This procedure was used to isolate a subset of available predictor variables in order to obtain an optimal prediction equation with as few terms as possible. The predictor or independent variables (IVs) were negative life change, positive life change, ego strength, sensation seeking, and all 2-way interactions of these variables, with two measures of neuroticism as the dependent variables. The order of inclusion of these independent variables was determined by their respective contributions to explained variance. The variable that explained the greatest amount of variance in the dependent variable entered the regression equation first. At each subsequent step in the equation a variable entered that explained the greatest amount of variance in the dependent variable left unexplained by the variable(s) already in the equation (Kim & Kohout, 1975).

With respect to the interrelationships among the main independent variables, Cohen and Cohen (1975) have stated that "The coding of the interaction contrast required the multiplication of the coding coefficients for the two main effects ( $X_1$  and  $X_2$ ), and the resulting  $X_3$  could be interpreted as any other IV in an MRC analysis" (p. 291). Interactions, defined in this manner as being carried by an IV in MRC analysis, may be studied among quantitative scales, or among combinations of quantitative and nominal scales (Cohen & Cohen, 1975). Thus, all 2-way interactions of the main independent variables in the present study were entered in the regression equation as IVs in MRC analysis. As with the main independent variables, the order of inclusion of these independent variables representing different interactions was determined by their respective contributions to explained variance.

Means and standard deviations of all test scores are presented in Table 1.

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Insert Table 1 about here

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Table 2 presents Pearson correlation coefficients of all test scores and significant probability values.

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Insert Table 2 about here

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The results showed significant positive correlations between negative life stress and the  $\mathcal{D}_i$  measure of neuroticism, and between negative life stress and the MMPI measure of neuroticism. These results confirmed the hypothesis that subjects who scored relatively higher on the negative life change measure had higher scores on the measures of neuroticism than subjects with lower negative life change scores. Thus, an increase in the amount of negative life stress appeared to be related to increasing levels of neurotic symptomatology.

A significant positive correlation was evidenced between the  $\mathcal{D}_i$  measure of neuroticism and the MMPI measure of neuroticism. Results showed a small but significant positive correlation between the sensation-seeking tendency and ego strength, and a small but significant negative correlation between ego strength and negative life stress. Significant negative correlations were shown between ego strength and the  $\mathcal{D}_i$  measure of neuroticism, and between ego strength and the MMPI measure of neuroticism.

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Insert Table 3 about here

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Table 3 presents the multiple regression equation of ego strength and negative life stress on the  $\mathcal{D}i$  measure of neuroticism. Table 4 presents the multiple regression equation of ego strength and negative life stress on the MMPI measure of neuroticism. The multiple  $R$ s indicated that ego strength and negative life stress, in combination accounted for

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Insert Table 4 about here

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30.24% of the total variance in the  $\mathcal{D}i$  neuroticism measure, and 26.19% of the total variance in the MMPI neuroticism measure. Both of these results were statistically significant, as were the individual contributions of ego strength (28.12%) and negative life stress (2.06%) to the total variance in the  $\mathcal{D}i$  measure of neuroticism, and the individual contribution of ego strength (25.55%) to the total variance in the MMPI measure of neuroticism. Negative life stress explained only an additional 0.64% of the variance in the MMPI neuroticism measure, a result that was not significant. Positive life stress, sensation seeking, and all 2-way interactions of the independent variables failed to provide significant individual contributions to the total variance in either neuroticism measures. Therefore, the hypotheses that ego strength and sensation seeking function as moderator variables in the relationship between negative life stress and neuroticism were not supported by the present findings.

### Discussion

The introduction of negative life change into the relationship between ego strength and neuroticism ( $\mathcal{D}i$  scale) added significantly, though modestly, to the predictability of neuroticism as assessed by Lanyon's Discomfort scale. If negative life change had been forced into the

prediction equation before ego strength, the negative life change variable would have accounted for more than the 2.06% represented in Table 3, namely 7.08% of the variance in the *Di* measure of neuroticism. This would occur because negative life change and ego strength explain common variance in the dependent variable. By entering negative life change first, this common variance (5.02%) would be absorbed by the negative life change variable, thereby increasing the predictive power of this variable while decreasing that of ego strength. Similarly, even though negative life change independently explained 3.92% of the variance in the MMPI measure of neuroticism, the negative life change variable explained only an additional 0.64% of the variance in the MMPI neuroticism measure after ego strength had entered the prediction equation (see Table 4).

A number of researchers have reported findings which fail to support a strong relationship between stressing life events and evidence of illness or maladjustment (Aponte & Miller, 1972; Bieliauskas, 1980; Bieliauskas & Webb, 1974; Goldberg & Comstock, 1976; Lahniers & White, 1976; Spilken & Jacobs, 1971; Wershow & Rinehart, 1974). Results of the present study appear to lend some support to their findings. The subjects used in this study had relatively low levels of negative life stress overall, which may have contributed to the failure to find a stronger relationship between negative life stress and the subjects' scores on two neuroticism scales. Thus, in a college population such as the one presently studied, it may be necessary to use different measures such as subjects' daily "hassles" in order to clarify the relationship between negative life change and neuroticism.

Kanner, Coyne, Schaefer, and Lazarus (in press) compared life events with the more minor hassles and uplifts of everyday life for the prediction of psychological symptoms. Using a community sample of middle-aged adults,

these researchers found their Hassles Scale to be a better predictor of concurrent and subsequent psychological symptoms than were life event scores. Most of the variance in symptoms accounted for by life events was shared with the Hassles Scale, and hassles and symptoms remained significantly correlated when the effects of life event scores were removed. Although uplifts were not related to symptoms for men, a positive relationship was evidenced for women. Further analysis showed that this positive relationship could be accounted for by common variance with the hassles score (Kanner et al., in press).

Kanner et al. (in press) have proposed that hassles (and uplifts) may act as mediators of the effect of major life events on adaptational outcomes. It may also hold true that hassles operate independently of major life events, with the possibility that hassles are of more importance than life events in the relationship with neuroticism.

The variable ego strength clearly had an impact on neurotic symptomatology, both independently and in combination with negative life change. However, the present findings indicated that ego strength was more strongly related to neuroticism than was negative life change.

Garritty, Somes, and Marx (1977) state that personality may also be thought of as a variable which may have causative influence on life change. Personality traits may predispose one to more or less life change, especially the sort which comes under voluntary control such as change of residence or job. Personality profile is not a variable which is either prior or subsequent in its relationship to life change, but may well be both (p. 29).

From this, one might speculate that ego strength may have had causative



influence on the negative life change scores. In other words, the finding that ego strength was inversely related to negative life stress could have been due to the possibility that higher levels of ego strength predispose one to less negative life change. Another alternate explanation could be that those higher in ego strength, being better able to cope with changes in their environment, did not construe as many life changes as being negative in quality than did those lower in ego strength.

One possible explanation for the present finding of a significant relationship between ego strength and neuroticism could be that subjects who are lower in ego strength are more prone to what Mechanic (1976) has described as illness behavior. That is, the higher levels of neurotic symptomatology reported by those subjects were not due to a relative inability to cope with a stressful environment "but that they simply want to act and be treated as if they are sick and thereby withdraw from a life situation experienced as too stressful" (Kobasa, 1979, p. 10). This possible distortion of the questionnaire data by subjects engaging in illness behavior could have influenced the measure of neuroticism provided by Lanyon's Discomfort scale as this measure contains a number of items pertaining to physical well-being. However, the results obtained by the present study cannot be completely explained by the concept of illness behavior as the MMPI neuroticism scale does not contain any items directly related to physical health.

The ego-strength scale and the MMPI measure of neuroticism have two items in common. This may have contributed somewhat to the finding of a significant relationship between the two measures.

With respect to the relationship between life stress and neurotic symptomatology, it may be that neuroticism is related to stress of life change thresholds. As the college population that was examined in this

study displayed relatively low amounts of both positive and negative life change, the threshold required for a stronger relationship to be evidenced between negative life change and neuroticism may not have been reached.

In the present study, the personality variable of ego strength takes precedence in the relationship with the neuroticism measures. However, we may find that negative life change becomes more primary in the relationship with neuroticism as the levels of life stress increase in different populations under scrutiny.

In a recent study, Bieliauskas (1980) examined professional aid-seeking for psychological or medical reasons by 80 firefighters. The impact of physiologically measured stress and psychological defensiveness on the relationship between life events and professional aid-seeking was determined for a retrospective period of six months and a prospective period of eight weeks. The author suggested that the finding of no significant relationship between any of the response measures, SRRS, MMPI K scale from the Mini-Mult (Kincannon, 1968), and seventeen-hydroxycorticosteroid (17-OHCS), and indices of aid-seeking imply that relationships between stress and illness are questionable in low-stress, low-maladjustment populations. Bieliauskas concluded that the subject population of firefighters under study was likely at a generally low level of stress and had generally low overall quantitative levels of maladjustment. He interpreted the results of his study as supportive of the concept that physical or psychological illness onset is influenced by a life change threshold effect.

The possibility of a "threshold effect" for the relationship between life stress and subsequent illness manifestation was suggested by Wildman and Johnson (1977), and has received support from a number of other recent investigations (Crandall and Lehman, 1977; Theorell, 1976; Wildman, 1978).

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Insert Figure 1 about here

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Figure 1 presents a model for the degree of relationship with neuroticism of negative life change and ego strength. In this model, an intermediate relationship displayed when the amount of negative life change is below threshold and ego strength is low would be primarily due to the ego strength variable. An intermediate relationship evidenced when the amount of negative life change is above threshold and ego strength is high would be largely attributed to the life stress variable. A high relationship occurring when negative life change is above threshold and ego strength is low would likely be influenced by both the life stress and ego strength variables. Future research will need to examine populations with both high and low levels of negative life change to determine if the model that has been proposed is tenable. Until that time, the results of the present study emphasize the importance of personality variables such as ego strength in the area of life stress research.

A number of studies concerned with the construct validity of "ego strength" measures (Frank, 1967; Gottesman, 1959; Harmon, 1980; Stein & Chu, 1967) have suggested "the complexity of ego functioning and the need for further investigation of the patterns of ego functioning that seem to comprise mental health and illness" (Herron, Guido, & Kantor, 1965, p. 404).

Several research investigations have used Barron's (1953) measure of ego strength to examine the complex patterns of ego functioning. A study by Harmon (1980) related Barron's *Es* scale to the Edwards Personal Preference Schedule (Edwards, 1959), the Tolerance Scale of the California Psychological Inventory (Gough, 1957), and the Practical Outlook Scale of

the Omnibus Personality Inventory (Heist & Yonge, 1968) using a sample of 80 normal adult women. Her results showed significant correlations ( $p < .05$ ) between Ego Strength and Dominance (.19), Abasement (-.44), Tolerance (.69), and Practical Outlook (-.32). The author concluded that the  $\bar{E}_s$  scale's "lack of significant correlations with most of the personality needs to the Edwards Personal Preference Schedule suggests that the test is not differentiating people on the basis of their specific personality profiles" (Harmon, 1980, p. 435).

Stein and Chu (1967) used a sample of 310 subjects composed of 70 schizophrenic, 150 anxiety reaction, and 90 normal subjects matched for age and education in a cluster analysis of the  $\bar{E}_s$  scale. Although five oblique clusters emerged, it was found using a hierarchical analysis that the first three clusters (emotional, cognitive, and physical well-being) could be combined in a single 28-item cluster which the authors called "sense of well-being". This condensed cluster was found to have a reliability of .90 and a generality of .66. The well-being clusters displayed consistent significant mean differences between the abnormal and normal groups in both the original sample and in a replicated sample of 100 psychiatric and 100 normal subjects. The clusters called "religious nonbelief and nonparticipation" and "seeking heterosexual stimulation and escape from boredom" did not consistently differentiate between psychiatric and nonpsychiatric subjects across the original and replicated samples. Comparisons of mean differences between the abnormal subgroups (150 anxiety reactions, and 70 schizophrenics composed of 32 paronoid and 38 other schizophrenics) were inconsistent for all clusters.

Frank (1967) reviewed research conducted with Barron's  $\bar{E}_s$  scale and with two measures of ego strength derived from the Rorschach (the Prognostic Rating Scale and  $F^+$ ; Rorschach, 1951). He concluded that the  $\bar{E}_s$  scale is

limited to measuring the presence or absence of psychopathology, as it does not appear to be able to discriminate among types of pathology. However, based on the findings reported by various researchers (Frank, 1967; Harmon, 1980; Stein & Chu, 1967), the  $E_s$  scale may have practical utility as a screening device for differentiating "at risk" groups in "normal" populations. Further research is needed to investigate this possibility.

The results of the present study also have implications for treatment strategies employed with some clients in clinical practice. In a study of 43 male college students, Artwohl (1979) found a significant correlation of  $-.412$  ( $p < .005$ ) between scores on the  $E_s$  scale and Rotter's (1966) Locus of Control Scale. This result supported the author's hypothesis that individuals who score higher on the  $E_s$  scale tend to have an internal locus of control, while individuals who score lower on the  $E_s$  scale tend to have an external locus of control. Artwohl suggested that this finding "supports the utility of fostering internality as a therapeutic goal for some clients with an external orientation" (1979, p. 498). The finding of the present study that individuals who are higher in ego strength have lower neuroticism scores appears to lend additional support to Artwohl's suggestion. A treatment strategy which pursues the therapeutic goal of internality for clients with an external orientation may develop higher levels of ego strength in those clients, with the possible associated benefits of lower levels of neurotic symptomatology.

Hurley (1980) used 60 college students (37 females and 23 males) to study the effects of hypnotic treatment, biofeedback treatment, trophotropic (relaxation) treatment, and a control condition on three dependent measures: anxiety, ego strength, and locus of control. Subjects were administered the IPAT Anxiety Scale (Cattell & Scheier, 1963), the Ego-strength scale (Barron, 1953), and the Locus of Control Scale (Rotter, 1966) both prior

to and following an 8-week training period. During this period, the three self-regulatory techniques were employed in experimental groups that met separately for 60 minutes once a week. A series of covariance analyses indicated that hypnosis significantly lowered subjects' anxiety levels ( $p < .01$ ), and increased subjects' ego strength ( $p < .01$ ). The biofeedback training group was also effective in increasing ego strength scores ( $p < .01$ ), and the two techniques did not appear to differ in their effectiveness for improving ego strength. No other significant treatment effects were found. As an increase in ego strength has been shown to be related to lower levels of neuroticism by the present study, the use of hypnotic and biofeedback treatments may be effective in increasing ego strength and subsequently reducing neuroticism. This may also have treatment implications for a "patient" population as well as a "healthy" population. More research with both populations concerning the complex relationships of ego strength is presently indicated.

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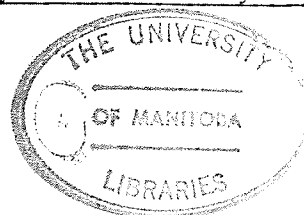
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Table 1

Scale scores ( $N = 160$ )

Scale	$M$	$SD$
Neuroticism ( $D_i$ )	8.025	4.092
Neuroticism (MMPI)	4.569	3.063
Negative life stress	7.319	7.069
Positive life stress	8.231	6.199
Ego strength	46.475	5.417
Sensation seeking	11.575	3.609

Table 2

Pearson correlation coefficients  
and probability values ( $N = 160$ )

	Neuroticism ( $\mathcal{D}_i$ )	Neuroticism (MMPI)	Negative life stress	Positive life stress	Ego strength
Sensation seeking	-0.039	-0.107	0.139	0.87	0.239**
Ego strength	-0.531***	-0.505***	-0.239**	-0.065	
Positive life stress	-0.058	-0.008	0.142		
Negative life stress	0.266***	0.198*			
Neuroticism (MMPI)	0.618***				

\*  $p < .02$

\*\*  $p < .01$

\*\*\*  $p < .001$

Table 3

Cumulative  $R$ -squares, individual  $R$ -squares, standardized regression coefficients and probability values of MRC predictors of neuroticism ( $\mathcal{D}i$  scale;  $N = 160$ )

Variables	Cumulative $R^2$	Individual $R^2$	Standardized regression coefficient
Ego strength ( $E_s$ )	0.2818*	0.2818*	-0.2913
Negative life stress (NLS)	0.3024*	0.0206**	0.9109
Positive life stress (PLS)	0.3150*	0.0126	-0.6093
Sensation seeking (SS)	0.3201*	0.0051	0.4897
NLS by $E_s$	0.3342*	0.0141	-1.0102
NLS by SS	0.3401*	0.0059	0.1950
$E_s$ by SS	0.3420*	0.0019	-0.5438
NLS by PLS	0.3443*	0.0023	0.1326
PLS by $E_s$	0.3468*	0.0025	0.4215

\*  $p < .01$

\*\*  $p < .05$

Table 4

Cumulative  $R$ -squares, individual  $R$ -squares, standardized regression coefficients and probability values of MRC predictors of neuroticism (Baggaley-Riedel MMPI scale;  $N = 160$ )

Variables	Cumulative $R^2$	Individual $R^2$	Standardized regression coefficient
Ego strength ( $E_s$ )	0.2555*	0.2555*	-0.4906
Negative life stress (NLS)	0.2619*	0.0064	0.1248
Positive life stress (PLS)	0.2646*	0.0027	0.3558
NLS by PLS	0.2795*	0.0149	-0.2363
NLS by Sensation seeking (SS)	0.2818*	0.0023	-0.3472
SS	0.2853*	0.0035	0.0844
NLS by $E_s$	0.2871*	0.0018	0.4175
PLS by $E_s$	0.2884*	0.0013	-0.3265
PLS by SS	0.2885*	0.0001	0.0470

\*  $p < .01$

		<u>Negative life change</u>	
		Below threshold	Above threshold
<u>Ego strength</u>	High	Low relationship	Intermediate relationship
	Low	Intermediate relationship	High relationship

Figure 1. Model for degree of relationship with neuroticism of negative life change and ego strength.

APPENDIX A

Instructions to Subjects

This is a study concerning the relationship between life stress and a number of personality variables. Although some of the questions may not specifically apply to you at the present time, it is important that you try to answer all the questions as best you can.

Please place your name and student number on the first page of each questionnaire. All research data will be kept strictly confidential.

Thank you for your cooperation.



APPENDIX B

The Life Experience Survey

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

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

Section 1

	0 to 6 mo	7 mo to 1 yr	extremely negative	moderately negative	somewhat negative	no impact	slightly positive	moderately positive	extremely positive
1. Marriage			-3	-2	-1	0	+1	+2	+3
2. Detention in jail or comparable institution			-3	-2	-1	0	+1	+2	+3
3. Death of spouse			-3	-2	-1	0	+1	+2	+3
4. Major change in sleeping habits (much more or much less sleep)			-3	-2	-1	0	+1	+2	+3

	0 to 6 mo	7 mo to 1 yr	extremely negative	moderately negative	somewhat negative	no impact	slightly positive	moderately positive	extremely positive
5. Death of close family member:									
a. mother			-3	-2	-1	0	+1	+2	+3
b. father			-3	-2	-1	0	+1	+2	+3
c. brother			-3	-2	-1	0	+1	+2	+3
d. sister			-3	-2	-1	0	+1	+2	+3
e. grandmother			-3	-2	-1	0	+1	+2	+3
f. grandfather			-3	-2	-1	0	+1	+2	+3
g. other (specify)			-3	-2	-1	0	+1	+2	+3
6. Major change in eating habits (much more or much less food intake)			-3	-2	-1	0	+1	+2	+3
7. Foreclosure on mortgage or loan			-3	-2	-1	0	+1	+2	+3
8. Death of close friend			-3	-2	-1	0	+1	+2	+3
9. Outstanding personal achievement			-3	-2	-1	0	+1	+2	+3
10. Minor law violations (traffic tickets, disturbing the peace, etc.)			-3	-2	-1	0	+1	+2	+3
11. <u>Male</u> : Wife/girlfriend's pregnancy			-3	-2	-1	0	+1	+2	+3
12. <u>Female</u> : Pregnancy			-3	-2	-1	0	+1	+2	+3
13. Changed work situation (different work responsibility, major change in working conditions, working hours, etc.)			-3	-2	-1	0	+1	+2	+3

	0 to 6 mo	7 mo to 1 yr	extremely negative	moderately negative	somewhat negative	no impact	slightly positive	moderately positive	extremely positive
14. New job			-3	-2	-1	0	+1	+2	+3
15. Serious illness or injury of close family member									
a. father			-3	-2	-1	0	+1	+2	+3
b. mother			-3	-2	-1	0	+1	+2	+3
c. sister			-3	-2	-1	0	+1	+2	+3
d. brother			-3	-2	-1	0	+1	+2	+3
e. grandfather			-3	-2	-1	0	+1	+2	+3
f. grandmother			-3	-2	-1	0	+1	+2	+3
g. spouse			-3	-2	-1	0	+1	+2	+3
h. other (specify)			-3	-2	-1	0	+1	+2	+3
16. Sexual difficulties			-3	-2	-1	0	+1	+2	+3
17. Trouble with employer (in danger of losing job, being suspended, demoted, etc.)			-3	-2	-1	0	+1	+2	+3
18. Trouble with in-laws			-3	-2	-1	0	+1	+2	+3
19. Major change in financial status (a lot better off or a lot worse off)			-3	-2	-1	0	+1	+2	+3
20. Major change in closeness of family members (increased or decreased close- ness)			-3	-2	-1	0	+1	+2	+3

	0 to 6 mo	7 mo to 1 yr	extremely negative	moderately negative	somewhat negative	no impact	slightly positive	moderately positive	extremely positive
21. Gaining a new family member (through birth, adoption, family member moving in, etc.)			-3	-2	-1	0	+1	+2	+3
22. Change of residence			-3	-2	-1	0	+1	+2	+3
23. Marital separation from mate (due to conflict)			-3	-2	-1	0	+1	+2	+3
24. Major change in church activities (increased or decreased attendance)			-3	-2	-1	0	+1	+2	+3
25. Marital reconciliation with mate			-3	-2	-1	0	+1	+2	+3
26. Major change in number of arguments with spouse (a lot more or a lot less arguments)			-3	-2	-1	0	+1	+2	+3
27. <u>Married male:</u> Change in wife's work outside the home (beginning work, ceasing work, changing to a new job, etc.)			-3	-2	-1	0	+1	+2	+3
28. <u>Married female:</u> Change in husband's work (loss of job, beginning new job, retirement, etc.)			-3	-2	-1	0	+1	+2	+3

	0 to 6 mo	7 mo to 1 yr	extremely negative	moderately negative	somewhat negative	no impact	slightly positive	moderately positive	extremely positive
29. Major change in usual type and/or amount of recreation			-3	-2	-1	0	+1	+2	+3
30. Borrowing more than \$10,000 (buying home, business, etc.)			-3	-2	-1	0	+1	+2	+3
31. Borrowing less than \$10,000 (buying car, TV, getting school loan, etc.)			-3	-2	-1	0	+1	+2	+3
32. Being fired from job			-3	-2	-1	0	+1	+2	+3
33. <u>Male</u> : Wife/girlfriend having abortion			-3	-2	-1	0	+1	+2	+3
34. <u>Female</u> : Having abortion			-3	-2	-1	0	+1	+2	+3
35. Major personal illness or injury			-3	-2	-1	0	+1	+2	+3
36. Major change in social activities, e.g., parties, movies, visiting (increased or decreased partici- pation)			-3	-2	-1	0	+1	+2	+3
37. Major change in living conditions of family (building new home, remodeling, deterioration of home, neighborhood, etc.)			-3	-2	-1	0	+1	+2	+3
38. Divorce			-3	-2	-1	0	+1	+2	+3
39. Serious injury or illness of close friend			-3	-2	-1	0	+1	+2	+3

	0 to 6 mo	7 mo to 1 yr	extremely negative	moderately negative	somewhat negative	no impact	slightly positive	moderately positive	extremely positive
40. Retirement from work			-3	-2	-1	0	+1	+2	+3
41. Son or daughter leaving home (due to marriage, college, etc.)			-3	-2	-1	0	+1	+2	+3
42. End of formal schooling			-3	-2	-1	0	+1	+2	+3
43. Separation from spouse (due to work, travel, etc.)			-3	-2	-1	0	+1	+2	+3
44. Engagement			-3	-2	-1	0	+1	+2	+3
45. Breaking up with boyfriend/girlfriend			-3	-2	-1	0	+1	+2	+3
46. Leaving home for the first time			-3	-2	-1	0	+1	+2	+3
47. Reconciliation with boyfriend/ girlfriend			-3	-2	-1	0	+1	+2	+3
Other recent experiences which have had an impact on your life. List and rate.									
48. _____			-3	-2	-1	0	+1	+2	+3
49. _____			-3	-2	-1	0	+1	+2	+3
50. _____			-3	-2	-1	0	+1	+2	+3
Section 2: Student Only									
51. Beginning a new school experience at a higher academic level (college, graduate school, pro- fessional school, etc.)			-3	-2	-1	0	+1	+2	+3

	0 to 6 mo	7 mo to 1 yr	extremely negative	moderately negative	somewhat negative	no impact	slightly positive	moderately positive	extremely positive
52. Changing to a new school at same academic level (undergraduate, graduate, etc.)			-3	-2	-1	0	+1	+2	+3
53. Academic probation			-3	-2	-1	0	+1	+2	+3
54. Being dismissed from dormitory or other residence			-3	-2	-1	0	+1	+2	+3
55. Failing an important exam			-3	-2	-1	0	+1	+2	+3
56. Changing a major			-3	-2	-1	0	+1	+2	+3
57. Failing a course			-3	-2	-1	0	+1	+2	+3
58. Dropping a course			-3	-2	-1	0	+1	+2	+3
59. Joining a fraternity/sorority			-3	-2	-1	0	+1	+2	+3
60. Financial problems concerning school (in danger of not having sufficient money to continue)			-3	-2	-1	0	+1	+2	+3



## APPENDIX C

Barron's E<sub>s</sub> Scale

	<u>True</u>	<u>False</u>	
1.	A	B	I have a good appetite.
2.	A	B	I have diarrhea once a month or more.
3.	A	B	At time I have fits of laughing and crying that I cannot control.
4.	A	B	I find it hard to keep my mind on a task or job.
5.	A	B	I have had very peculiar and strange experiences.
6.	A	B	I have a cough most of the time.
7.	A	B	I seldom worry about my health.
8.	A	B	My sleep is fitful and disturbed.
9.	A	B	When I am with people, I am bothered by hearing very queer things.
10.	A	B	I am in just as good physical health as most of my friends.
11.	A	B	Everything is turning out just like the prophets of the Bible said it would.
12.	A	B	Parts of my body often have feelings like burning, tingling, crawling, or like "going to sleep".
13.	A	B	I am easily downed in an argument.
14.	A	B	I do many things which I regret afterwards (I regret things more or more often than others seem to).
15.	A	B	I go to church almost every week.
16.	A	B	I have met problems so full of possibilities that I have been unable to make up my mind about them.
17.	A	B	Some people are so bossy that I feel like doing the opposite of what they request, even though I know they are right.
18.	A	B	I like collecting flowers or growing house plants.
19.	A	B	I like to cook.
20.	A	B	During the past few years I have been well most of the time.
21.	A	B	I have never had a fainting spell.

- |     | <u>True</u> | <u>False</u> |   |
|-----|-------------|--------------|---|
| 22. | A           | B            | When I get bored, I like to stir up some excitement.  |
| 23. | A           | B            | My hands have not become clumsy or awkward.   |
| 24. | A           | B            | I feel weak all over much of the time.  |
| 25. | A           | B            | I have had no difficulty in keeping my balance in walking.  |
| 26. | A           | B            | I like to flirt.  |
| 27. | A           | B            | I believe my sins are unpardonable.   |
| 28. | A           | B            | I frequently find myself worrying about something.  |
| 29. | A           | B            | I like science.   |
| 30. | A           | B            | I like to talk about sex.   |
| 31. | A           | B            | I get mad easily and then get over it soon.   |
| 32. | A           | B            | I brood a great deal.   |
| 33. | A           | B            | I dream frequently about things that are best kept to myself.   |
| 34. | A           | B            | My way of doing things is apt to be misunderstood by others.  |
| 35. | A           | B            | I have had blank spells in which my activities were interrupted and I did not know what was going on around me. |
| 36. | A           | B            | I can be friendly with people who do things I consider wrong.   |
| 37. | A           | B            | If I were an artist, I would like to draw flowers.  |
| 38. | A           | B            | When I leave home, I do not worry about whether the door is locked and the windows closed.                      |
| 39. | A           | B            | At times I hear so well it bothers me.  |
| 40. | A           | B            | Often I cross the street in order not to meet someone I see.  |
| 41. | A           | B            | I have strange and peculiar thoughts.   |
| 42. | A           | B            | Sometimes I enjoy hurting persons I love.   |
| 43. | A           | B            | Sometimes some unimportant thought will run through my mind and bother me for days.                             |
| 44. | A           | B            | I am not afraid of fires.   |
| 45. | A           | B            | I seldom worry about my health.   |

- |     | <u>True</u> | <u>False</u> |   |
|-----|-------------|--------------|---|
| 46. | A           | B            | When someone says silly or ignorant things about something I know, I try to set him right.                            |
| 47. | A           | B            | I feel unable to tell anyone all about myself.  |
| 48. | A           | B            | My plans have frequently seemed so full of difficulties that I have had to give them up.                              |
| 49. | A           | B            | I would certainly enjoy beating a crook at his own game.  |
| 50. | A           | B            | I have had some very unusual religious experiences.   |
| 51. | A           | B            | One or more members of my family is very nervous.   |
| 52. | A           | B            | I am attracted to member of the opposite sex.   |
| 53. | A           | B            | The man who had most to do with me when I was a child (such as my father, step-father, etc.) was very strict with me. |
| 54. | A           | B            | Christ performed miracles such as changing water into wine.   |
| 55. | A           | B            | I pray several times every week.  |
| 56. | A           | B            | I feel sympathetic towards people who tend to hang on to their grief and troubles.                                    |
| 57. | A           | B            | I am afraid of finding myself in a closet or small closed place.  |
| 58. | A           | B            | Dirt frightens me.  |
| 59. | A           | B            | I think Lincoln was greater than Washington.  |
| 60. | A           | B            | In my home we have always had the ordinary necessities (such as enough food, clothing, etc.).                         |
| 61. | A           | B            | I am made nervous by certain animals.   |
| 62. | A           | B            | My skin seems to be unusually sensitive to touch.   |
| 63. | A           | B            | I feel tired a good deal of the time.   |
| 64. | A           | B            | I never attend a sexy show if I can avoid it.   |
| 65. | A           | B            | If I were an artist, I would like to draw children.   |
| 66. | A           | B            | I sometimes feel that I am about to go to pieces.   |
| 67. | A           | B            | I have often been frightened in the middle of the night.  |
| 68. | A           | B            | I very much like horseback riding.  |

APPENDIX D

Items for SS Scale: Form II

1. A. I would like a job which would require a lot of traveling.  
B. I would prefer a job in one location.
2. A. I am invigorated by a brisk, cold day.  
B. I can't wait to get into the indoors on a cold day.
3. A. I often wish I could be a mountain climber.  
B. I can't understand people who risk their necks climbing mountains.
4. A. I dislike all body odors.  
B. I like some of the earthly body smells.
5. A. I get bored seeing the same old faces.  
B. I like the comfortable familiarity of everyday friends.
6. A. I like to explore a strange city or section of town by myself, even if it means getting lost.  
B. I prefer a guide when I am in a place I don't know well.
7. A. I would not like to try any drug which might produce strange and dangerous effects on me.  
B. I would like to try some of the new drugs that produce hallucinations.
8. A. I would prefer living in an ideal society where everyone is safe, secure, and happy.  
B. I would have preferred living in the unsettled days of our history.
9. A. I sometimes like to do things that are a little frightening.  
B. A sensible person avoids activities that are dangerous.
10. A. I would like to take up the sport of water skiing.  
B. I would not like to take up water skiing.
11. A. When I go on a trip I like to plan my route and timetable fairly carefully.  
B. I would like to take off on a trip with no preplanned definite routes, or timetables.
12. A. I would like to learn to fly an airplane.  
B. I would not like to learn to fly an airplane.
13. A. The most important goal of life is to live it to the fullest and experience as much of it as you can.  
B. The most important goal of life is to find peace and happiness.
14. A. I would not like to be hypnotized.  
B. I would like to have the experience of being hypnotized.
15. A. I would like to try parachute jumping.  
B. I would never want to try jumping out of a plane, with or without a parachute.

16. A. I enter cold water gradually giving myself time to get used to it.  
B. I like to dive or jump right into the ocean or a cold pool.
17. A. I prefer friends who are excitingly unpredictable.  
B. I prefer friends who are reliable and predictable.
18. A. When I go on a vacation I prefer the comfort of a good room and bed.  
B. When I go on a vacation I would prefer the change of camping out.
19. A. The essence of good art is in its clarity, symmetry of form, and harmony of colors.  
B. I often find beauty in the "clashing" colors and irregular forms of modern paintings.
20. A. I prefer people who are emotionally expressive even if they are a bit unstable.  
B. I prefer people who are calm and even tempered.
21. A. A good painting should shock or jolt the senses.  
B. A good painting should give one a feeling of peace and security.
22. A. People who ride motorcycles must have some kind of an unconscious need to hurt themselves.  
B. I would like to drive or ride on a motorcyle.

APPENDIX E



PSI Items for the *Di* Scale

	<u>True</u>	<u>False</u>	
1.	A	B	I am usually happy.
2.	A	B	I guess I am not very efficient.
3.	A	B	I forget things more quickly nowadays.
4.	A	B	I don't get sick very often.
5.	A	B	When I sleep I toss and turn.
6.	A	B	I often find it hard to concentrate.
7.	A	B	I think there is something wrong with my memory.
8.	A	B	I am pretty healthy for my age.
9.	A	B	I am tempted to sleep too much.
10.	A	B	I am easily distracted from a task.
11.	A	B	I have a lot of energy.
12.	A	B	I rarely or never get headaches.
13.	A	B	Much of my life is uninteresting.
14.	A	B	Sometimes I am no good for anything at all.
15.	A	B	I frequently feel nauseated.
16.	A	B	I am often tired during the day.
17.	A	B	My health is no problem for me.
18.	A	B	My appetite is very healthy.
19.	A	B	I have little confidence in myself.
20.	A	B	I rarely wake up tired.
21.	A	B	I feel isolated from other people.
22.	A	B	People often embarrass me.
23.	A	B	I can usually judge what effect I will have on others.
24.	A	B	I rarely stumble or trip when I walk.

- |     | <u>True</u> | <u>False</u> |   |
|-----|-------------|--------------|---|
| 25. | A           | B            | I seldom feel frightened.                       |
| 26. | A           | B            | My strength often seems to drain away from me.  |
| 27. | A           | B            | Sometimes I wish I could control myself better. |
| 28. | A           | B            | I rarely feel anxious in my stomach.            |
| 29. | A           | B            | Occasionally I feel dizzy or lightheaded.       |
| 30. | A           | B            | At times I feel worn out for no special reason. |

APPENDIX F

Baggaley and Riedel Scale

<u>True</u>	<u>False</u>	
1. A	B	My daily life is full of things that keep me interested.
2. A	B	My sleep is fitful and disturbed.
3. A	B	I wish I could be as happy as others seem to be.
4. A	B	Most of the time I feel blue.
5. A	B	I am certainly lacking in self-confidence.
6. A	B	I usually feel that life is worth while.
7. A	B	I am happy most of the time.
8. A	B	I believe that my home life is as pleasant as that of most people I know.
9. A	B	Criticism or scolding hurts me terribly.
10. A	B	I certainly feel useless at times.
11. A	B	Most nights I go to sleep without thoughts or ideas bothering me.
12. A	B	Sometimes, when embarrassed, I break out in a sweat which annoys me greatly.
13. A	B	I enjoy many different kinds of play and recreation.
14. A	B	I brood a great deal.
15. A	B	I think that I feel more intensely than most people do.
16. A	B	Even when I am with people I feel lonely much of the time.
17. A	B	I am more sensitive than most other people.
18. A	B	I am inclined to take things hard.

APPENDIX G

NAME \_\_\_\_\_

STUDENT # \_\_\_\_\_

Confidential Background Information

1. Age \_\_\_\_\_
2. Sex (please check one) Male \_\_\_\_\_ Female \_\_\_\_\_
3. Marital Status: Single \_\_\_\_\_ Married \_\_\_\_\_ Common-law \_\_\_\_\_  
Separated \_\_\_\_\_ Divorced \_\_\_\_\_ Widowed \_\_\_\_\_
4. Employment Status: Full-time \_\_\_\_\_ Part-time \_\_\_\_\_  
Unemployed \_\_\_\_\_
5. What is the combined yearly salary of both your parents?  
(check one only)  

0 - \$4,999 _____	\$5,000 - \$9,999 _____
\$10,000 - \$14,999 _____	\$15,000 - \$19,999 _____
\$20,000 - \$24,999 _____	\$25,000 - \$29,999 _____
\$30,000 - \$34,999 _____	\$35,000 - \$39,999 _____
\$40,000 - \$44,999 _____	\$45,000 and over _____
6. How many people does this income support? \_\_\_\_\_
7. a. Do you live with your parent(s)? \_\_\_\_\_  
b. Do you live with a friend or friends? \_\_\_\_\_  
c. Do you live alone? \_\_\_\_\_