

RELATIONSHIP OF SELF-ESTEEM AND
EXTRAVERSION TO STRESS REACTION

by

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Abstract

In recent years a great deal of interest has been expressed in the role of individual difference variables as potential mediators of stress reactions. Self-esteem and extraversion are two personality variables that have been identified as determinants of the observed individual differences in response to stress. Previous research suggests that self-esteem may exert its greatest influence on stress reactions at the level of threat appraisal whereas extraversion would seem to be most influential in terms of its implications for arousability or tolerance for arousal. The present study further investigated the mediating role of these two variables with primary emphasis on their possible interactive effects.

Fifty-six female, first-year nursing students served as experimental subjects and 30 second-year nursing students served as a nonstress comparison group. Experimental subjects were subdivided into four groups on the basis of their responses to the extraversion scale of the Eysenck Personality Inventory (EPI), a measure of extraversion and neuroticism, and the Self-Description Inventory, a measure of general self-esteem. Data were collected across three experimental phases. During phase I, experimental and comparison subjects were group administered the EPI, the Self-Description Inventory, and the State-Trait Anxiety Inventory (STAI) (A-state). During phase II, experimental subjects completed the Wonderlic Personnel Test, the

STAI (A-state), and an information sheet containing demand rating, performance rating, and causal attribution scales. Second-year students completed the STAI (A-state) and the Self-Description Inventory--the latter instrument was re-administered for the purpose of collecting test-retest reliability data. The last phase of data collection for experimental subjects coincided with an important final examination in the first-year nursing course. The examination constituted a natural setting that was highly stressful for the participants. Immediately following the examination, subjects completed the STAI (A-state) and an information sheet identical to the one administered in phase II. Second-year students completed the STAI (A-state) at the beginning of a regular (no-test) class meeting.

The statistical results failed to support the predicted interaction effects of self-esteem and extraversion. Contrary to prediction, high and low self-esteem introverts did not differ significantly in terms of their posttest anxiety and exam performance scores. In line with prediction, however, was the failure to find differences on these measures for high and low self-esteem extraverts. Although the main interaction hypothesis was not supported, trends were observed which suggested that under conditions of ego threat interaction effects may occur in the sphere of cognitive activity. These trends were discussed in terms of their implications for coping ability or stress resistance. Some suggestions were offered as to how future investigations could clarify and extend the research findings.

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In recent years the concept of stress has become the focus of considerable attention. In particular, a great deal of research interest has centred on the effects of stressful life events as precipitators of somatic and psychological disease (Thurlow, 1971; Rubin, Gunderson & Arthur, 1971; Thomson & Hendrie, 1972; Gunderson & Rahe, 1974). Relatively less attention has been directed toward the more positive role that stress may play in our day-to-day lives. Clearly, not all individuals succumb to the pressures of modern-day living; indeed, for some, even the most stressful life experiences appear insufficient to precipitate physiological and psychological breakdown (Hinkle, 1974; Antonovsky, 1974; Paykel, 1974).

Increasingly, researchers are turning their attention toward the 'stressed' but 'healthy' individual, in an effort to identify and better understand the factors underlying successful coping (Kobasa, 1979; Folkman & Lazarus, 1980; McFarlane, Norman, Streiner, Roy & Scott, 1980). Particular interest has been expressed in the role of individual difference variables as potential mediators of the relationship between life stresses and psychological health (Dohrenwend & Dohrenwend, 1974; Rabkin & Struening, 1976; Chan, 1977; Johnson & Sarason, 1979; Gilbert & Mangelsdorff, 1979). Several personality variables have been identified as determinants of the observed individual differences in response to stress. The present study further investigates the influence of two such variables: self-esteem and

extraversion. Of primary interest are the possible interactive effects of these two variables on stress reactions; an avenue of research which, to date, remains largely unexplored. In addressing this question, the study adopts a narrow focus with the investigation centring around a specific life stress situation. Should interaction effects be found, evidence would exist for the inclusion of both self-esteem and extraversion in broader based life stress research.

Stress Definition

The definition of stress that forms the basis of the present investigation takes as its focus man's interaction with his environment. According to the transactional definition, stress involves an imbalance between a person's perception of the demand placed on him by his environment and his perceived ability to cope with that demand when the consequences of failing to cope are important (McGrath, 1970; Sells, 1970; Mechanic, 1970; Cox, 1978; Lazarus, 1976). The cornerstone of the transactional definition is cognitive appraisal; appraisal being seen as the intervening process in psychological stress analysis, the precursor of stress reactions (Lazarus, 1966 1977; Monat & Lazarus, 1977).

The transactional definition of stress represents the most recent formulation in the evolutionary history of the stress concept. Initially, stress was viewed largely as a response phenomenon, a conceptualization that is credited

to Hans Selye (1956). Selye defined stress in terms of a physiological syndrome: the General Adaptation Syndrome. No attempt was made, however, to specify those stimulus conditions--stressors--that give rise to stress reactions. While Selye's response-based definition is firmly rooted in physiological responses, the concept has been expanded by others to include both behavioural and cognitive reactions. Indeed, any bodily response that deviates momentarily or over time from what would generally be regarded as normal or usual for the individual--or some appropriate reference group--may constitute a stress response (Appley & Trumbull, 1977).

A second formulation of the stress concept takes as its focus those 'disturbing or noxious' environmental conditions that are presumed to give rise to stress reactions. From this perspective, stress is seen as residing within the stimulus characteristics of the environment. The stimulus-based definition has been likened to an engineering model (Cox, 1978; Parrot, 1971) in that man is seen as possessing a built-in tolerance to stress; just as physical objects have an elastic limit, so too are people presumed to have a stress tolerance level beyond which physical or psychological damage may occur.

The transactional definition of stress incorporates aspects of both the response- and stimulus-based definitions; however, the emphasis on cognitive appraisal constitutes a significant expansion of the stress concept insofar as it

introduces the notion of individual differences into the stress formula. How an individual reacts to a given stimulus situation is seen as a function of his cognitive appraisal of that situation; and this appraisal is determined by the interplay of personality and the environmental stimulus configuration (Lazarus, 1977). The two personality variables to be considered in the present investigation--self-esteem and extraversion--would seem to have important implications for the appraisal process and resulting stress responses.

Self-esteem

Lazarus (1977) has written that "expectations about his power to deal with the environment and master danger are a factor in determining whether the person will feel threatened or challenged by what happens" (p. 149). The foregoing statement comes close to White's (1971) notion of competence, the central element in his definition of self-esteem. For White, competence means "to be sufficient or adequate to meet the demands of a situation or task . . . Level of self-esteem depends upon one's confidence, based on experience, that one can make desired things happen, . . ." (p. 273). To the extent that an individual judges himself to be generally competent, he is unlikely to appraise a large demand-capability discrepancy in most transactions with his environment. In this sense, self-esteem, defined as a 'sense of competence', may be thought to exert a

strong influence on the appraisal of threat and by extension stress reactions.

Historically, the self-esteem variable entered into psychological stress research in the context of stress induction. Early investigations involving self-concept were concerned with the effect of general threats to self-esteem on coping behaviour. As a case in point, an early study by Harvey, Kelley, and Shapiro (1947) assessed the reaction of individuals to unfavourable evaluation of the self made by others and concluded that degree of threat apparently determined defensive activity. The underlying premise, on which this and virtually all subsequent self-esteem research has been based, is that individuals are motivated, either innately (Snygg & Combs, 1949) or as a result of learning (Kaplan, 1975), to maintain or enhance their self-esteem. The frustration or thwarting of this motive is presumed to constitute a major source of stress for the individual.

The study of self-esteem as an individual difference variable is strongly associated with the persuasibility research of the mid 1950s (Hovland & Janis, 1959). Out of this research came the general experimental finding that differences in self-esteem were associated with considerable differences in individuals' responses to external pressure, an observation that prompted Cohen (1959) to articulate a model of self-esteem based on defensive styles. In essence, Cohen suggested that high self-esteem individuals

are characterized by a preference for ego defenses which help them to repress, deny, or ignore challenging and conflictual impulses, whereas low self-esteem individuals favour more expressive, sensitizing defenses. In consequence, high self-esteem individuals were thought to be more resistant to change that may disturb their self-picture, as well as to influence in general.

Cohen's model has served as a springboard for countless research investigations. Out of these studies have come a number of important findings concerning the effects of level of self-esteem on the individual's response to ego threat. In considering the various investigations involving self-esteem, it is important to note that a variety of instruments have been used to assess the self-esteem construct (Cohen's ideal-actual discrepancy measure, 1959; Tennessee Self-Concept Scale, 1964; Coopersmith Self-esteem Inventory, 1967; Janis-Field Personality Questionnaire, 1959; Manifest Anxiety-Defensiveness Scale, 1970). And yet, despite the divergence in measuring instruments, certain findings have repeatedly emerged. For example, it has been found that low self-esteem individuals are more sensitive to negative than to positive information about the self while high self-esteem individuals are more sensitive to positive than to negative self-information (Leventhal & Perloe, 1962; Fitch, 1970; Shrauger & Rosenberg, 1970; Ryckman & Rodda, 1972; Perez, 1973). In other words, high self-esteem individuals possess a high

threshold for perceiving threat to self-esteem while low self-esteem individuals possess a low threshold for perceiving ego threat.

Differences in responsivity to ego-threatening information have been related to differences in the performance of high and low self-esteem individuals following failure; low self-esteem individuals frequently suffer performance decrements under failure-feedback conditions whereas the performance of high self-esteem individuals is relatively less negatively affected (Shrauger & Rosenberg, 1970), and, in some instances, is actually enhanced by such feedback (Diener & Dweck, 1978). The differential performance of high and low self-esteem individuals following ego threat has, in turn, been related to differences in the arousal and resolution of affect. Millimet and Gardner (1972) found that in most situations involving some degree of ego threat, high self-esteem individuals experienced positive affect. This was in sharp contrast to the pervasive negative affect that was typically experienced by low self-esteem individuals. Given the detrimental effect of anxiety on many types of learning and performance tasks, the frequent finding of greater performance decrements in low than in high self-esteem individuals is not unexpected.

Further support for the notion that high self-esteem individuals are relatively better defended against threats to self-esteem than their low self-esteem counterparts

comes from research in the area of causal attribution. Briefly stated, attribution theory holds that man attempts to bring order and meaning to his world by determining the causal antecedents of events (Heider, 1958). There is evidence to suggest that low self-esteem and high self-esteem individuals differ markedly in their cognitive reactions following failure. Research has shown that high self-esteem individuals are inclined to attribute failure either to a lack of effort or to external factors such as luck or task difficulty. In contrast, the low self-esteem individual is inclined to attribute failure to a perceived lack of ability (Burke, 1978; Diener & Dweck, 1978). To the extent that lack of ability explanations engender more negative affect than lack of effort explanations (Meyer, 1973--cited in Heckhausen, 1975) the low self-esteem individual would appear to be more prone to react with stress responses than the high self-esteem individual.

A recent line of self-esteem research that sheds additional light on the low self-esteem individual's apparent susceptibility to stress reactions centres on the notion of 'focus of attention'. 'Focus of attention' refers to the distinction between attention directed outward toward the external environment and attention directed inward toward the self (Duval & Wicklund, 1972). There is evidence to suggest that low self-esteem and self-focusing are positively correlated (Turner, Scheier, Carver, & Ickes, 1978). To the extent that self-focused attention

heightens a person's awareness of, and responsivity to, affect of both a positive and negative nature (Scheier & Carver, 1977), the low self-esteem individual would be expected to experience heightened levels of negative affect following ego threat, an expectation that has been experimentally supported (Millimet & Gardner, 1972). The high self-esteem individual, on the other hand, would not be expected to experience negative affect in those instances where self-focusing and ego threat converge (Brockner, 1979b). Presumably, for these self-confident individuals, self-focusing leads to a greater awareness of their capability and hence more positive affect.

In summary, the research evidence suggests that relative to low self-esteem individuals persons characterized by high levels of self-esteem are less responsive to information that threatens their self-concept as evidenced by less negative affect and less disruption in performance following ego threat. Furthermore, high self-esteem individuals defend against ego threat by leaning toward causal attributions that enable them to maintain their sense of competence and hence their self-esteem.

Although the experimental evidence supports a relationship between self-esteem and stress reactions, one cannot predict stress responses solely on the basis of the self-esteem variable. The fact remains: Not all low self-esteem individuals exhibit stress reactions under ego-threatening conditions (Brockner, 1979b). Thus, while

low levels of self-esteem may predispose an individual to react with stress responses, other determinants are clearly involved. One variable that would seem to speak to the issue of differential reactions to ego-threat appraisal is extraversion.

Extraversion

The extraversion dimension of personality, as articulated by Hans Eysenck (1967), is important to the study of stress insofar as it reflects fundamental differences between the introvert and the extravert with regard to level of arousal. These differences, in turn, relate to hypothesized differences in the reaction of introverts and extraverts to potential stressors.

Specifically, Eysenck's theory holds that the dimension of extraversion is an expression of cortical arousal mediated by the reticular formation; introverts are habitually in a state of greater arousal than extraverts and consequently they show lower sensory thresholds and greater reactions to sensory stimulation. This higher level of cortical arousal is presumed to underly the introvert's greater conditionability relative to the extravert. The idea that introverts are more highly conditionable than extraverts forms the basis of Eysenck's theory regarding the behavioural differences between these two personality types. Eysenck postulates that introverts form the conditioned reflexes comprising the conscience with greater

ease than extraverts; the extravert's relatively less socialized behaviour is reflected in his characteristic impulsiveness and heightened sociability, the two sub-factors that have been found to underly extraversion.

Associated with, but distinct from, extraversion is another personality dimension: neuroticism. For Eysenck, neuroticism is equated with degree of emotionality or 'emotional overresponsiveness'. It is his contention that high levels of emotionality in combination with introversion define the dysthymic neuroses while strong emotions combined with extraversion result in psychopathic behaviours.

Eysenck's emphasis on the greater conditionability of the introvert relative to the extravert has recently been challenged by Gray (1970). In a modification of Eysenck's theory, Gray proposed that introverts form the conditioned fear reactions more strongly than extraverts, not because they are better at conditioning, but because they show heightened sensitivity to punishment and warnings of punishment. Gray has suggested that the extravert's sociability and impulsiveness are related to his relative lack of sensitivity to punishment and to the fact that his behaviour is more determined by potential rewards in his environment.

Whether one accepts Eysenck's formulation or Gray's modification, the basic predictions derived from the theory are the same. Of particular interest here are the research data supporting the hypothesized differences in arousal

level and tolerance of arousal for introverts and extraverts.

The finding of lower auditory thresholds (Haslam, 1971) and pain thresholds (Smith, 1971) for introverts than extraverts lends support to the theoretical notion that introverts are characterized by higher levels of excitation or arousal than extraverts. The related prediction that introverts should display a certain degree of 'stimulus aversion' while extraverts should display a certain degree of 'stimulus hunger' has also received experimental support. Farley and Farley (1967) found a positive correlation of .47 between extraversion and stimulus seeking as measured by the Sensation Seeking Scale (Zuckerman, Kolin, Price, & Zoob, 1964); extraverts were found to choose items reflecting stimulus-seeking motivation and preference for sensory variability. The findings of less stimulus deprivation tolerance (Petrie, Collins, & Solomon, 1960), greater pain tolerance (Lynn & Eysenck, 1971), and greater risk taking (Lynn & Butler, 1971) among extraverts than introverts lends further weight to the notion of greater stimulus-seeking motivation among extraverted individuals.

The implication of the above findings for psychological stress research was recently demonstrated in an investigation by Smith, Johnson, and Sarason (1978). This study specifically addressed the variable of sensation seeking as a moderator of life stress. It was found that individuals low on the sensation-seeking dimension were negatively affected by life changes, a finding that did not

hold for subjects high on the sensation-seeking dimension.

The notion that extraverts exhibit greater tolerance of arousal than introverts has also been supported by the findings of Norman and Watson (1976). These investigators examined the relationship between extraversion and reactions to cognitive dissonance (Festinger, 1957)--a presumably stressful state. They reasoned that to the extent that extraverts are characterized by a greater tolerance for complex, novel, and arousing circumstances than introverts, they should show less of a tendency to reduce cognitive inconsistency than introverts. In other words, for the extraverts, the inconsistency would not be experienced as an aversive state leading to arousal-reducing activity. In line with their prediction, introverts were far more likely than extraverts to change their attitudes in a direction that would lead to greater consistency and hence less arousal. Still further support for the relationship between arousal tolerance and extraversion has been provided by Schalling (1975). This researcher reported that feelings of unpleasantness in thrilling adventurous situations were negatively related to impulsiveness and extraversion. In addition, it was found that extraverts reported fewer unpleasant feelings than introverts in anticipatory situations.

In summary, the research evidence suggests that extraverts have a lower sensitivity to aversive stimulation and a greater liking for, and hence tolerance of, arousal

as compared with introverts.

Taken together, the research evidence seems to point to the potential fruitfulness of considering both self-esteem and extraversion when it comes to stress analysis. While previous research studied the relationship of self-esteem to cognitive emotional reactions and behavioural responses under ego-threatening conditions, the personality dimension of extraversion was not considered in these investigations. The present research aims at testing the interactive effects of self-esteem and extraversion on stress reactions as measured by state anxiety and exam performance. As a departure from previously cited self-esteem research, the personality variables in question will be tested within the context of a naturalistic as opposed to an experimentally-induced stress situation.

Hypotheses

1. Self-esteem and extraversion will interact in such a fashion that stress reactions to an ego-threatening situation will be significantly influenced by level of self-esteem for introverts but not for extraverts. Specifically, it is predicted that low self-esteem introverts will report higher levels of anxiety and will exhibit poorer performance scores than high self-esteem introverts. It is reasoned that the high self-esteem individual's high threshold for perceiving threats to self-esteem (Cohen, 1959) will serve to short-circuit the appraisal of threat.

and hence stress reactions. In consequence, the arousal level of the high self-esteem introvert will reflect only cortical arousal whereas the arousal level of the low self-esteem introvert will reflect both cortical arousal and the negative affect engendered by the perceived ego threat. The moderate arousal of the high self-esteem introvert is expected to facilitate performance while the high arousal of the low self-esteem introvert should inhibit performance, an expectation consistent with drive theory (Yerkes & Dodson, 1908). It is further predicted that high and low self-esteem extraverts will not differ significantly in terms of their anxiety and performance scores. This prediction is based on the extravert's liking for arousal and hence resistance to its potentially negative effects. Thus, while low self-esteem may predispose the extravert to perceive threats to self-esteem, this appraisal is not expected to translate into heightened anxiety and impaired performance.

In addition to testing the above hypothesis, the present study will also address the relationship between self-esteem and demand rating, performance rating, and causal attribution. The following hypotheses will be tested:

2. High self-esteem subjects will rate an ego-threatening situation as less demanding than low self-esteem subjects. This prediction is based on the high self-esteem individual's greater "sense of competence"

which should result in lower threat appraisal relative to the low self-esteem individual.

3. High self-esteem subjects will rate their performance in an ego-threatening situation higher than low self-esteem subjects. This prediction is based on the low self-esteem individual's greater responsivity to information that threatens self-esteem. One may speculate that the low self-esteem individuals will focus on the negative as opposed to the positive aspects of their performance resulting in an overall lowering of their performance ratings.

4. For high self-esteem subjects, there will be a positive correlation between performance rating and causal attribution to ability. For low self-esteem subjects, performance rating and causal attribution to ability will be negatively correlated. This prediction is in line with previous research findings which suggest that low self-esteem individuals are prone to attribute failure to a lack of ability while attributing success to such causal factors as luck, task difficulty, and effort. In contrast, high self-esteem individuals have been found to attribute success to ability and effort and to defend against threats to their self-esteem by attributing causality to less threatening factors--effort, task difficulty, and luck (Burke, 1978; Diener & Dweck, 1978).

Method

Experimental Design

A 2 x 2 factorial design was employed. The two between subject factors were self-esteem (high, low) and extraversion (extraverts, introverts). The dependent variables were baseline anxiety, posttest anxiety, demand rating, performance rating, coping index, causal attributions to effort, difficulty, ability, and luck, and final exam score.

Subjects

The subjects were all female students of the first year (experimental group) and second year (comparison group) of a bachelor of nursing program at the University of Manitoba. Participation was strictly voluntary with subjects receiving no remuneration for having participated. Although 60 first-year students and 53 second-year students began the study, only 56 first-year students and 30 second-year students completed it. The high attrition rate among second-year students appears to have resulted from absenteeism on the final day of data collection. Of the four subjects lost from the experimental group, two failed to sit for the final examination and two failed to complete the posttest questionnaires.

First-year nursing students were specifically chosen as experimental subjects because they met two important selection criteria: They had committed themselves to a career choice and they were enrolled in a program known

among teachers and students to be stressful. To the extent that these criteria were met, the final examination in an important course constituted an adequate natural setting that was highly stressful for the participants. Second-year nursing students were chosen as a nonstress comparison group against which the responses of the experimental subjects could be compared. This group also served as a sample for the collection of test-retest reliability data.

Experimental subjects were subdivided into four groups on the basis of their responses to the extraversion scale of the Eysenck Personality Inventory (EPI), a measure of extraversion and neuroticism, and the Self-Description Inventory, a measure of general self-esteem. The extraversion and self-esteem measures correlated .49 for the entire sample. Subjects obtaining a score equal to, or greater than, the sample mean on the EPI ($\bar{M} = 15$) were designated extraverts; those scoring below the mean were designated introverts. Similarly, subjects scoring at or above the mean on the Self-Description Inventory ($\bar{M} = 70$) were labelled high self-esteem and those scoring below the mean were labelled low self-esteem. The means and standard deviations on extraversion and self-esteem for the four experimental groups are shown in Table 1.

Materials

Eysenck Personality Inventory (EPI). Extraversion was measured in this study by the EPI, a standardized test of the extraversion and neuroticism dimensions of personality

TABLE 1

Extraversion and Self-esteem Means and Standard
Deviations of the Four Experimental Groups

		Extraversion		Self-esteem	
Group	<u>n</u>	Mean	SD	Mean	SD
Introverts					
Low esteem	15	10.2	2.65	61.29	5.62
High esteem	7	12.9	1.46	74.99	3.13
Extraverts					
Low esteem	15	17.1	1.98	64.62	5.76
High esteem	19	18.5	1.84	78.02	4.72

developed by Eysenck and Eysenck (1964). Form B of the inventory was selected for use--test retest reliability coefficients of .80 and .85 have been reported for this form of the extraversion scale. Further evidence for the reliability (Farley, 1971) and validity (White, Stephenson, Child & Gibbs, 1968; Harrison & McLaughlin, 1969; Gibson, 1971) of the EPI has been reported.

Self-Description Inventory. The instrument chosen to measure self-esteem was the Self-Description Inventory, a modified and expanded form of a measure developed by Cutick (1962) and used extensively by Diggory (1966) and his co-workers. The modified form has been widely used as a measure of general self-esteem (Shrauger & Rosenberg, 1970; Shrauger, 1972; Brockner & Hulton, 1978; Brockner, 1979a, 1979b) and was similarly employed in the present investigation. The scale assessed the individuals' perceived competence across 16 situations. Subjects were asked to indicate the percentage of time a particular outcome or behaviour applied to them. Nine of the items were worded so that higher percentages indicated higher self-esteem whereas seven items were phrased so that lower percentages were indicative of higher self-esteem. For the latter items, subjects' percentage ratings were subtracted from 100. An average score was then obtained for the 16 items with higher scores representing higher levels of self-esteem.

Although the Self-Description Inventory has been widely used as a measure of general self-esteem, validity

and reliability coefficients have not as yet been reported for the instrument. Consequently, as part of the present study, test-retest reliability was assessed using the sample of 53 second-year nursing students with a four-week retest interval. A correlation of .78, $p < .001$ was obtained indicating acceptable reliability.

State-Trait Anxiety Inventory (STAI). Situational or state anxiety, a primary dependent variable in this investigation, was measured by the A-state scale of the STAI (Spielberger, Gorsuch & Lushene, 1970). The ability of the A-state scale to discriminate between high and low stress conditions has been well documented (Spielberger et al., 1970; Martuza & Kallstrom, 1974; Metzger, 1976). Of particular interest, from the standpoint of the present investigation, was its apparent sensitivity to changes in academic stress. Alpha reliability coefficients, computed from the normative samples, ranged from .83 to .92, suggesting that the instrument also had good internal consistency.

Wonderlic Personnel Test--Form V (1975 ed.). This instrument, which measures the individual's 'ability to learn', was administered to experimental subjects for the sole purpose of collecting comparison data. It was presumed that a group administered intelligence test would serve as an intermediate stress condition--more stressful than the baseline phase and presumably less stressful than the final examination phase. Subjects' responses on the dependent

measures were to be compared across the two conditions. Scores obtained on the instrument itself were not considered.

Demand rating scale. The demand rating was presumed to reflect one aspect of the individual's appraisal of the threat inherent in each test situation. Subjects were asked to indicate on a 7-point scale how demanding they found the Personnel Test and the final examination to be. Anchor points were set at 1 (not at all demanding) and 7 (very demanding).

Performance rating scale. The performance rating was presumed to measure a second aspect of the threat appraisal process, namely, the individuals' assessment of how well they had coped with the demand. Subjects were asked to rate their performance on the Personnel Test and the final examination with anchor points ranging from 1 (very poorly) to 7 (very well).

Coping index. The coping index was derived from the demand rating and performance rating scales and represented the difference between these two measures (performance rating minus demand rating). The discrepancy between an individual's perception of the demand placed on him by his environment and his perceived ability to cope with that demand has been widely accepted as an index of perceived threat (McGrath, 1976; French, Rodgers, & Cobb, 1974). Degree of threat has, in turn, been related to level of arousal and other stress reactions. Insofar as the discrepancy score used in the present study was derived

from posttest demand and performance ratings, it differed conceptually from the demand-ability discrepancy score. Whereas the latter focuses on the individual's appraisal of his ability or competence to meet a particular demand, the posttest demand-performance discrepancy measures the individual's perception of how well he did in fact cope, i.e., how successful he was in meeting the demand. While acknowledging the difference between these two measures, it nevertheless seemed reasonable--or at least not unreasonable--to suppose that they might be related to stress reactions in a similar fashion. Just as the appraisal of an inability to meet a demand is threatening, so too might the perception of a poor performance vis-a-vis the demand constitute a threat, assuming, of course, that failure to meet the demand has important consequences for the individual. In short, it was presumed that the demand-performance discrepancy score (coping index) would provide a useful, albeit crude, index of perceived threat.

Causal attribution ratings. Subjects were asked to ascribe causality for their performance to four causal categories: effort, task difficulty, ability, and luck. Each factor was rated with regard to its relative contribution or influence. Ratings were made in terms of percentages with the constraint that the percentages sum to 100% across the four categories.

Procedure

At the beginning of the second school term, students

enrolled in first and second year of the Bachelor of Nursing program were approached during a regular class meeting and asked to participate in the research project. The study was presented to first-year students as an investigation of personality variables and their relationship to cognitive and behavioural responses. No reference was made to stress reactions. Second-year students were asked to assist the researcher in the collection of normative data which was to be used in a subsequent study. Following a verbal description of the project and an outline of what their participation would entail, subjects were asked to indicate their willingness to serve as subjects by signing a consent from which was to be returned to the researcher via their class instructor. It was emphasized that participation was strictly voluntary and that they were free to withdraw from the study at any time. Two weeks after the solicitation of volunteers, the first phase of data collection began. The three distinct phases of data collection for first- and second-year students are outlined in Table 2.

Phase I. First-year and second-year students were approached at the beginning of a regular (no-test) class period and were group administered the State-Trait Anxiety Inventory (A-state), the Eysenck Personality Inventory, and the Self-Description Inventory. The STAI provided a nonstress baseline measure of state anxiety. All of the inventories were presented together in booklet form. Subjects were instructed to preserve the confidentiality

TABLE 2

Sequence of Data Collection for First-year (Experimental Group)
and Second-year (Comparison Group) Nursing Students

Group	Phase I	Phase II	Phase III
Experimental	STAI (A-state)	Personnel Test	Examination
	EPI	STAI (A-state)	STAI (A-state)
	S-DI	Demand rating scale	Demand rating scale
		Performance rating scale	Performance rating scale
		Causal attribution scale	Causal attribution scale
Comparison	STAI (A-state)	STAI (A-state)	STAI (A-state)
	EPI	S-DI	
	S-DI		

STAI = State-Trait Anxiety Inventory; EPI = Eysenck Personality Inventory;

S-DI = Self-Description Inventory

of their responses by recording only their student number, and no other form of identification, on the front page of the booklet. The timing of phase I for first- and second-year students corresponded as closely as possible.

Phase II. Four weeks after the initial data collection phase experimental subjects were approached, once again at the beginning of a regular (no-test) class meeting, and were group administered the Wonderlic Personnel Test under standardized instructions. The confidentiality of their responses was stressed. Immediately following the Personnel Test, subjects completed the State-Trait Anxiety Inventory (A-state) followed by an information sheet containing a demand rating scale, a performance rating scale, and a causal attribution scale. These materials were presented in a separate envelope which subjects were instructed not to open until they had completed the Personnel Test.

The second phase of data collection for the comparison group involved completion of the State-Trait Anxiety Inventory (A-state) and the re-administration of the Self-Description Inventory--the latter instrument was re-administered in order to assess its test-retest reliability. The instruments were administered at the beginning of a regular (no-test) class period and were timed to correspond with the second phase of data collection for the experimental group.

Phase III. The third, and last, phase of data collection for experimental subjects coincided with the

final examination in the first-year nursing course. The examination constituted a naturalistic stress condition. Prior to beginning the examination, subjects were given an envelope which contained the State-Trait Anxiety Inventory (A-state) and an attached information sheet identical to the one administered in phase II. Subjects were informed that the envelope contained two brief questionnaires which they were to answer immediately upon completing the examination.

The final phase of data collection for the comparison group was timed to correspond, as far as possible, with the final phase of data collection for experimental subjects. This phase consisted simply of the administration of the State-Trait Anxiety Inventory (A-state) at the beginning of a regular (no-test) class period.

Results

The statistical results failed to support the main interaction hypothesis and provided only partial support for the predictions related to self-esteem. Trends were observed, however, which were suggestive of an interaction between the self-esteem and extraversion variables. These latter findings together with the results of the specific hypothesis tests are presented below.

Primary statistical analyses were performed on data collected during phases I and III of the study with the final sample consisting of 56 experimental subjects. Although data collected during phase II were to be included in the analyses, only 37 first-year students completed this phase of the study. The high attrition rate appears to have resulted from absenteeism on the day of data collection; it is to be noted that attrition was not disproportionately high in any of the four experimental groups. Notwithstanding the small sample size, it was decided to conduct a modified analysis of the phase II data. The results of this secondary analysis are presented separately following a consideration of the primary statistical results.

Stressfulness of the Examination

To the extent that the present study focused on the interaction of self-esteem and extraversion under stress conditions, establishing the examination as stressful was seen as a prerequisite for any stress interpretation of the

results. Stressfulness was assessed by correlated t-tests performed on the change in mean state anxiety scores from the time of the baseline measure to the time of the final examination (Table 3). The results indicated a significant increase in anxiety for experimental subjects, $t(55) = -9.05$, $p < .001$. In contrast, second-year students showed comparable levels of anxiety across the two conditions, $t(29) = -.73$, $p < .472$. Although second-year students were generally more anxious than first-year students, as evidenced by their greater baseline anxiety scores, $t(84) = 2.19$, $p < .05$, first-year students showed significantly greater levels of anxiety than second-year students in the examination phase, $t(84) = 3.92$, $p < .001$. Taken together, these results support the contention that the substantial increase in anxiety exhibited by experimental subjects was a function of the stressfulness of the examination and not the result of extraneous variables.

In order to evaluate the central interaction hypothesis, the predictions related to self-esteem, and the relationship of self-esteem and extraversion to other variables of interest, separate two-way analyses of covariance (ANCOVA) were performed on 10 dependent measures: baseline anxiety, posttest anxiety, exam score, performance rating, demand rating, coping index, and attributions to effort, difficulty, ability, and luck. Neuroticism served as the covariate in these analyses. The inclusion of the covariate was based on Eysenck's contention that neuroticism reflects

TABLE 3
State Anxiety Means and Standard Deviations for First-year
(Experimental Group) and Second-year (Comparison Group)
Nursing Students across Three Experimental Phases

Group	<u>n</u>	Baseline		Personnel Test		Examination	
		Mean	SD	Mean	SD	Mean	SD
Experimental	56	33.46	9.67	39.20*	11.00	50.27	11.87
Comparison	30	38.27	9.75	37.16	12.07	39.70	12.00

*n = 37

emotionality or "emotional overresponsiveness", a factor which presumably would influence the magnitude of stress responses. A multivariate test for regression of parallelism of hyperplanes was nonsignificant ($F(24, 119.514) = .929, p < .563$) indicating that covariance of the neuroticism variable was appropriate.

Relationship of Self-esteem and Extraversion to State Anxiety

A two-way ANCOVA failed to support the predicted interaction effect of self-esteem and extraversion on posttest anxiety scores (Table 4). Contrary to prediction, high and low self-esteem introverts did not exhibit differential levels of anxiety under stress conditions, $F(1,51) = 1.45, p < .23$ (Table 5). In line with prediction, however, was the failure to find significant differences in anxiety for high and low self-esteem extraverts.

Although no significant interaction or main effects were obtained on the posttest anxiety variable, main effects for both self-esteem and extraversion were detected on the baseline anxiety measure. Under low threat conditions (Table 6) anxiety was lower for high self-esteem subjects than for low self-esteem subjects. Similarly, anxiety was lower for high extraversion subjects than for low extraversion subjects. These differences were significant, $F(1,51) = 6.50, p < .02$ and $F(1,51) = 4.96, p < .03$ respectively (Table 7).

TABLE 4
Means and Standard Deviations for State Anxiety and Exam Performance
of the Four Experimental Groups

Group	State Anxiety					
	Baseline		Posttest		Exam	
	Mean	SD	Mean	SD	Mean	SD
Introverts						
Low esteem	38.5	9.8	49.3	8.6	54.4	5.2
High esteem	34.7	12.4	54.5	11.9	56.0	5.8
Extraverts						
Low esteem	33.9	9.6	51.5	12.7	52.6	7.8
High esteem	28.7	4.5	48.6	13.6	53.0	5.9

TABLE 5
Analysis of Covariance - Posttest Anxiety

Source	SS	df	MS	F
Self-esteem	.6376	1	.6376	.0045
Extraversion	15.6487	1	15.6487	.1116
Interaction	203.2032	1	203.2032	1.4487
Error	7153.5201	51	140.2651	
Total	359.7546	54		

TABLE 6

Baseline Anxiety Means and Standard Deviations
for the Self-esteem and Extraversion Groups

Group	<u>n</u>	Mean	SD
Self-esteem			
High	26	31.7	9.8
Low	30	36.2	7.8
Extraversion			
High	34	31.3	7.9
Low	22	36.6	10.7

TABLE 7
Analysis of Covariance - Baseline Anxiety

Source	SS	df	MS	F
Self-esteem	443.6213	1	443.6213	6.4972**
Extraversion	338.8875	1	338.8875	4.9632*
Interaction	6.4870	1	6.4870	.0950
Error	3482.2494	51	68.2794	
Total	857.2752	54		

* $p < .03$

** $p < .02$

Relationship of Extraversion and Self-esteem to Exam Performance

The predicted interaction effect of extraversion and self-esteem on exam performance was not supported. As may be seen in Table 4, neither the introverted nor the extraverted groups differed appreciably in their final exam scores, $F(1,51) = .10$, $p < .75$ (Table 8). Although the failure to find differences in the exam performance of high and low self-esteem introverts was contrary to prediction, the absence of such differences for high and low self-esteem extraverts was in accordance with expectations.

Relationship of Personality Variables to Demand Rating

The prediction that high self-esteem individuals would rate the examination as less demanding than low self-esteem individuals was not supported; however, an interaction trend was detected (Table 9). High self-esteem introverts tended to report higher demand ratings than low self-esteem introverts while high self-esteem extraverts tended to report lower demand ratings than low self-esteem extraverts, $F(1,51) = 3.44$, $p < .07$ (Table 10).

Relationship of Personality Variables to Performance Rating

Contrary to prediction, high and low self-esteem subjects did not differ with regard to their performance ratings. A tendency toward an interaction effect between the self-esteem and extraversion variables was observed, however. As indicated in Table 9, high self-esteem introverts

TABLE 8
Analysis of Covariance - Exam Scores

Source	SS	df	MS	F
Self-esteem	1.2361	1	1.2361	.0306
Extraversion	64.7294	1	64.7294	1.6029
Interaction	4.0270	1	4.0270	.0997
Error	2059.4973	51	40.3823	
Total	110.3748	54		

TABLE 9

Means and Standard Deviations of Demand and Performance
Ratings for the Four Experimental Groups

Group	Demand		Performance	
	Mean	SD	Mean	SD
Introverts				
Low esteem	4.8	1.0	4.0	1.1
High esteem	5.5	.8	3.6	1.1
Extraverts				
Low esteem	5.4	1.2	3.6	1.1
High esteem	5.0	1.1	4.1	1.0

TABLE 10

Analysis of Covariance - Demand Rating

Source	SS	df	MS	F
Self-esteem	.0658	1	.0658	.0579
Extraversion	.1838	1	.1838	.1619
Interaction	3.9049	1	3.9049	3.4388
Error	57.9105	51	1.1355	
Total	5.2900	54		

tended to report lower performance ratings than low self-esteem introverts whereas high self-esteem extraverts showed a tendency to report higher performance ratings than their low self-esteem counterparts, $F(1,51) = 2.51, p < .12$ (Table 11).

Although high and low self-esteem subjects did not differ significantly in their performance ratings, differences were found in the accuracy of their perceived performance. For low self-esteem subjects there was a significant correlation ($r(28) = .61, p < .01$) between performance rating and exam score. These variables were uncorrelated for high self-esteem subjects ($r(24) = .14$). The difference between the two correlations was significant ($p < .05$).

Discrepancy Between Performance Rating and Demand Rating in Relation to Self-esteem and Extraversion

A significant interaction effect was obtained on the coping index variable, $F(1,51) = 4.26, p < .05$ (Table 12). As may be observed in Table 13, the combination of low self-esteem and introversion resulted in smaller discrepancy scores than the combination of high self-esteem and introversion. In contrast, low self-esteem in association with extraversion resulted in larger discrepancy scores than the combination of high self-esteem and extraversion.

TABLE 11
Analysis of Covariance - Performance Rating

Source	SS	df	MS	F
Self-esteem	.4203	1	.4203	.3584
Extraversion	.0003	1	.0003	.0003
Interaction	2.9397	1	2.9397	2.5071
Error	59.7975	51	1.1725	
Total	4.5328	54		

TABLE 12
Analysis of Covariance - Coping Index

Source	SS	df	MS	F
Self-esteem	.1535	1	.1535	.0480
Extraversion	.1996	1	.1996	.0624
Interaction	13.6208	1	13.6208	4.2615*
Error	163.0113	51	3.1963	
Total	17.1702	54		

* $p < .05$

TABLE 13
Means and Standard Deviations of Discrepancy
Scores for the Four Experimental Groups

Group	Discrepancy	
	Mean	SD
Introverts		
Low esteem	-.77	1.4
High esteem	-1.98	1.8
Extraverts		
Low esteem	-1.76	1.9
High esteem	-.85	1.9

Relationship of Extraversion and Self-esteem to Effort Attributions

Examination of the univariate tests for the four causal attribution variables indicated no significant main or interaction effects. There was, however, a tendency toward an interaction effect on the effort category. As shown in Table 14, low self-esteem introverts displayed a tendency to endorse effort attributions to a greater extent than high self-esteem introverts. In contrast, high self-esteem extraverts showed a slight tendency to ascribe greater causality to effort than low self-esteem extraverts, $F(1,51) = 2.62, p < .11$ (Table 15).

Relationship of Extraversion and Self-esteem to Patterns of Causal Attribution

In order to determine whether the pattern of causal attributions differed as a function of group membership, a profile analysis (MULTIVARIANCE VI, Finn, 1978) was conducted on the mean attributions to effort, difficulty, and ability. Dependency within the data--a result of the restriction that the causal attributions sum to 100%--necessitated the elimination of one of the causal categories in order that the statistical analysis could be performed. The category of luck was chosen for elimination on the basis that it received the lowest ratings across all four groups.

The profile analysis failed to provide support for the presence of interaction or main effects in the data. The results did indicate, however, that for the sample as a

TABLE 14

Mean Percentage Attributions and Standard Deviations of Four Causal
Attributions Involved in First-year Nursing Examination

		Effort		Difficulty		Ability		Luck	
Group	<u>n</u>	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Introverts									
Low esteem	15	29.0	24.1	26.3	15.5	37.5	17.9	7.1	5.2
High esteem	7	16.5	19.0	31.2	16.8	43.4	24.6	8.9	5.8
Extraverts									
Low esteem	15	21.4	10.7	26.1	12.7	43.7	21.9	8.8	7.8
High esteem	19	27.3	23.1	27.2	17.0	40.3	28.1	5.2	5.9

TABLE 15
Analysis of Covariance - Effort Attribution

Source	SS	df	MS	F
Self-esteem	7.0905	1	7.0905	.018
Extraversion	.3082	1	.3082	.001
Interaction	1031.5844	1	1031.5844	2.6152
Error	20117.6380	51	394.4635	
Total	1433.4466	54		

whole attributions to ability were endorsed to a significantly greater degree than attributions to effort ($\bar{M} = 40.9$ and $\bar{M} = 24.8$ respectively), $F(1,51) = 7.91$, $p < .007$. There was also a tendency for subjects as a group to view ability as a more important causal category than task difficulty ($\bar{M} = 27.2$), $F(1,51) = 3.11$, $p < .09$.

Relationship of Performance Rating and Attribution to Ability for High and Low Self-esteem Subjects

In order to test the prediction of a positive correlation between performance rating and attribution to ability for high self-esteem subjects and a negative correlation for low self-esteem subjects, separate pearson-product moment correlations were calculated between the two variables for high and low self-esteem groups. As predicted, the more favourably high self-esteem subjects rated their exam performance the more inclined they were to ascribe causality to ability, $r(24) = .42$, $p < .02$. The related prediction that low self-esteem subjects would ascribe greater causality to ability following an unfavourable performance rating than a favourable one was not supported, $r(28) = -.11$, although the correlation was in the predicted direction. The difference between the two correlations was significant ($p < .05$).

Relationship Between Set of Personality Variables and Set of Dependent Measures

The relationship between self-esteem and extraversion

on the one hand and the dependent measures on the other was assessed by a canonical correlation analysis. Two canonical correlations were calculated (BMDP6M) with the first canonical correlation, $R_{C1} = .58$, yielding a significant chi-square value of 30.93 ($df = 16$, $p < .01$). This result indicated that the first two canonical variables were significantly related. An examination of the structure coefficients, the zero-order correlations of the canonical variables with their constituent variables (Table 16), indicated that self-esteem and baseline anxiety predominated on their respective sides. At the same time, extraversion, effort attribution and ability attribution also contributed meaningfully to the correlation.

The results of the canonical correlation analysis were consistent with the earlier reported finding of significant main effects on the baseline anxiety variable. In addition, the results indicated that high self-esteem extraverts and low self-esteem introverts were distinguished from one another on the basis of their attributions to effort and ability. Specifically, high self-esteem extraverts attributed greater causality to ability than low self-esteem introverts. On the other hand, attributions to effort were endorsed to a greater degree by low self-esteem introverts than by high self-esteem extraverts.

Zero-order Correlations among Independent and Dependent Variables for Total Sample

Examination of the correlations among the independent

TABLE 16
 Structure Coefficients for the Significant Canonical
 Correlation Between the Personality Variables
 and the Dependent Measures

$R_{C1} = .58$ C	
Variable	
Personality factors	
Self-esteem	.964
Extraversion	.702
Dependent measures	
Baseline anxiety	-.884
Posttest anxiety	-.142
Demand rating	.140
Performance rating	.277
Effort attribution	-.412
Difficulty attribution	.236
Ability attribution	.370
Exam score	.068

and dependent variables (Table 17) revealed a substantial negative correlation between attributions to ability and attributions to effort ($r(54) = .70, p < .001$) suggesting that there was a tendency for subjects to view these two causal categories as mutually exclusive.

Moderate negative correlations between self-esteem and baseline anxiety ($r = -.460, p < .001$) and extraversion and baseline anxiety ($r = -.455, p < .001$) were also obtained providing further support for the notion that high levels of self-esteem and high levels of extraversion are associated with low levels of anxiety under conditions of low ego threat.

Finally, the performance rating variable was found to correlate negatively with both demand rating ($r = -.400, p < .01$) and posttest anxiety ($r = -.483, p < .001$) and to correlate positively with exam score ($r = .433, p < .01$); the more favourably subjects rated their performance, the less demanding they found the examination to be, the less anxiety they exhibited, and the better they performed on the final examination. Where discrepancy scores were calculated, relationships between the obtained coping index and posttest anxiety and exam scores were also detected; the greater the negative discrepancy between performance rating and demand rating, the higher the anxiety and the poorer the exam performance ($r = -.47, p < .001$ and $r = .41, p < .01$ respectively).

TABLE 17
Zero-order Correlations among Independent and Dependent Variables for
Total Sample^a

	Extra	SE	Anx1	Anx2	DR	PR	Eff	Diff	Abil	Exam
SE	.487***									
Anx1	-.455***	-.460***								
Anx2	.085	-.133	.179							
DR	.121	.055	-.182	.308						
PR	-.041	.213	-.055	-.483***	-.400**					
Eff	-.035	-.281*	.218	-.044	-.049	-.178				
Diff	-.032	.180	-.045	.045	.127	.052	-.296*			
Abil	.084	.232	-.219	-.024	-.027	.175	-.699***	-.395**		
Exam	-.128	.096	.069	.052	-.245	.433**	-.208	.047	.208	
Cope	-.097	.094	.076	-.472***	--	--	-.077	-.045	.121	.405**

* p < .05

^an = 56

** p < .01

*** p < .001

Extra=extraversion; SE=self-esteem; Anx1=baseline anxiety; Anx2=posttest anxiety; DR=demand rating; PR=performance rating; Eff=attributions to effort; Diff=attributions to difficulty; Abil=attributions to ability; Exam=final exam score; Cope=coping index (PR minus DR)

Phase II Data Analysis

The phase II data collected on the 37 experimental subjects who had completed all phases of the study were submitted to analysis. Separate two-way analyses of covariance (ANCOVA) were performed on eight dependent variables: posttest anxiety, demand rating, performance rating, coping index, attributions to effort, difficulty, ability, and luck. The baseline and two posttest anxiety scores for these 37 subjects were also compared. The following results obtained.

Stressfulness of the Personnel Test in Relation to Baseline and Examination Conditions

Correlated t-tests performed on the changes in state anxiety across the three experimental phases indicated a significant increase in anxiety for experimental subjects from baseline to Personnel Test condition ($\bar{M} = 32.8$, $SD = 9.6$ and $\bar{M} = 39.2$, $SD = 11.0$ respectively, $t(36) = -3.34$, $p = <.002$) and from the Personnel Test condition to the final examination ($\bar{M} = 39.2$, $SD = 11.0$ and $\bar{M} = 50.7$, $SD = 10.9$ respectively, $t(36) = -5.10$, $p = <.001$). In contrast mean state anxiety scores for second-year nursing students did not differ significantly across the three experimental phases ($\bar{M} = 38.3$, $\bar{M} = 37.2$, $\bar{M} = 39.7$). In addition to providing support for the stressfulness of the Personnel Test, the above results suggest that the two stress conditions were differentially stressful for

experimental subjects with the final examination constituting a greater stressor than the Personnel Test.

Relationship of Self-esteem and Extraversion to State Anxiety

A two-way ANCOVA performed on posttest anxiety scores indicated a significant main effect for the self-esteem variable, $F(1,32) = 5.97$, $p < .02$ (Table 18), with high self-esteem subjects exhibiting lower levels of anxiety ($M = 35.39$, $n = 18$) than low self-esteem subjects ($M = 43.49$, $n = 19$). No other main or interaction effects were detected.

Relationship of Self-esteem and Extraversion to Demand Rating, Performance Rating and Coping Index

The statistical tests failed to yield significant main or interaction effects on the demand rating, performance rating, or coping index variables. An inspection of the coping index scores indicated that all groups viewed their performance on the Personnel Test favourably with the exception of the low self-esteem extravert group for which a slight negative discrepancy score was obtained.

Relationship of Personality Variables to Causal Attributions

Separate ANCOVAs performed on the four causal attribution variables indicated no significant main or interaction effects. There was a tendency, however, toward an interaction effect on the attribution to difficulty category. As may be seen in Table 19, low self-esteem introverts were inclined to endorse difficulty attributions

TABLE 18
Analysis of Covariance - Posttest Anxiety

Source	SS	df	MS	F
Self-esteem	643.8149	1	643.8149	5.9657*
Extraversion	64.8670	1	64.8670	.6011
Interaction	8.9295	1	8.9295	.0827
Error	3453.4272	32	107.9196	
Total	825.5310	35		

* $p < .02$

TABLE 19

Mean Percentage Attributions and Standard Deviations of Four Causal
Attributions Involved in Personnel Test

		Effort		Difficulty		Ability		Luck	
Group	<u>n</u>	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Introverts									
Low esteem	9	30.0	23.9	36.9	19.4	25.1	14.8	8.0	9.5
High esteem	4	26.0	16.5	26.5	17.0	43.9	22.9	3.7	2.5
Extraverts									
Low esteem	10	31.5	20.9	21.4	11.2	38.1	27.2	9.0	10.7
High esteem	14	27.0	23.5	35.7	23.8	31.7	19.9	5.7	8.7

to a greater extent than high self-esteem introverts
whereas high self-esteem extraverts showed a tendency to
ascribe greater causality to difficulty than low self-
esteem extraverts, $F(1,32) = 3.37, p < .08$ (Table 20).

TABLE 20

Analysis of Covariance - Difficulty Attribution

Source	SS	df	MS	F
Self-esteem	217.0183	1	217.0183	.6398
Extraversion	244.2786	1	244.2786	.7202
Interaction	1142.4165	1	1142.4165	3.3680
Error	10854.3000	32	339.1969	
Total	1942.9103	35		

Discussion

The results of the present study indicate that under ego-threatening conditions self-esteem and extraversion do not interact so as to differentially affect exam performance and state anxiety. There were trends in the data, however, which suggest that interaction effects may occur in the sphere of cognitive activity. These interaction trends would seem to have some bearing on the obtained null findings. Before proceeding to a discussion of the trends and their implications for stress reactions, other factors which may have contributed to the absence of predicted main and interaction effects will be considered.

Global Versus Task-specific Self-esteem

One explanation for the failure to find interaction effects for posttest anxiety and exam performance may lie in the measure of self-esteem that was used. It may be the case that general self-esteem is unrelated to performance and anxiety in achievement situations. Shrauger (1972) found no differences in the performance of high and low self-esteem subjects on a concept-attainment task when the groups were differentiated on the basis of general self-esteem. However, between group differences were observed when a measure of task-specific self-esteem was employed. On the other hand, findings in direct opposition to Shrauger's results have also been reported. Brockner and Hulton (1978) found that general self-esteem, as measured by the

Self-Description Inventory, was related to differences in the performance of high and low self-esteem subjects whereas specific self-esteem was not. These investigators also found evidence for a relationship between level of general self-esteem and anxiety reactions.

Notwithstanding Shrauger's negative findings, the accumulating evidence seems to support a relationship between general self-esteem and stress reactions in achievement settings (Shrauger & Rosenberg, 1970; Brockner, 1979a, 1979b). It seems likely, therefore, that the null findings of the present investigation were not the result of inadequate differentiation of subjects along the self-esteem dimension, but rather, reflected the operation of other variables.

Stressfulness of the Examination

One factor which may have contributed to the absence of predicted interaction effects is the stressfulness of the examination. One might speculate that the high level of threat evoked by the examination obscured potential group differences. Some support for this position is to be found in the self-esteem data. The failure to find differences in posttest anxiety and exam performance for high and low self-esteem subjects is contrary to the results typically reported in the literature. There is a considerable body of research to suggest that high self-esteem individuals outperform low self-esteem individuals in achievement situations (Hamachek, 1971; Shrauger, 1972;

Wells & Marwell, 1977) and, in addition, report lower levels of anxiety under such conditions (Brockner & Hulton, 1978; Feld & Lewis, 1967). The failure of the present research to support these well-documented findings may lie in the high degree of threat that was experienced by high and low self-esteem subjects alike. The finding of comparable demand and performance ratings for high and low self-esteem subjects is consistent with this notion. Perhaps under conditions of high ego threat the defenses of the high self-esteem individual break down rendering them as vulnerable to stress reactions as the low self-esteem individual. Such an explanation could account for the presence of significant main effects for self-esteem on the baseline anxiety variable but not on the posttest anxiety measure. The failure to find differences in the exam performance of high and low self-esteem subjects is also consistent with a high threat hypothesis. To the extent that high self-esteem individuals were as threatened by the examination as low self-esteem individuals, any advantage normally accruing to them as a result of their typically low level of anxiety would be lost, the end result being an absence of significant between group differences in exam performance. In short, to the extent that predicted interaction effects were predicated on the existence of differential levels of anxiety for high and low self-esteem subjects, the absence of such differences would negate the predictions.

While comparable levels of threat-induced anxiety for high and low self-esteem subjects could account for the absence of predicted interaction effects, no definitive conclusions are possible on the basis of the available data. There is data at hand, however, which may shed some additional light on the issue. The data in question relate to the cognitive activity exhibited by the participants. Although these data may be viewed simply as trends, they warrant consideration insofar as they suggest interaction effects; effects which may have implications for the obtained null findings in particular and cognitive coping activity in general.

Relationship of Self-esteem and Extraversion to Cognitive Behaviour Under Conditions of Ego Threat

The pivotal role played by cognitive processes in the determination of individual response to stressful events has been well articulated by Lazarus (1966, 1977). For Lazarus, the cognitive process of appraisal underlies both threat appraisal and the coping processes employed to reduce threat. Whether an individual reacts to a potentially stressful situation with stress reactions will depend, ultimately, on whether or not, and to what degree, he perceives the situation as threatening and how effective his coping strategies are.

With respect to the present research, it has been established that the examination was perceived as threatening, as evidenced by the substantial increase in state

anxiety from baseline to the time of the posttest measure. The question remains, however: Did the groups differ in the degree to which threat was appraised and in the coping strategies employed? In addressing this two-part question, two sets of data appear relevant: demand and performance ratings and causal attributions. Before proceeding to a discussion of these data, a word or two is in order concerning the use of demand-performance discrepancy scores as an index of threat appraisal and arousal.

Discrepancy between performance rating and demand rating as a measure of threat appraisal and arousal.

Implicit in the presumption that demand-performance discrepancy scores reflect threat appraisal is the expectation that these scores should be related, in some manner, to measures of arousal; and, indeed, such is the case. It will be recalled that a significant negative correlation ($r = -.47$) was found between discrepancy scores and posttest anxiety scores; as discrepancy scores became more negative --reflecting greater disparity between perceived performance and perceived demand--posttest anxiety scores increased. This finding makes sense. To the extent that subjects had a vested interest in doing well on the examination, the perception of a poor performance might be expected to result in heightened anxiety. It should also be noted that although the four experimental groups failed to differ significantly in terms of their posttest anxiety scores, the two groups with the largest discrepancy scores did exhibit the highest

levels of posttest anxiety.

Taken together, these findings provide support for the notion that negative demand-performance discrepancy scores reflected threat appraisal with large discrepancies signalling greater threat perception and resulting tension than small discrepancies. It is this interpretation of demand-performance discrepancy scores that is incorporated into the following discussion.

Performance rating and demand rating in relation to self-esteem and extraversion. The finding of interaction trends in the performance rating and demand rating data suggests that level of self-esteem tended to differentially affect the cognitive activity of introverts and extraverts. Contrary to expectation, however, high self-esteem introverts were inclined to rate the examination as more demanding than low self-esteem introverts. Also unexpected was the tendency for high self-esteem introverts to report lower performance ratings than low self-esteem introverts. Given the high self-esteem individual's greater 'sense of competence' coupled with a characteristic defense against threats to self-esteem, one would have expected the opposite pattern to emerge. If, as the data suggest, negative demand-performance discrepancy scores are a reflection of threat appraisal and concomitant arousal, then these findings would seem to indicate that high self-esteem introverts were more threatened by the examination than low self-esteem introverts. Why the typical threat-reducing cognitive

defenses of the high self-esteem individual were not in evidence for high self-esteem introverts is difficult to explain. Equally puzzling is the finding of cognitive behaviour typical of high self-esteem individuals among low self-esteem introverts; indeed, the demand and performance ratings of the low self-esteem introvert group were highly similar to those of the high self-esteem extravert group as were the posttest anxiety scores.

One can only speculate as to the processes underlying these results. It appears, however, that high ego threat may have activated cognitive coping behaviour in the low self-esteem introvert group while undermining the cognitive defenses of the high self-esteem introvert group. This could account for the absence of predicted group differences in posttest anxiety. Specifically, the lowering of high pretask anxiety levels in the low self-esteem introvert and the raising of comparatively low pretask anxiety levels in the high self-esteem introvert would serve to cancel out the expected differences. In the absence of pretask measures of anxiety there is, of course, no way of knowing whether posttest anxiety was elevated or reduced relative to pretask levels. In consequence, a clear picture of the relationship between observed cognitive behaviour patterns and stress reactions is unobtainable.

In contrast to the findings for the high and low self-esteem introvert groups, the data for the two extravert groups were in line with expectations. First, the

differences between demand and performance ratings were in the predicted direction with low self-esteem subjects tending to report higher demand ratings and lower performance ratings relative to high self-esteem subjects. Furthermore, and perhaps more important, the low self-esteem extraverts' appraisal of a greater demand-performance discrepancy relative to high self-esteem extraverts, did not translate into significant differences in posttest anxiety and exam performance. This finding is entirely consistent with the extravert's lower arousability level. To the extent that tension is experienced positively by these individuals, one would not anticipate large negative arousal scores.

Although a negative discrepancy between demand and performance ratings may serve as an index of perceived threat, discrepancy scores are not, in and of themselves, sufficient to explain stress reactions. It will be recalled that the individual's interpretation of a poor performance figures prominently in the final emotional response. By attributing failure to such factors as task difficulty, luck, or lack of effort, the individual may reduce negative emotional arousal. On the other hand, anxiety reactions may be increased by attributing failure to a lack of ability.

Implicit in the foregoing is the notion that causal attributions, like demand and performance ratings, may serve a defensive function. It is of interest, therefore, to consider the causal attributions of the present sample

with an eye to determining whether or not the groups differed in their causal attribution patterns and whether the observed patterns were related to level of anxiety.

Causal attribution patterns in relation to self-esteem and extraversion. Differences in the attributional tendencies of high and low self-esteem individuals following success and failure have been well documented (Burke, 1978). Briefly, high self-esteem individuals have been found to attribute failure to a lack of effort while attributing success to ability and effort. In contrast, low self-esteem individuals are inclined to attribute failure to a lack of ability while viewing success as the result of effort. These research findings provide a framework within which to view the causal attribution data of the present sample.

In considering the attributional tendencies of the four experimental groups, one is struck by the overall similarity in attributional patterns. The high percentage attributions to ability which obtained for all groups is particularly noteworthy. Considering the role that causal attributions have been found to play in protecting the high self-esteem individual from threats to self-esteem, one would not have expected this finding to obtain for high self-esteem introverts. In light of their relatively high demand-performance discrepancy scores, one would have anticipated high percentage attributions to effort rather than to ability and task difficulty. It has already been suggested that this group may have suffered a breakdown in the cognitive

processes which normally protect the high self-esteem individual from perceiving threats to self-esteem. The causal attribution data suggest that this breakdown may have extended to the cognitive coping defenses which serve to reduce arousal in the wake of perceived threat.

The absence of an arousal-reducing causal attribution pattern in low self-esteem extraverts is consistent with expectations. To the extent that extraverts show a preference for arousal, one would not expect the activation of arousal-reducing defenses in response to a perceived demand-performance discrepancy. In their absence, high percentage attributions to ability should, and did, occur in keeping with the low self-esteem individual's tendency to attribute a poor performance to a lack of ability.

Turning to the attributional data for the remaining two groups, one also finds patterns in line with expectations. In their tendency to see effort as an important causal category, low self-esteem introverts display a causal attribution pattern similar to that typically observed among low self-esteem individuals following success. Similarly, the tendency for high self-esteem extraverts to ascribe high percentage attributions to ability and effort reflects the attributional pattern frequently observed among high self-esteem individuals following success. It is to be noted that the results of the canonical correlation analysis support and strengthen the trends hinted at in the causal attribution data. It will be recalled that low

self-esteem and introversion were associated with high attributions to effort, whereas high self-esteem and extraversion were associated with high attributions to ability.

In summary, the observed causal attribution patterns suggest that low self-esteem introverts and high self-esteem extraverts tended to view their performances as more successful than unsuccessful while high self-esteem introverts and low self-esteem extraverts tended to view their performances in a decidedly more negative light. These conclusions parallel those drawn earlier on the basis of the demand-performance discrepancy scores. The correspondence between these two independently derived conclusions lends added weight to the validity of the interpretations.

As mentioned previously, the causal attribution pattern of the high self-esteem introvert group was inconsistent with the pattern typically observed among high self-esteem individuals following ego threat. Rather, it resembled the attribution pattern of the low self-esteem individual following failure. One possible explanation for what appears to be a breakdown in the typical cognitive coping style of the high self-esteem individual involves the notion of defensive self-esteem. Schneider and Turkat (1978) have distinguished between genuine and defensive high self-esteem individuals, the latter being distinguished from the former by their strong need for social approval. These authors suggest that people with a high need for approval might

report high self-esteem in order to defend against possible social derogation. To the extent that high self-esteem is just a protective façade, it is conceivable that under sufficiently high levels of ego threat the protective defenses might break down revealing cognitive defensive patterns more akin to those of the low self-esteem individual. Of course, in the absence of a measure of 'need for social approval', such an explanation must remain purely conjectural.

Before leaving the discussion of causal attributions, brief mention should be made of the attributional patterns observed in the Personnel Test condition. While a full-scale comparison of these patterns with those observed in the examination condition is not warranted, given the small sample size on which the phase II results are based, it is worth noting that the attributional patterns tended to differ across the two conditions. Specifically, there appeared to be a shift toward effort attributions for high self-esteem introverts and low self-esteem extraverts in the Personnel Test condition, and a shift away from ability attributions and toward difficulty attributions for low self-esteem introverts and high self-esteem extraverts. To the extent that all groups reported lower demand ratings and higher performance ratings in the Personnel Test condition than in the examination condition, these apparent shifts in attributional tendencies may be related to differences in level of perceived threat. It is also

conceivable that they reflect differences in the type of stressor. Perhaps success or failure on an intelligence test leads to different causal attribution patterns than perceived success or failure on an examination. In this regard, it is to be noted that both the low self-esteem introvert and high self-esteem extravert groups tended to ascribe high percentage attributions to difficulty following perceived success on the Personnel Test; attributions to effort and ability would have been expected on the basis of previous research findings. What these observations would seem to suggest is that causal attribution patterns may vary, not only as a function of level of self-esteem and perceived success or failure, but also as a function of kind, and degree, of threat. This is an area of research clearly in need of further exploration.

The Role of Self-esteem as a Mediator of Stress Reactions

Earlier in the discussion the absence of a significant main effect for self-esteem on posttest anxiety scores was offered as a possible explanation for the failure to obtain predicted interaction effects. This unexpected finding warrants further consideration in its own right. Not only does it contradict a substantial body of literature, it also goes against the intuitive notion that high self-esteem individuals should be less reactive to stress than low self-esteem individuals.

In attempting to account for the comparable levels of anxiety exhibited by high and low self-esteem subjects in

the examination condition, it is instructive to consider the results obtained in phase II of the study. It will be recalled that a significant main effect for self-esteem was obtained on the state anxiety scores following the administration of the Personnel Test. Specifically, high self-esteem subjects reported lower levels of anxiety than low self-esteem subjects, a finding consistent with previous research results. The question to be addressed is why differences emerged in one condition but not the other. The answer to this question may well lie in the differences between the two stress conditions.

It was previously established that the two ego-threat conditions were perceived as differentially stressful, with the examination constituting a greater threat than the Personnel Test. This is not surprising. After all, one would expect an individual to have a greater personal investment in the outcome of an important final examination than in the outcome of an intelligence test administered as part of a psychological experiment. The distinction here is one of experimentally-induced threat versus naturally occurring threat. It has long been recognized that laboratory experiments can, at best, only approximate the levels of threat arising out of naturally stressful events. The results of the present study would seem to underscore this point. More important, the results suggest the need for a closer look at the research evidence linking level of self-esteem and stress responses.

Although most self-esteem research has indicated a superior coping capability among high self-esteem individuals, the majority of this research has centred around experimentally-induced threat. The present results suggest that such experimental manipulations may engender relatively low levels of threat. If this is so, then the conclusion to be drawn from earlier research is that high self-esteem individuals are better copers than low self-esteem individuals under conditions of relatively low threat. The question remains: Do they demonstrate superior coping ability under conditions of high threat? At present, this question has not been adequately addressed. Based on the current findings, however, one would have to conclude that under at least some conditions of high threat apparently they do not. It remains the task of future research to specify the precise conditions under which level of self-esteem will serve a mediating role in stress reactions and under which conditions it will not.

Conclusions

The results of the present study suggest some tentative conclusions concerning the relationship of self-esteem and extraversion to stress reaction. First, and perhaps foremost, is the conclusion that self-esteem and extraversion may interact, under conditions of ego threat, to differentially affect the cognitive behaviour underlying threat appraisal and other coping processes. It would appear that

high self-esteem introverts may be particularly susceptible to the disruptive effects of ego threat on cognitive coping behaviour. Under ego-threatening conditions, the cognitive self-protective defenses of these high self-esteem individuals may break down leaving them vulnerable to stress reactions. Although in the present study there were no significant differences between groups on the two stress measures (posttest anxiety and exam performance) to indicate that high self-esteem introverts were more stressed than the other three groups, it is to be noted that high self-esteem introverts did report the highest level of posttest anxiety and did obtain the highest exam score. While the latter finding is contrary to the prediction of performance disruption in reaction to stress, it is consistent with drive theory. To the extent that high self-esteem introverts were well prepared for the examination --a reasonable assumption given its importance--high levels of anxiety would be expected to facilitate rather than inhibit exam performance. On a more novel task--one not admitting of advance preparation--performance decrements would be expected.

A second conclusion, which follows from the first, is that low self-esteem introverts are relatively better defended against ego threat than high self-esteem introverts. In addition to cognitive defenses, which may serve to moderate threat appraisal, low self-esteem introverts appear to be bolstered by an extra ability not possessed by their

high self-esteem counterparts. In this study, as in others (Brockner & Hulton, 1978), low self-esteem individuals were found to perceive their actual performance more accurately than high self-esteem individuals. The ability to gauge their performance would seem to provide the low self-esteem introverts with a potential advantage. Insofar as these individuals are able to accurately perceive a successful performance, one would not expect them to manifest stress reactions in all ego-threatening situations. It may be the case that this factor was operating in the present study to reduce the anxiety of the low self-esteem introverts. In other words, the demand and performance ratings may not have been a reflection of defensive activity, as previously suggested, but rather, may have reflected an accurate appraisal of performance. It is to be noted that this group did perform on a par with the other experimental groups and, thus, their appraisal of a successful performance appears justified. Perhaps, under conditions of perceived failure, the seemingly defensive cognitive behaviour of the low self-esteem introverts would disappear along with their relatively low levels of anxiety.

A third conclusion arising from the study is that, in general, extraverts are better defended against stress reactions than introverts. For the high self-esteem extravert cognitive defenses protect against threats to self-esteem. Where low self-esteem results in relatively high threat appraisal, constitutional factors, specifically, the

extravert's low arousability level, appear to reduce stress reactions. Introverts, on the other hand, being predisposed to high arousal, are more dependent on the effectiveness of cognitive defenses. In this respect, they may be thought of as more vulnerable to stress reactions. As already indicated, the degree of vulnerability would seem to depend, in large measure, on the introvert's level of self-esteem.

A fourth conclusion, which follows from the previous three, is that a consideration of both the self-esteem and extraversion variables may prove useful when it comes to stress analysis. To assume that high levels of self-esteem will necessarily protect the individual against ego threat, and subsequent stress reactions, is unwarranted, as is the assumption that low self-esteem individuals will necessarily be at a disadvantage, relative to high self-esteem individuals, in ego-threatening situations. The present results suggest that the qualification of these assumptions in terms of the extraversion dimension may lead to more accurate prediction of stress responses. This is not to say that knowledge of a person's standing on the self-esteem and extraversion dimensions is sufficient to predict stress reactions. There is no question that other factors--environmental and psychological--contribute to the individual's response to ego threat. Some of these factors have already been suggested. Their clarification, and the specification of others, remains a task for future research.

Clearly, the present research raises more questions

than answers. With this in mind, some specific suggestions are offered as to how future research could clarify and extend the current findings.

First, future studies must include a pretask measure of anxiety. This information is essential if changes in anxiety from pretask to posttask condition are to be assessed. Without a knowledge of the direction, and degree, of such change, no definitive conclusions may be drawn concerning the relationship of self-esteem and extraversion to stress reaction.

Second, the inclusion of pretask demand and performance expectancy ratings is also recommended. This would permit an evaluation of cognitive reappraisal, a defensive strategy aimed at reducing negative arousal. It would be of particular interest to consider the pretask demand and performance expectancy ratings of the high and low self-esteem introvert groups. Perhaps under these conditions the typical cognitive defenses of high and low self-esteem individuals would emerge. If this were the case, then changes in the level of threat appraisal from pretask to posttask condition would have important implications for the coping ability or stress resistance of these two groups.

Third, the introduction of different levels of stress into future research designs is also highly desirable. The specific question to be addressed is whether self-esteem and extraversion interact differentially as a function of different stress levels. The answer to this question

could contribute meaningfully toward a major goal of stress research, namely, the prediction of which individuals will be adversely affected by which stressful situations.

Fourth, a measure of defensive self-esteem should be included in subsequent research. It would be of interest to compare the cognitive coping behaviour of the defensive self-esteem individual with that of the genuine self-esteem individual. Such a comparison could help to clarify the implications that a confounding of these two variables would have for stress reactions.

Finally, future stress research could benefit from a change in strategy. Lazarus (1977) has written that "the best strategy for ...research on the cognitive mediators of emotion and coping is idiographic and naturalistic" (p. 158). While the present investigation centred around a naturalistic stress condition the study was normative in nature and limited in scope. There remains a pressing need to study individuals on a continuing basis as they struggle to cope with day-to-day environmental demands. This would allow for the full complexity of stress reactions within the total context of the individual and his environment. Such an approach may well be a prerequisite for meaningful advancements in stress research.

Appendices

Appendix A: Personality Inventories

NOTICE/AVIS

PREVIOUSLY COPYRIGHTED MATERIAL
LES DOCUMENTS ENCORE SOUS L'EFFET
DES DROITS D'AUTEUR

Appendix A

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NOT MICROFILMED/N'ONT PAS ETE MICROFILMES

EYSENCK PERSONALITY

INVENTORY FORM B

1963 EDUCATIONAL AND

INDUSTRIAL TESTING SERVICE

Box 7234, SAN DIEGO, CALIFORNIA

92107

EYSENCK PERSONALITY INVENTORY

FORM B

By **H. J. Eysenck**
and **Sybil B. G. Eysenck**

Name_____ Age_____ Sex_____

Grade or Occupation_____ Date_____

School or Firm_____ Marital Status_____

INSTRUCTIONS

Here are some questions regarding the way you behave, feel and act. After each question is a space for answering "Yes," or "No."

Try and decide whether "Yes," or "No" represents your usual way of acting or feeling. Then blacken in the space under the column headed "Yes" or "No."

Work quickly, and don't spend too much time over any question; we want your first reaction, not a long drawn-out thought process. The whole questionnaire shouldn't take more than a few minutes. Be sure not to omit any questions. Now turn the page over and go ahead. Work quickly, and remember to answer every question. There are no right or wrong answers, and this isn't a test of intelligence or ability, but simply a measure of the way you behave.

Section of Answer Column Correctly Marked	
Yes	No
<input checked="" type="checkbox"/>	<input type="checkbox"/>
Yes	No
<input type="checkbox"/>	<input checked="" type="checkbox"/>

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PRINTED IN U. S. A.

- | | | | |
|-----|---|-----------------|----------------|
| 1. | Do you like plenty of excitement and bustle around you? | Yes
::
:: | No
::
:: |
| 2. | Have you often got a restless feeling that you want something but do not know what? . . | Yes
::
:: | No
::
:: |
| 3. | Do you nearly always have a "ready answer" when people talk to you? | Yes
::
:: | No
::
:: |
| 4. | Do you sometimes feel happy, sometimes sad, without any real reason? | Yes
::
:: | No
::
:: |
| 5. | Do you usually stay in the background at parties and "get-togethers"? | Yes
::
:: | No
::
:: |
| 6. | As a child did you always do as you were told immediately and without grumbling? . . . | Yes
::
:: | No
::
:: |
| 7. | Do you sometimes sulk? | Yes
::
:: | No
::
:: |
| 8. | When you are drawn into a quarrel, do you prefer to "have it out" to being silent hoping things will blow over? | Yes
::
:: | No
::
:: |
| 9. | Are you moody? | Yes
::
:: | No
::
:: |
| 10. | Do you like mixing with people? | Yes
::
:: | No
::
:: |
| 11. | Have you often lost sleep over your worries? | Yes
::
:: | No
::
:: |
| 12. | Do you sometimes get cross? | Yes
::
:: | No
::
:: |
| 13. | Would you call yourself happy-go-lucky? . . . | Yes
::
:: | No
::
:: |
| 14. | Do you often make up your mind too late? . . | Yes
::
:: | No
::
:: |
| 15. | Do you like working alone? | Yes
::
:: | No
::
:: |
| 16. | Have you often felt listless and tired for no good reason? | Yes
::
:: | No
::
:: |
| 17. | Are you rather lively? | Yes
::
:: | No
::
:: |
| 18. | Do you sometimes laugh at a dirty joke? . . | Yes
::
:: | No
::
:: |

- | | | | |
|-----|--|-----------------|----------------|
| 19. | Do you often feel "fed-up"? | Yes
::
:: | No
::
:: |
| 20. | Do you feel uncomfortable in anything but
everyday clothes? | Yes
::
:: | No
::
:: |
| 21. | Does your mind often wander when you are
trying to attend closely to something? . . . | Yes
::
:: | No
::
:: |
| 22. | Can you put your thoughts into words quickly? | Yes
::
:: | No
::
:: |
| 23. | Are you often "lost in thought"? | Yes
::
:: | No
::
:: |
| 24. | Are you completely free from prejudices of
any kind? | Yes
::
:: | No
::
:: |
| 25. | Do you like practical jokes? | Yes
::
:: | No
::
:: |
| 26. | Do you often think of your past? | Yes
::
:: | No
::
:: |
| 27. | Do you very much like good food? | Yes
::
:: | No
::
:: |
| 28. | When you get annoyed do you need someone
friendly to talk to about it? | Yes
::
:: | No
::
:: |
| 29. | Do you mind selling things or asking people
for money for some good cause? | Yes
::
:: | No
::
:: |
| 30. | Do you sometimes boast a little? | Yes
::
:: | No
::
:: |
| 31. | Are you touchy about some things? | Yes
::
:: | No
::
:: |
| 32. | Would you rather be at home on your own than
go to a boring party? | Yes
::
:: | No
::
:: |
| 33. | Do you sometimes get so restless that you
cannot sit long in a chair? | Yes
::
:: | No
::
:: |
| 34. | Do you like planning things carefully, well
ahead of time? | Yes
::
:: | No
::
:: |
| 35. | Do you have dizzy spells? | Yes
::
:: | No
::
:: |
| 36. | Do you always answer a personal letter as
soon as you can after you have read it? . . | Yes
::
:: | No
::
:: |

- | | | | |
|-----|---|-----------------|----------------|
| 37. | Can you usually do things better by
figuring them out alone than by talking
to others about it? | Yes
::
:: | No
::
:: |
| 38. | Do you ever get short of breath without
having done heavy work? | Yes
::
:: | No
::
:: |
| 39. | Are you an easy-going person, not generally
bothered about having everything "just-so"? | Yes
::
:: | No
::
:: |
| 40. | Do you suffer from "nerves"? | Yes
::
:: | No
::
:: |
| 41. | Would you rather plan things than do things? | Yes
::
:: | No
::
:: |
| 42. | Do you sometimes put off until tomorrow
what you ought to do today? | Yes
::
:: | No
::
:: |
| 43. | Do you get nervous in places like elevators,
trains or tunnels? | Yes
::
:: | No
::
:: |
| 44. | When you make new friends, is it usually
you who makes the first move, or does the
inviting? | Yes
::
:: | No
::
:: |
| 45. | Do you get very bad headaches? | Yes
::
:: | No
::
:: |
| 46. | Do you generally feel that things will sort
themselves out and come right in the end
Somehow? | Yes
::
:: | No
::
:: |
| 47. | Do you find it hard to fall asleep at
bedtime? | Yes
::
:: | No
::
:: |
| 48. | Have you sometimes told lies in your life? . | Yes
::
:: | No
::
:: |
| 49. | Do you sometimes say the first thing that
comes into your head? | Yes
::
:: | No
::
:: |
| 50. | Do you worry too long after an embarrassing
experience? | Yes
::
:: | No
::
:: |
| 51. | Do you usually keep "yourself to yourself"
except with very close friends? | Yes
::
:: | No
::
:: |
| 52. | Do you often get into a jam because you do
things without thinking? | Yes
::
:: | No
::
:: |
| 53. | Do you like cracking jokes and telling funny
stories to your friends? | Yes
::
:: | No
::
:: |

- | | | | |
|-----|--|-----|----|
| 54. | Would you rather win, than lose a game? . . . | Yes | No |
| | | ⋮ | ⋮ |
| 55. | Do you often feel self-conscious when you
are with superiors? | Yes | No |
| | | ⋮ | ⋮ |
| 56. | When the odds are against you, do you still
usually think it worth taking a chance? . . . | Yes | No |
| | | ⋮ | ⋮ |
| 57. | Do you often get "butterflies in your
stomach" before an important occasion? . . . | Yes | No |
| | | ⋮ | ⋮ |

PLEASE CHECK TO SEE THAT YOU HAVE ANSWERED ALL THE QUESTIONS.

Self-Description Inventory

The following questions ask you to assess your competence in various areas of performance. Indicate your responses to the following questions in the blank to the left of each question. Just give a number from 0 to 100 that shows how you feel about your ability. Zero would be "never" and a hundred would be "all the time". You can pick any number you want, just so it is closest to how you feel.

It is important that you try to answer each item frankly and honestly. Please read each question carefully and try to answer all items.

_____ When you try some new sport or physical activity, what percent of the time do you feel you have not mastered the skill as well as the average person?

_____ When you face new situations which require fast decisions, what percent of the time can you make them effectively?

_____ When you try to reach important goals of any kind, what percent of the time do you feel you have really succeeded?

_____ When you are required to direct the activities of others, in what percent of the cases can you feel that you fail to receive the cooperation and respect of those directed?

_____ When you are attempting to get someone of the same sex to form a favorable impression of you, what percent of the time do you think you are unsuccessful?

_____ What percent of people of your own age and sex have a more pleasing personal appearance than you?

_____ In situations where it is necessary for you to speed up your performance in order to meet a deadline, in what percent of the cases can you do so without sacrificing the quality of your work?

_____ When you enter a new college course, what percent of the time do you feel uncertain that you will do as well as the average student?

_____ When doing things that interest you most, what percent of the time are you satisfied with your performance?

continued on next page

When you are part of group activities, what percent of the time do your ideas and opinions influence the group?

When put in a situation which is new and unfamiliar, what percent of the time do you feel you are not able to function adequately?

When you have to take the initiative and act independently of others, what percent of the time can you handle things on your own?

When meeting new people for the first time, what percent of the time are you able to impress them favorably and form good relations?

When others trust and depend on you for something, what percent of the time can you live up to this?

When you are attempting to get someone of the opposite sex to form a favorable impression of you, what percent of the time do you think you are unsuccessful?

When wise, careful judgment is needed about something, what percent of the time do you make sound judgments?

Appendix B: Questionnaires

Self-Evaluation Questionnaire

Developed by C.D. Spielberger, R.L. Gorsuch and R. Lushene

STAI FORM X-1

NAME _____ DATE _____

DIRECTIONS: A number of statements which people have used to describe themselves are given below. Read each statement and then circle the appropriate number to the right of the statement to indicate how you feel right now, that is, at this moment. There are no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to describe your present feelings best.

	not at all	somewhat	moderately so	very much so
1. I feel calm.	1	2	3	4
2. I feel secure.	1	2	3	4
3. I am tense	1	2	3	4
4. I am regretful	1	2	3	4
5. I feel at ease	1	2	3	4
6. I feel upset	1	2	3	4
7. I am presently worrying over possible misfortunes.	1	2	3	4
8. I feel rested.	1	2	3	4
9. I feel anxious	1	2	3	4
10. I feel comfortable	1	2	3	4
11. I feel self-confident.	1	2	3	4
12. I feel nervous	1	2	3	4
13. I am jittery	1	2	3	4
14. I feel "high strung"	1	2	3	4
15. I am relaxed	1	2	3	4
16. I feel content	1	2	3	4

continued on next page

- | | | | | | |
|-----|--|---|---|---|---|
| 17. | I am worried | 1 | 2 | 3 | 4 |
| 18. | I feel over-excited and "rattled". . . . | 1 | 2 | 3 | 4 |
| 19. | I feel joyful. | 1 | 2 | 3 | 4 |
| 20. | I feel pleasant. | 1 | 2 | 3 | 4 |

INFORMATION SHEET

- 1) How demanding did you find the test to be? Place an X in the appropriate box.

Not at all
demanding

1	2	3	4	5	6	7	

Very
demanding

- 2) How well do you think you performed on the test?

Very
poorly

1	2	3	4	5	6	7	

Very
well

- 3) Indicate the relative contribution or influence you think each of the following 4 factors had on your performance. Please make your estimate in terms of percentages. You can assign any value you like to each category so long as they all add up to 100%. In other words, if you assign a value of 50% to one factor and 50% to another, then each of the remaining two factors must be assigned a value of 0%.

YOUR TRYING
OR NOT TRYING
ON THE TEST

THE EASINESS
OR HARDNESS
OF THE TEST

YOUR ABILITY
OR INABILITY
FOR THE TEST

GOOD LUCK
OR BAD LUCK
FOR THE TEST

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