PREDICTING STRESS IN INTENSIVE CARE NURSES

DISSERTATION

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BY

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The problem of this study was to determine whether or not the variables locus of control, perceived anxiety, anxiety proneness, nursing experience and intensive care experience were better than chance predictors of job stress in intensive care nurses.

The study was conducted using 200 volunteer nurses (RN's) who worked in the Intensive Care Units of two major hospitals in a large metropolitan area. All subjects were administered Spielberger's State-Trait Anxiety Inventory, Rotter Internal-External Locus of Control Scale and the Nursing Stress Scale as well as a demographic questionnaire.

Multiple Regression Analysis was used to determine the predictive value of the characteristic variables to job stress and to determine the most efficient predictive model possible using these variables.

The results of the analysis indicate a relationship between the variables ICU experience and perceived anxiety and job stress. The findings indicate that as ICU experience increases, stress scores tend to decrease, while as perceived anxiety scores increased, stress scores also increased. The
most efficient overall predictive model was the one containing the variables perceived anxiety, anxiety proneness and the multiplicative combination of perceived anxiety and anxiety proneness. The variables nursing experience and locus of control were not found to be significantly related to job stress.
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PREDICTING STRESS IN INTENSIVE CARE NURSES

One of the current and growing concerns in the nursing profession is the issue of job stress. A study conducted in Tennessee by the National Institute for Occupational Safety and Health (1978) found that health care professionals such as nurses are involved in jobs that produce excessive stress; in fact, out of 130 surveyed occupations, registered nurses ranked 27th. Professional nurses who work in intensive care units experience continuing high degrees of stress because of the demanding nature of the specialty area. According to published reports (1982), geographical shortages of nurses in 1982 ranged between 15.5 percent and 20 percent, with hospitals reporting that the intensive care units were the single largest under-staffed specialty area with a 27 percent shortage.

as the most vulnerable population at risk for developing professional and emotional burnout due to stress.

Stress as a concept presents an immediate problem, that of definition. Stress can be sensibly defined, according to Cox (1978) only as a perceptual phenomenon that arises from a comparison between the demand on the person and the ability to cope. An imbalance in this comparison gives rise to stressful experience and to the stress response, which attempts to cope with the source of stress. Coping is both psychological (involving cognitive and behavioral strategies) and physiological. If normal coping is ineffective, stress is prolonged and abnormal responses may occur. The occurrence of these abnormal responses, and prolonged exposure to stress per se, may give rise to functional and structural damage. The progress of these events is subject to great individual variation.

Cox (1978), Hartl (1979), Seyle (1974) and others believe that stress is a personal experience, a physical and emotional phenomenon. When there is too much stress or too much stress for too long, problems relating to stress became apparent in the nature of physical and psychological responses that allow the human system to cope with the excessive stress. Seyle (1974) believes that physiological stress response does not depend on the nature of the stressor nor, within reason, on the species in which
it is evoked. The response syndrome represents a universal pattern of defense reactions serving to protect individuals and preserve their integrity.

Lazarus (1978) has defined stress as "any event in which environmental or internal demands (or both) tax or exceed the adaptation resources of an individual." The transaction is mediated, according to Lazarus, by the individual's cognitive appraisal of the situation. Whether the transaction is appraised as one of harm, threat or challenge depends upon the perception of the individual. This means that although the environment or situation is important, the individual's appraisal of the situation is equally important.

The individual's perception of the significance and impact of life events are clearly tempered by the uniqueness of his or her nature and environmental experiences (Masuda and Holmes 1978). Wolf and Geogell (1968) believe that stress arising from a situation is based largely on the way the subject perceives it; this perception depends on many factors, genetic equipment, basic individual needs, early conditioning influences, life experiences and cultural pressures.

Lazarus (1966) believes two factors exert significant influence over a person's perception of threat in potential stressful situations. One factor is the person's belief about his or her capacity to encounter or avoid threat in
that situation, in other words the person's belief about
his or her control over the potential threat. The second
influence on the perception of threat is a person's general
belief about his or her control of the environment.
Specifically, if a person generally believes he or she lacks
control (or is helpless) this should increase the perception
of threat, while the general belief that he or she has
control should decrease the perception of threat.

A review of the literature on job stress by Newman and
Beehr (1978) noted that causes of job stress can be found
both in the person and within the person's environment.
Appley and Turmball (1977) believe that the degree and
extent to which stress is experienced can be influenced by
the nature of the stressor(s) as well as by the individual's
perceptions and social interactions. They point out that
the behavior of individuals facing stressors can be
influenced by other individuals as well as the social and
cultural milieu of the setting.

Bailey, Steffen & Grout (1980), from their survey of
1800 ICU nurses, found that the three categories which
produce the greatest job stress for nurses are (a) management
of the unit, (b) interpersonal relationships, and (c) patient
care. Paradoxically, patient care, knowledge and skills,
and interpersonal relationships were found to provide the
most satisfaction for the same population. Bailey and others
consider these findings important since they point out that
the perception of the individual is the key to the identification of stress.

A similar finding is reported by Cassen and Hackett (1975), who note that the greatest source of difficulty and satisfaction for the ICU nurses surveyed is caring for desperately ill patients. These findings appear to support the assumption that the cause of stress can be found both within the person and the environment. Evidence that there is a relationship between perception, anxiety, control and stress may be found in the literature.

Houston (1972) reported on the role of perception as it relates to stress and anxiety. He found that when subjects had no control over a threatening, stressful situation, they experienced increased anxiety. The reverse was found in those subjects who were given control and who perceived their degree of control to be consistent with their perceived ability to assume control. These findings suggest that an individual's sense of control over the environment is linked to his or her levels of anxiety and stress.

Wennerholm and Zarle (1976) hypothesized that extremely internally controlled or extremely externally controlled individuals would experience a greater incidence of stress-related disorders than individuals with a moderate level of internal or external control. The researchers found that those individuals who were extremely externally controlled...
experienced more anxiety than others, while those who were extremely internally controlled experienced more physical disorders.

Sarason & Johnson (1978) suggested the importance of moderator variables in a study of the relationship among life change and measured of anxiety and depression as a function of locus of control. A positive relationship was found between negative change and depression and anxiety for externally oriented subjects but not for internals.

**Problem**

The literature clearly indicates that stress is a multifaceted problem and that nurses working in the intensive care unit are highly susceptible to it. The shortage of nurses on these units experienced during this past year attests to the need to identify these nurses most susceptible to stress and begin to formulate intervention strategies to reduce it. This study, therefore, investigated some of the factors that may be related to job stress experienced by nurses who work in intensive care units. The purposes of this study were (1) to determine whether or not locus of control, perceived anxiety, anxiety proneness, nursing experience and ICU experience are better than chance predictors of ICU nurses job stress and (2) to provide some direction as to the possible determinants which may be addressed in providing job stress intervention strategies.
Limitations

All of the subjects included in this study were registered nurses working in the intensive care units of two large hospitals in a metropolitan area of north central Texas. In addition, all of the subjects were voluntarily participating.

Assumptions

It was assumed that intensive care units in large (500 bed or larger) hospitals are equipped in the same manner and that the nurses serving in the ICUs are a relatively homogeneous group; and that the patient population is relatively homogeneous, that is, critically ill, requiring constant supervision and care. In addition, it is assumed that the instruments are sufficiently valid for this study.

Review of Related Literature

The review of the literature which is related to the present investigation is presented in two categories; (1) Role Stress, as it relates to individual nurse's perceptions and (2) Anxiety, Locus of Control and Stress.

Role Stress

From an organizational perspective, a role is a set of expectations applied to the incumbent of a particular position by both the incumbent and role senders within and beyond the organizations' boundaries (Brief, Van Sell, Aldag, Melone 1979). Individuals required to play roles that conflict with their value system, or to play two or
more roles that conflict with each other are said to experience a form of role stress labeled role conflict. An additional form of role stress, role ambiguity, occurs when individuals confront single or multiple roles that are not clearly articulated in terms of behavior or expected performance levels (Briddle 1979).

In role-theory terms, the student nurse is socialized to expect that his or her role as a practicing nurse will include a variety of professionally valued task demands such as patient instruction and counseling and the planning and coordination of patient care (Brief, Van Snell, Aldag and Melone 1979). The difference between the nurse's anticipatory definition of his or her role and the hospital's definition leads to the nurses experiencing anxiety and stress.

Storlie (1979), a nursing leader who wrote on stress and burnout, describes burnout as an insidious process with an etiology which is difficult to trace. Burnout requires a susceptible host—that host being the high idealist nurse. For many it begins in nursing school.

Kramer (1974) notes that in many young nurses, the discrepancy between what they learn in school and what is actually practiced in the work setting results in "professional bureaucratic work conflict" (1974 p. 3). She says this conflict results in "reality shock" wherein the new graduate may experience rejection of the new surroundings or profession and, most assuredly, stress.
The view of role expectation and its relationship to stress is further supported by Puetz (1981) who notes that nurses may have self-expectations that are unrealistic in view of the role expectations within a given employment setting. The ambiguity of the role perception for the nurse and others leads to anxiety, loss of control and increasing stress for the nurse.

Nowhere is the role conflict more apparent than in the intensive care unit, says Baxter (1975). Intensive care nurses have a high degree of responsibility for interpreting changing vital signs and even more for instituting emergency treatment. This latter role is directly contradictory to most nurses' training during which a physician directs all treatment.

Hay and Oken (1972) further make note of a frequent paradox occurring in the ICU:

Nowhere more than in the ICUs is a good nurse expected to make observations about their patient's condition, to interpret subtle changes and to use judgment to take appropriate action. But often the ICU nurse is so unremittingly involved in collecting and charting information that they have little time to interpret it accurately. Habituation is both inevitable and necessary if the nurse is not to work to an exhausted state of chronic crisis. Yet, they must maintain an underlying alertness to discern and respond to cues
which have special meaning. This is like the mother who hears the infant cry of her baby over the commotion of a party, (1972), p. 111).

Other factors relating to stress have been reported that burnout, a result of too much stress or too much stress too long, is most likely to occur after eighteen months to twenty-four months on the same job. Paradoxically in a study of stress and ICU nurses, Huckabay and Jagla (1979) reported finding that years of ICU experience significantly reduced the stress scores of nurses who worked there.

There is a perceived danger by nurses that is inherent in the nature of the medical profession as a professional hierarchy. The nurses' position is often made more confusing or confounding by the complexity of accountability, guidelines, requirements, and changing technical demands (Hartl, 1979).

It appears clear from the literature that perceived role conflict and role ambiguity are two major sources of stress for nurses who work in the ICU. Less clear however is the relationship of experience to these to perceived sources of stress.

Anxiety, Locus of Control and Stress

Stress, from a homeostatic viewpoint (Lazarus, 1966), is a stimulus condition that results in system disequilibrium and produces a dynamic kind of strain. All stimuli, according to Lazarus, encountered by the individual are
appraised as either harmful, benign, or beneficial with threat being identified as a key intervening variable. Lazarus (1966) defined threat as the anticipation of a future confrontation with harm that is based on cues which are appraised by cognitive processes. Anxiety which becomes a chronic or disproportionate response state is suggested by Lazarus as predisposing the individual to having a tendency to appraise any situation he or she encounters as threatening.

According to Spielberger's Trait-State Anxiety Theory (Spielberger, 1966), it is essential to distinguish between anxiety as a transitory state or as a relatively stable personality trait. Spielberger (1970), reported that in general, it would be expected that those who are high in A-Trait will exhibit A-State elevations more frequently than low A-Trait individuals because they tend to react to a wider range of situations as dangerous or threatening.

O'Neil (1972) administered the State-Trait Anxiety Inventory to female college students in a study on the effects of stress on state anxiety and task performance. The results indicate that stressful events were perceived as more threatening to those subjects with high state anxiety than with low state anxiety. O'Neil also reported that high A-Trait subjects in the stress condition showed a significantly greater increase in A-State than did the low A-Trait subjects.
Other researchers have explored the relationship of anxiety and locus of control. Price and Blackwell (1980) in a study of migraine sufferers administered the State-Trait Anxiety Inventory and Rotter's Internal-External Locus of Control Scale to migraine sufferers and a control group. The migraine sufferers reported higher anxiety than non-sufferers. In addition, the data indicated a clear relationship between migraines, depression and locus of control.

The issue of perception is central to how nurses perceive and respond to stress. Wortman, Pancreia, Shusterman and Hibscher (1976) tested the hypothesis that the stress experienced by a person who is unable to control aversive stimulation is not a function of locus of control per se, but of the attribution of causality that he or she makes for failure to exert control. According to their study, if the lack of control is perceived as due to the individual's personal inadequacy, it creates stress, while if the lack of control is perceived as due to the situation, there is little or no stress.

Felton and Kahana (1974) studied the relationship between locus of control and adjustment among institutionalized aged persons. Externally rather than internally perceived control was found to relate to good adjustment. Results indicate that perceived locus of control appeared
to have a different meaning in institutional settings where persons external to the individual may function as intermediaries between the powerless self and rigid institutional environment.

Manuck, Hinrichsen and Ross (1975) studied life stress, locus of control and anxiety. Their results support the prediction that increasing levels of life stress are associated with greater anxiety. In addition, the researchers found that subjects who scored as externals on Rotter's Locus of Control Scale and who experienced low levels of stress reported more state anxiety than did subjects who scored as internals and experienced similar low levels of stress. However highly stressed internals did not differ from highly stressed externals, both reported greater state and trait anxiety than subjects experiencing low levels of stress. There was no relationship between locus of control and anxiety in the high stress group.

Although the research data are not consistent, it is clear from the literature that both anxiety and locus of control are factors in the stress response.

Other variables identified in the literature as having a relationship to stress have been age and experience. Masuda and Holmes (1978), Jewell (1977), and Horowitz (1974) have all reported that older people consistently score Social Readjustment Rating Scale life events lower than
younger people when asked to rate them on the amount of emotion generated.

Why should the elderly regard life events as having less impact on their lives, or conversely why should the young perceive life events as having greater meaning? Masuda and Holmes (1978) have questioned this and hypothesized that the young have fewer events over their lifetime as compared to the old and they thus perceive the unknown with greater anxiety or trepidation.

Summary

The preceding review of the literature has suggested that nurses are involved in jobs which produce excessive stress. Furthermore, nurses who work in intensive care units of hospitals are a high risk population vulnerable to excessive stress. In addition, the key variable of perception as related to the characteristics of anxiety and locus of control appears to influence the stress response. Finally, the review includes the view of researchers who have questioned the role of experience in moderating the individual's response (perception of) stress as implied by Kramer (1974), Storlie (1979), Huckabay and Jagla (1979), Friel and Tehan (1981) and Puetz (1981).

It should be noted that according to the literature review the personality characteristics of perceived anxiety, anxiety proneness and locus of control have a relationship to stress. Precisely what this relationship is, is unclear owing to the contradictory results of research previously reported.
Research findings supporting a positive relationship between anxiety and stress have been fairly consistent. O'Neil (1972) reported a positive relationship between stress and anxiety. Price and Blackwell (1980) also reported a strong relationship between stress and anxiety.

The research findings on the relationship of locus of control to stress and anxiety is slightly less clear. Although Wennerholm and Zarle (1976) and Houston (1972) have reported locus of control to be significantly related to stress, Wortman, Pancreia, Shusterman, and Hibscher (1976) reported they found the attribution of casualty not locus of control as being significantly related to stress.

The present study was attempted in order to enhance the understanding and prediction of job stress and its interrelationship with anxiety and locus of control and experience. The hypotheses which follow are based upon the review of literature previously reported.

**Hypotheses**

1. Job stress can be predicted significantly better than change by some linear combination of the following selected characteristic and demographic variables: locus of control, perceived anxiety, anxiety proneness, nursing experience and ICU experience.

2. The relationship of nursing experience to stress is conditioned by locus of control.
3. The relationship of ICU experience to stress is conditioned by locus of control.

4. The relationship of perceived anxiety to stress is conditioned by locus of control.

5. The relationship of perceived anxiety to stress is conditioned by anxiety proneness.

**Definition of Terms**

**Stress** is a physical, mental, or emotional reaction that results from an individual's response to environmental tensions, conflicts or pressures: for the purpose of this study, stress was operationally defined as each nurse's total score on the Nursing Stress Scale.

**Perceived anxiety** is a conscious, human emotional state characterized by fearful tense feelings and increased activity of the autonomic nervous system (Spielberger, Gorsuch and Lushene 1970). It is seen to be a function of exposure to specific situations, short term or acute. For the purpose of this study, level of perceived anxiety was measured by the state anxiety scale of the State-Trait Anxiety Scale.

**Anxiety proneness** is a human tendency to interpret situations or events as threatening and to respond with a degree of perceived anxiety (Spielberger, Gorsuch and Lushene 1970). It is considered a more or less permanent, chronic personality characteristic that remains stable over long periods of time. For the purpose of this study, level
of anxiety proneness was measured by the trait anxiety scale of the State-Trait Anxiety Scale. 

External control of reinforcement or external locus of control, is reinforcement perceived by the subject as following some action of his own but not being entirely contingent upon his action, then, in our culture, it is typically perceived as the result of luck, change fate, as under the control of powerful others (Rotter 1973). In this study external locus of control was measured by the Rotter Internal-External Locus of Control Scale.

Internal control of reinforcement or internal locus of control is reinforcement perceived by the subject as contingent upon his own behavior or his own relatively permanent characteristics (Rotter 1973). In this study, internal locus of control was measured by the Rotter Internal-External Locus of Control Scale.

Method

Subjects

The subjects for this investigation were 200 registered nurses currently working on intensive care units in two major hospitals in a large metropolitan area. These hospitals had a minimum patient bed capacity of 600, and each one had one or more intensive care units. The subjects were notified of the study by (1) notices placed in the inservice bulletin, (2) announcements made by the unit coordinators at unit meetings and (3) word of mouth.
The age of the subjects ranged from 20 to 57 years with the average age being 34 years. The number of married subjects was 112, 25 were divorced, 61 were single and two were widowed. Nursing education varied from associate degree to master's level with 78 subjects having associate degree, 45 having three-year diplomas, 75 having bachelor's degree and two having master's degrees. Nursing experience ranged from one month to 35 years with the average being seven years. ICU experience ranged from one month to 15 years with the average being four years.

**Instrumentation**

A measure of job stress was obtained by the administration of the Nursing Stress Scale. The Nursing Stress Scale developed by Gray-Toft and Anderson (1981) is a self-evaluation questionnaire that consists of thirty-four items which describe identified situations that cause stress for nurses in the performance of their duties. It provides a total stress score as well as scores for each of seven subscales that measure the frequency of stress experienced by nurses in hospital environment.

The seven subscales were derived from a factor analysis of the scale items which identifies seven major sources of stress. One factor relates to the physical environment, four factors arise from the psychological environment, and two factors relate to the social environment of the hospital. Based on these seven factors, subscales were created by
adding the individual nurse's scores on the item that loaded on each factor. Intercorrelations among the seven subscales were determined, and factor analysis of the intercorrelations (using a quartimax rotation), revealed a common stress factor since all seven subscales loaded highly on a single factor. As a result, a total score, which measures the overall frequency of stress experienced by the nurse, can be created by adding the individual's response to all thirty-four items. Total scores range from 0 to 102, with higher scores indicating more frequent stress. Scoring is done on a 0 (never) to 3 (very frequently) scales for each question.

Gray-Toft and Anderson (1981) report in "The Nursing Stress Scale: Development of an Instrument" that they applied two measures of reliability to the Nursing Stress Scale (test-retest and internal consistency). The test-retest coefficient for the scale was 0.81. Four measures of internal consistency obtained a Spearman-Brown coefficient of 0.79, a Guttman split-halves coefficient of 0.79, a coefficient of 0.89*, and a standardized-

*A coefficient alpha of Cronbach's alpha is the maximum likelihood estimate of the reliability coefficient if the parallel model (two sets \( x \) = number of items) is assumed to be true.
The validity of the Nursing Stress Scale was determined by investigating its relationship to other important criteria to which stress is theoretically related—trait anxiety, state anxiety, job satisfaction and turnover. Trait anxiety was measured with the Institute for Personality and Ability Testing Anxiety Scale Questionnaire (ASQ). State anxiety was measured with the Potent Negative Affect component of the Affect Rating Scale, and job satisfaction was measured with the Work Subscale of the Job Description Index. The ASQ (Krog, Scheier & Cattell 1976) is a forty-item scale that includes indicators of worry, tension, low self control, emotionality and suspiciousness. The Affect Rating Scale (Sipprelle, Gilberg and Ascough 1981) consists of thirty bipolar adjectives that describe jobs in general, and to which respondents indicate their degree of satisfaction. Correlations of the Nursing Stress Scale are 0.39 with trait anxiety (ASQ) and 0.35 with state anxiety (ARS), both of which are statistically significant at the .01 level of

*The standardized-item alpha is closely related to alpha; in essence, if the observations on each item are standardized by dividing them by the standard deviation of the item, alpha would have the value calculated by the subprogram as standardized-item alpha.
significance. The correlation of the Nursing Stress Scale with the Work Subscale of the Job Description Index is -0.15 and not statistically significant (Gray-Toft and Anderson 1981).

Validity was also determined by examining turnover during a five-month period among the nursing staff on the five units included in Gray-Toft and Anderson's (1981) study. Turnover is considered to be an important indicator of staff burnout that results from high levels of stress. Staff turnover was highest (30 per cent) on units with the highest mean scores on the Nursing Stress Scale ($\bar{X} = 94.11$) and the lowest (0) on the units with the lowest mean scores on the Nursing Stress Scale ($\bar{X} = 84.59$).

A measure of perceived anxiety and anxiety proneness of the subjects was obtained by the administration of the State-Trait Anxiety Inventory (STAI) (Spielberger, Gorsuch, and Lushene, 1970). The STAI consists of two separate self report scales containing twenty items each (see appendix). The A-State scale requires the subject to report how they are feeling at the time of administration. The A-Trait scale requires the subject to report how they feel most of the time. The STAI yields one score for each scale, ranging from twenty to eighty. These scores correspond with percentile scores indicating the degree of perceived anxiety and anxiety proneness (Spielberger, Gorsuch and Lushene, 1970). However, in the analysis of the data, raw scores of STAI were
Test-retest coefficients reported by Spielberger, Gorsuch and Lushene (1970) ranged from .73 to .86 for the A-Trait scale; but for the A-State scale, for which temporal stability is not expected, they were quite low, ranging from .16 to .54. Since the A-State scale measures transitory anxiety, a temporary emotional state, the alpha coefficient was used to measure the internal consistency of the scale. Using the Kuder-Richardson formula 20, alpha coefficients ranged from .83 to .96 for both scales.

Spielberger, Gorsuch and Lushene (1970) reported that concurrent validity of the STAI was suggested by a correlational study of the STAI the IPAT Anxiety Scale, and the Taylor Manifest Anxiety Scale (TMAS). The correlation coefficient for the STAI and IPAT was .75, while the coefficient for the STAI and the TMAS was .80.

A measure of locus of control of the subjects was obtained by the administration of the Rotter Internal-External Locus of Control Scale, (I-E), (Rotter, 1966). This instrument was constructed within the context of social learning theory. In explaining its use, Rotter wrote (1966) "the effect of reinforcement following some behavior...is not a single stamping in process but depends upon whether or not the person perceives a casual relationship between his own behavior and the reward," (58, p. 1). Internal
control refers to the individual's perception of an event as contingent upon his own behavior or his own relatively permanent characteristics. External control, on the other hand, indicates that a positive or negative reinforcement following some action of the individual is perceived as not being entirely contingent upon his own action but the result of change, fate or luck; or it may be perceived as under the control of powerful others and unpredictable because of the complexity of forces surrounding the individual.

The I-E scale is a forced choice, 29 item, self report inventory. The score is the total number of external choices. Scores range from 0 to 23, with higher scores indicating greater externality.

According to Anastasi (1976), considerable information is available regarding the I-E scale. Split-halves and Kuder-Richardson reliabilities cluster around .70. Test-retest reliabilities after intervals of one to two months are around the same .70 level, but vary somewhat with the length of the interval.

Studies have compared the I-E scale with other methods of assessing the same variable such as questionnaire, interview assessment, Likert scale and rating from a story completion technique (Adams-Webber 1963, Blackman 1962, Campbell and Fiske 1959, Cardi 1962, Johnson 1961), with satisfactory correlations being obtained.
Procedures

All subjects were tested in small groups on various days, during a seven day period. The tests were administered to all subjects at the hospital prior to their going on duty. The tests were administered to all subjects in the same order. The following instructions were given to all groups at the time of testing:

Please read the instructions carefully before beginning and then complete these tests as honestly and accurately as you can. There are no right or wrong answers. Confidentiality of all test data will be maintained. I do need you to place the last four digits of your social security number in the upper right hand corner of each test. There is merely to account for all tests in order to compare results. After all the results are obtained, all test material will be destroyed. At the conclusion of the study, if you wish, I will make available to you copies of the results. Thank you for your cooperation. The order of administration was: STAI Form x-1, STAI Form x-2, Rotter Internal-External Locus of Control Scale and lastly the Nursing Stress Scale.

Hypothesis I was tested by multiple regression analysis to obtain the most parsimonious subset of selected variables that may predict stress in professional nurses who work in intensive care units. According to Cohen and
Cohen (1975) and Pedhazur (1982) the surest way of answering how well a regression equation predicts is to apply it to a new set of data. Particularly when the original N is small, cross validation to a new sample is strongly recommended.

A cross validation was therefore performed to validate the results from the regression analysis in a predictive framework. The procedure was to divide the original sample of 200 subjects into two groups of 100's each (using a table of random numbers) with the designations sample 1 and sample 2.

Regular regression analysis was performed on sample 1; the scores of the Nursing Stress Scale were the criterion and the characteristic variables were the predictors. After calculating a $R^2$ and a regression equation, the regression equation from Sample 1 was applied to the predictor variable of the second sample, yielding a $Y$' (predicted criterion score) for each subject in Sample 2. A Pearson $r$ was calculated between the observed criterion score ($Y$) in sample 2 and the predicted criterion score ($Y'$). This $r_{yy'}$ is analogous to a multiple correlation in which the equation used is the one obtained in the first sample. The difference between $R^2$ of sample 1 and $R^2$ of sample 2 is an estimate of the amount of shrinkage. The estimate was considered reasonable and the $R^2$ was considered meaningful,
the two samples were combined and the regression equation for the combined groups was considered the best possible for use in future prediction. (The null hypothesis stated that there would be no significant relationship between selected characteristics and demographic variables and levels of stress as measured by scores on the Nursing Stress Scale.)

Hypothesis II through V were tested through multiple regression analysis. Interactions that were found to be significant were incorporated in the overall predictive model. (The null hypothesis for each research hypothesis stated that the two way interactions would not be statistically significant.)

Results

One purpose of this study was to determine whether or not the selected characteristics of locus of control, perceived anxiety, anxiety proneness, nursing experience and ICU experience were better than chance predictors of job stress in ICU nurses. Another purpose was to determine some direction, based on the predictive value of the selected characteristics, as to the possible determinants which could be addressed as intervention strategies.

Five research hypotheses were formulated to investigate the efficiency of prediction of job stress using selected variables and for statistical analysis were restated in the null form in the present selection.
Hypothesis 1

Null hypothesis 1 stated: Some linear combination of the variables locus of control, perceived anxiety, anxiety proneness, nursing experience and ICU experience will make a no better than chance prediction of job stress in ICU nurses. In order to test this hypothesis, a multiple regression analysis with a cross validation was performed as described by Pedhazur (1982). The original sample of 200 was divided, using a table of random numbers into two samples designated as sample 1 and sample 2. Sample 1 was used as the screening sample on which a regular regression analysis was performed. The intercorrelations of the predictor variables are recorded in Table 1. The means and standard deviations for the predictor variables are recorded in Table 2. The analysis began with all of the variables in the equation (Step 0) shown in Table 3.
Table 1
A matrix of correlational values for variables examined.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Stress</th>
<th>Locus</th>
<th>Perceive</th>
<th>Prone</th>
<th>Nursing</th>
<th>ICU</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stress</td>
<td>1.000</td>
<td>0.237</td>
<td>0.427</td>
<td>0.370</td>
<td>-0.190</td>
<td>-0.257</td>
</tr>
<tr>
<td>Locus</td>
<td>0.237</td>
<td>1.000</td>
<td>0.306</td>
<td>0.343</td>
<td>-0.050</td>
<td>-0.011</td>
</tr>
<tr>
<td>Perceive</td>
<td>0.427</td>
<td>0.306</td>
<td>1.000</td>
<td>0.798</td>
<td>-0.070</td>
<td>-0.100</td>
</tr>
<tr>
<td>Prone</td>
<td>0.370</td>
<td>0.343</td>
<td>0.798</td>
<td>1.000</td>
<td>-0.071</td>
<td>-0.087</td>
</tr>
<tr>
<td>Nursing</td>
<td>-0.190</td>
<td>-0.050</td>
<td>-0.070</td>
<td>-0.071</td>
<td>1.000</td>
<td>0.654</td>
</tr>
<tr>
<td>ICU</td>
<td>-0.257</td>
<td>-0.011</td>
<td>-0.100</td>
<td>-0.087</td>
<td>0.654</td>
<td>1.000</td>
</tr>
</tbody>
</table>

Table 2
Means and standard deviations of variables examined.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stress</td>
<td>38.670</td>
<td>10.666</td>
</tr>
<tr>
<td>Locus</td>
<td>8.900</td>
<td>3.844</td>
</tr>
<tr>
<td>Perceive</td>
<td>35.140</td>
<td>11.709</td>
</tr>
<tr>
<td>Prone</td>
<td>34.000</td>
<td>9.136</td>
</tr>
<tr>
<td>Nursing</td>
<td>7.480</td>
<td>6.684</td>
</tr>
<tr>
<td>ICU</td>
<td>4.860</td>
<td>4.456</td>
</tr>
</tbody>
</table>
Table 3
Regression coefficients and associated t-ratios for all variables in sample 1.

\[ R^2 = .24337 \]

<table>
<thead>
<tr>
<th>Variables</th>
<th>B</th>
<th>SEB</th>
<th>Beta</th>
<th>SE Beta</th>
<th>t</th>
<th>Sig t</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICU</td>
<td>-0.48156</td>
<td>0.18512</td>
<td>-0.20120</td>
<td>0.11913</td>
<td>-1.689</td>
<td>0.0954</td>
</tr>
<tr>
<td>Locus</td>
<td>0.32173</td>
<td>0.26586</td>
<td>0.11596</td>
<td>0.09582</td>
<td>1.210</td>
<td>0.2293</td>
</tr>
<tr>
<td>Perceive</td>
<td>0.30414</td>
<td>0.13600</td>
<td>0.33390</td>
<td>0.14930</td>
<td>2.236</td>
<td>0.0277</td>
</tr>
<tr>
<td>Nursing</td>
<td>-0.04118</td>
<td>0.18967</td>
<td>-0.02581</td>
<td>0.11886</td>
<td>0.217</td>
<td>0.8286</td>
</tr>
<tr>
<td>Prone</td>
<td>0.05240</td>
<td>0.17636</td>
<td>0.04489</td>
<td>0.15107</td>
<td>0.297</td>
<td>0.7670</td>
</tr>
<tr>
<td>Constant</td>
<td>25.98577</td>
<td>4.11200</td>
<td></td>
<td></td>
<td>6.319</td>
<td>0.000</td>
</tr>
</tbody>
</table>

Variables with t-ratios whose probabilities exceeded the .05 level were candidates for removal*. As table 3 indicates, nursing experience (nursing) had the largest such probability (0.8286) and was removed first (step 1) shown in table 4.

*According to Pedhazur (1982) each t-ratio is a test of a regression coefficient, and equivalently a test of the proportion of variance accounted for by a variable if it were to be entered last in the equation.
Table 4

Regression coefficients and associated t-ratios for variables in sample 1 with the variable nursing experience removed.

<table>
<thead>
<tr>
<th>Variables</th>
<th>B</th>
<th>SEB</th>
<th>Beta</th>
<th>SE Beta</th>
<th>t</th>
<th>Sig t</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICU</td>
<td>0.52199</td>
<td>0.21480</td>
<td>-0.21810</td>
<td>0.08975</td>
<td>-2.430</td>
<td>0.0170</td>
</tr>
<tr>
<td>Locus</td>
<td>0.32487</td>
<td>0.26413</td>
<td>0.11709</td>
<td>0.09520</td>
<td>1.230</td>
<td>0.2217</td>
</tr>
<tr>
<td>Perceive</td>
<td>0.30360</td>
<td>0.13529</td>
<td>0.33331</td>
<td>0.14853</td>
<td>2.244</td>
<td>0.0271</td>
</tr>
<tr>
<td>Prone</td>
<td>0.05293</td>
<td>0.17546</td>
<td>0.04534</td>
<td>0.15030</td>
<td>0.303</td>
<td>0.7635</td>
</tr>
<tr>
<td>Constant</td>
<td>25.84711</td>
<td>4.04168</td>
<td></td>
<td></td>
<td>6.395</td>
<td>0.000</td>
</tr>
</tbody>
</table>

As table 4 indicates, removing the variable nursing experience resulted in a very small reduction in \( R^2 \) (.00038). The variable anxiety proneness (prone) was removed next step (Step 2) shown in table 5 as the probability associated with its t-ratio was 0.7635.
As Table 5 indicates, removing the variable anxiety proneness resulted in a reduction of $R^2$ of only .00073. The variable with the largest probability associated with its $t$-ratio (.1943) locus of control (locus) was removed in Step 3, shown in Table 6.
Table 6

Regression coefficient and associated t-ratios for variables in sample 1 with the variable nursing experience, anxiety proneness and locus of control removed.

<table>
<thead>
<tr>
<th>Variables</th>
<th>B</th>
<th>SEB</th>
<th>Beta</th>
<th>SE Beta</th>
<th>t</th>
<th>Sig t</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICU</td>
<td>-0.51723</td>
<td>0.21450</td>
<td>-0.21611</td>
<td>0.08962</td>
<td>-2.411</td>
<td>0.0178</td>
</tr>
<tr>
<td>Perceive</td>
<td>0.36939</td>
<td>0.08163</td>
<td>0.40554</td>
<td>0.08962</td>
<td>4.525</td>
<td>0.0000</td>
</tr>
<tr>
<td>Constant</td>
<td>28.20325</td>
<td>3.28812</td>
<td></td>
<td></td>
<td>8.577</td>
<td>0.0000</td>
</tr>
</tbody>
</table>

As indicated in table 6, removing the variable locus of control resulted in a reduction in $R^2$ of .013. The remaining two variables, ICU experience (ICU) and perceived anxiety (perceive) have t-ratios with probabilities $< .05$. Therefore, neither variable was removed and the present analysis terminated.

The regression equation obtained from sample 1 ($stress = -0.51723 \times X_1 + 0.36936 \times X_2 + 28.20325$) was applied to the same two predictor variables of sample 2 and a Pearson $r$ was calculated between the observed criterion scores ($Y$) in sample 2 and the predicted criterion scores ($Y'$). The Pearson $r = 0.3598; p = 0.0001$. Data for the difference in the $R^2$'s of sample 1 and sample 2 are presented in table 7.
Table 7

R^2's and associated F-ratios for sample 1 (screening sample) and sample 2 (calibration sample).

<table>
<thead>
<tr>
<th>Sample</th>
<th>R^2</th>
<th>df</th>
<th>F</th>
<th>Est. Shrinkage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.22878</td>
<td>2.97</td>
<td>14.387*</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>0.12946</td>
<td>2.97</td>
<td>7.213*</td>
<td>0.09</td>
</tr>
</tbody>
</table>

*p < .01

Table 7 reveals that the difference between the R^2's is 0.09. Table 7 further reveals a significant F-ratio for each R^2. Table 8 shows the formula used to determine the predicted shrinkage between the samples.

Table 8

Formula used to determine the amount of shrinkage in the multiple correlation coefficient R.

\[
\bar{R}^2 - 1-(1-R^2) \cdot \frac{N + M}{N - M - 1}
\]

Where \( \bar{R} \) = new sample estimated multiple correlation

\( R \) = observed multiple correlation coefficient

\( M \) = number of independent variables

\( N \) = number of observations
Lord's (1950) formula for determining the amount of shrinkage expected in the multiple correlation coefficient (R) when a regression equation from one sample is used with a new sample.

Applying the formula in table 8 to the data from sample 1 yields an estimated $R^2$ of .19698. The actual shrinkage between the samples as shown in table 7 was 0.09.

In view of a highly significant correlation between the observed and predicted criterion scores of sample 2 and the significant F-ratios of each of the $R^2$'s of both samples, the relative increase in the observed shrinkage was taken as caution and the two samples were combined to obtain a new $R^2$ and regression equation based on the total sample of 200. The results of this analysis are reported in table 9.

**Table 9**

Regression coefficients and associated t-ratios for final predictive model using combined samples.

$$R^2 = 0.18340 \quad F (2,197) = 22.122 \quad p \quad .01$$

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>SEB</th>
<th>Beta</th>
<th>SE Beta</th>
<th>t</th>
<th>Sig t</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICU</td>
<td>-0.34423</td>
<td>0.16177</td>
<td>-0.13759</td>
<td>0.06466</td>
<td>2.128</td>
<td>0.0346</td>
</tr>
<tr>
<td>Perceive</td>
<td>0.40830</td>
<td>0.06716</td>
<td>0.39307</td>
<td>0.06466</td>
<td>6.079</td>
<td>0.0001</td>
</tr>
<tr>
<td>Constant</td>
<td>27.17608</td>
<td>2.59379</td>
<td></td>
<td></td>
<td>10.477</td>
<td>0.0001</td>
</tr>
</tbody>
</table>
Table 9 reveals that in combining the samples, the variables each yield a significant ($p < .04$) $t$-ratio and together yield an $R^2$ of approximately .18 with a significant $F$ ratio. Therefore, null Hypothesis 1 is rejected. That is, the linear combination of the variables ICU experience and perceived anxiety are better than chance predictors of job stress in ICU nurses.

**Hypothesis 2**

Null hypothesis 2 stated: The multiplicative combination of nursing experience and locus of control will not be statistically significant. Table 10 shows the regression coefficient and associated $t$-ratio for the multiplicative combination.

**Table 10**

Regression coefficients and associated $t$-ratios for the multiplicative combination of nursing experience and locus of control.

| $R^2$ | .10461 |

<table>
<thead>
<tr>
<th>Variables in the Equation</th>
<th>$df = 196$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variable</td>
<td>B</td>
</tr>
<tr>
<td>Locus</td>
<td>1.0665</td>
</tr>
<tr>
<td>Nursing</td>
<td>0.13048</td>
</tr>
<tr>
<td>Locus X Nursing</td>
<td>-0.03824</td>
</tr>
<tr>
<td>Constant</td>
<td>31.70219</td>
</tr>
</tbody>
</table>
Table 10 indicates the multiplicative combination of variables of nursing experience and locus of control yields a t-ratio of -1.204 and a nonsignificant probability of 0.23. Therefore, Null Hypothesis 2 is retained. That is, the multiplicative combination of nursing experience and locus of control is not statistically significant.

Hypothesis 3

Null hypothesis 3 stated: The multiplicative combination of ICU experience and locus of control will not be statistically significant. Table 11 shows the regression coefficients and associated t-ratios for the multiplicative combination.

Table 11
Regression coefficients and associated t-ratios for the multiplicative combination of ICU experience and locus of control.

<table>
<thead>
<tr>
<th>Variables in the Equation</th>
<th>df = 196</th>
</tr>
</thead>
<tbody>
<tr>
<td>r²</td>
<td>0.1259</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>SEB</th>
<th>Beta</th>
<th>SE Beta</th>
<th>t</th>
<th>Sig t</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICU</td>
<td>0.32187</td>
<td>0.49468</td>
<td>0.12865</td>
<td>0.19772</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Locus</td>
<td>1.14316</td>
<td>0.27761</td>
<td>0.40745</td>
<td>0.09895</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ICU X Locus</td>
<td>-0.08872</td>
<td>0.05522</td>
<td>0.33741</td>
<td>0.21001</td>
<td>-1.607</td>
<td>0.1097</td>
</tr>
<tr>
<td>Constant</td>
<td>31.67334</td>
<td>2.61483</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 11 shows that the multiplicative combination of ICU experience and locus of control yields a t-ratio of -1.607 and a nonsignificant probability of 0.10. Therefore, Null Hypothesis 3 is retained. That is, the multiplicative combination of ICU experience and locus of control is not statistically significant.

**Hypothesis 4**

Null Hypothesis 4 is stated: The multiplicative combination of perceived anxiety and locus of control will not be statistically significant. Table 12 shows the regression coefficients and associated t-ratios for the multiplicative combination.

Table 12

Regression coefficients and associated t-ratios for the multiplicative combination of perceived anxiety and locus of control.

\[ R^2 = 0.1967 \]

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>SEB</th>
<th>Beta</th>
<th>SE Beta</th>
<th>Sig t</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perceive</td>
<td>0.48517</td>
<td>0.18093</td>
<td>0.46708</td>
<td>0.17418</td>
<td></td>
</tr>
<tr>
<td>Locus</td>
<td>0.99507</td>
<td>0.68074</td>
<td>0.35467</td>
<td>0.24263</td>
<td></td>
</tr>
<tr>
<td>Perceive X Locus</td>
<td>-0.01273</td>
<td>0.01719</td>
<td>-0.24317</td>
<td>0.32842</td>
<td>-0.74 0.349</td>
</tr>
<tr>
<td>Constant</td>
<td>18.15430</td>
<td>6.61059</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 12 indicates that the multiplicative combination of perceived anxiety and locus of control yields a t-ratio of -0.740 and a nonsignificant probability of 0.45. Therefore, Null Hypothesis 4 is retained. That is, the multiplicative combination of ICU experience and locus of control is not statistically significant.

Hypothesis 5

Null Hypothesis 5 stated: The multiplicative combination of perceived anxiety and anxiety proneness will not be statistically significant. Table 13 shows the regression coefficients and associated t-ratios for the multiplicative combination.

Table 13

Regression coefficients and t-ratios for the multiplicative combination of perceived anxiety and anxiety proneness.

<table>
<thead>
<tr>
<th>Variables in the Equation</th>
<th>df = 196</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variables</td>
<td>B</td>
</tr>
<tr>
<td>Perceive</td>
<td>0.94178</td>
</tr>
<tr>
<td>Prone</td>
<td>0.60317</td>
</tr>
<tr>
<td>Perceive X Prone</td>
<td>-0.01429</td>
</tr>
<tr>
<td>Constant</td>
<td>4.21002</td>
</tr>
</tbody>
</table>
Table 13 indicates that the multiplicative combination of perceived anxiety and anxiety proneness yields a t-ratio of -2.327 and a significant probability of 0.02. Therefore, Null Hypothesis 5 is rejected. The multiplicative combination of perceived anxiety and anxiety proneness have a significant relationship to job stress.

In order to obtain the most efficient overall predictive model, the significant multiplicative combination of perceived anxiety and anxiety proneness were added to the model containing the variables ICU experience and perceived anxiety. Table 14 shows the regression coefficients and associated t-ratios for this model.

Table 14
Regression coefficients and associated t-ratios for the final predictive model.

<table>
<thead>
<tr>
<th>Variables in the Equation</th>
<th>df=196</th>
</tr>
</thead>
<tbody>
<tr>
<td>R² = .20370</td>
<td>F(4,195) = 12.47</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Variables</th>
<th>B</th>
<th>SEB</th>
<th>Beta</th>
<th>t</th>
<th>Sig t</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICU</td>
<td>-0.31603</td>
<td>0.16114</td>
<td>-0.12632</td>
<td>-1.961</td>
<td>0.0513</td>
</tr>
<tr>
<td>Perceive</td>
<td>0.88956</td>
<td>0.25227</td>
<td>0.85639</td>
<td>3.526</td>
<td>0.0005</td>
</tr>
<tr>
<td>Prone</td>
<td>0.56751</td>
<td>0.26068</td>
<td>0.43563</td>
<td>2.177</td>
<td>0.0307</td>
</tr>
<tr>
<td>Perceive X Prone</td>
<td>-0.01329</td>
<td>0.00612</td>
<td>-0.82113</td>
<td>-2.172</td>
<td>0.0311</td>
</tr>
<tr>
<td>Constant</td>
<td>7.43644</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 14 indicates that when included in the overall predictive model, the multiplicative combination of perceived anxiety and anxiety proneness remains significant as shown by a t-ratio of -2.172 and a significant probability of 0.03. Other variables remaining significant in the equation include perceived anxiety with a t-ratio of 3.526 and a significant probability of .0005 and anxiety proneness with a t-ratio of 2.177 and a significant probability of .03. The variable ICU experience which was found to be significant previously; now has a t-ratio of -1.961 and a non-significant probability of .0513.

Therefore, the most efficient predictors are perceived anxiety, anxiety proneness and the multiplicative combination of perceived anxiety and anxiety proneness. Table 11 shows this model to have an $R^2$ of .1880 and a significant F-ratio with the final regression equation being:

$$ Y' = 0.94178x_1 + 0.60317x_2 + -0.01429x_3 + 4.21002 $$

**Discussion**

In discussing the results presented in the previous section it is important to note Pedhazur's (1980) discussion on the difference between the test of $R^2$ and the test (t-ratio) of a given $b$ in a multiple regression equation. The test of $R^2$ is tantamount to testing all $b$'s simultaneously. But when a given $b$ is tested for significance, the question
being addressed is whether it differs from zero while controlling for the effects of the other independent variables. It is possible to find that $R^2$ is statistically significant leading to the conclusion that one or more of the regression coefficients are different from zero. And yet, when each regression coefficient is tested separately, it turns out that none of them is statistically significant.

The regression analysis done on Hypothesis 1 and subsequent examination of the regression coefficients indicated that although the probabilities associated with the overall $F$-ratios for all the regression analyses were significant, only two of the variables, ICU experience and perceived anxiety were found to be significant as a result of testing each variable's regression coefficient. This indicated that as ICU experience increases, stress scores tend to decrease. However, as perceived anxiety scores increased, stress scores also increased. These findings were consistent with the findings of Cassen and Hackett (1975) and Bailey, Steffen and Grout (1980) who reported that the individual's perception was the key to identifying stress. Huckabay and Jagla (1979) reported that years of ICU experience significantly reduced the stress scores of nurses who worked there.

Further analysis of these variables taken together in combination; nursing experience and locus of control, ICU
experience and locus of control, perceived anxiety and locus of control, revealed no significant conditional relationship between these variables and job stress. Only the multiplicative combination of perceived anxiety and anxiety proneness was found to be significantly related to job stress. That is, a conditional relationship exists, the relationship of perceived anxiety to stress varies with the level of anxiety proneness. When these variables were combined in the predictive equation including the variables ICU experience and perceived anxiety, they were found to be significant. Therefore, the most efficient overall predictive model is the one containing the variables perceived anxiety, anxiety proneness and the multiplicative combination of perceived anxiety and anxiety proneness.

The lack of significance of the variables locus of control, nursing experience and their various combinations appears contradictory to the assertions of stress experts quoted earlier in this study. Houston (1972) reported that an individual's control over his or her environment is linked to his or her level of stress and anxiety. Wennerholm and Zarle (1976) also reported that locus of control was directly related to levels of stress. Price and Blackwell (1980) reported a strong relationship between anxiety and locus of control in stress-related migraine headache sufferers. Kramer (1974) and Storlie (1980)
reported nursing experience as being a significant factor leading to stress and related burnout. Finally, Masuda and Holmes (1978), Jewell (1977) and Horwitz (1974) all have reported that older people consistently score life events lower than younger people when asked to rate them on the amount of emotion generated. Masuda and Holmes have suggested this difference is due to experience. These research findings appear contradictory to the present study's findings.

On the other hand, Lazarus (1966) suggested that chronic anxiety predisposes the individual to a tendency to appraise any situation as threatening and stressful. Felton and Kahana (1974) indicated that perceived locus of control appeared to have a different meaning in institutional settings where persons external to the individual may function as intermediaries between the powerless individual and the rigid institutional environment. Wortman, Pancreia, Shusterman and Hibscher (1976) reported that the attribution of causality, not locus of control, is related to stress. These studies seem to confirm the current investigation's lack of significance for the variables of locus of control, and nursing experience both singly and in combination.

Again, the lack of consistent and definitive results in this study indicates the need for further research.
exploring the relationship of the variables locus of control, anxiety and experience to job stress. These variables may prove to be highly predictive of job stress for another population or in combination with different variables.

One of the reasons for the lack of predictive significance of the variable locus of control may be the nature of the variable itself. It may be that locus of control is a dependent rather than independent variable in the reduction of levels of stress. The measured levels of this variable may be influenced by a change in stress rather than contributing to that change.

The lack of predictive significance of nursing experience may in part be due to the unique nature of job stress in the ICU. Cassen and Hackett (1975) and Bailey, Steffen and Grout (1980) have noted the paradox that what has been identified as the most stressful, caring for desperately ill patients, has also been identified by ICU nurses as the greatest source of satisfaction. Owing therefore to the uniqueness of the job stress in the ICU, ICU experience rather than nursing experience could possibly function as a moderator variable in the nurses' perception of stress.

Conclusions

Although, only two of the stated research hypotheses are confirmed on the basis of the present investigation, there are inferences and conclusions which may be drawn.
The results of the analysis of the data related to Hypothesis 1 suggest that the most efficient predictors of job stress in ICU nurses were (1) perceived anxiety and (2) ICU experience. As the level of perceived anxiety increased, stress scores increased; however, as ICU experience increased, stress scores decreased.

Analysis of the data related to Hypothesis 5 suggests that the relationship of perceived anxiety to stress varies with different levels of anxiety proneness.

Another conclusion suggested by the data analysis is that locus of control and nursing experience are not significantly related to levels of job stress. Furthermore, the hypothesized combination of these variables appears not to be related to job stress. Owing to the lack of consistent and definitive results, the current study does not lend itself to any conclusion regarding possible determinants which may be addressed in providing job stress interventions.

Recommendations

The results of the current investigation suggest the following recommendations in the areas of future research and practical application. These recommendations are based on the conclusions and limitations of the present study.

Future predictive research concerning job stress in ICU nurses should be conducted with a larger population and include a cross validation. The larger population
would decrease the possibility of capitalization on chance and reduce the shrinkage of $R^2$ in the cross validation.

Because two of the variables used in the present study seems to have little relationship to job stress, future research should consider studying different variables and/or different combinations of variables. It may be that the variables employed in this study would be significant in differing combinations with different variables.

Other instruments which might be studied in addition to those of this research include the Group Embedded Figures Test and the Taylor Manifest Anxiety Scale. Future researchers may also consider using the Social Readjustment Rating Scale (Holmes and Rahe 1967) as an instrument to measure uncontrollable factors of various life events and influences which could also effect job stress.
APPENDICES
Demographic Questionnaire

Directions: Please complete the following questions. If the answer cannot be stated in years, use number of months.

1. Age: _____

2. Marital Status: _____Married _____Divorced
   _____Widowed _____Single

3. Nursing Education: _____ADN _____Diploma _____BSN
   _____Other _______________________

4. Years of nursing experience as a R.N.: _____

5. Years of experience in ICU: _____

6. Years of nursing experience in nursing prior to licensure as an R.N.: _____

7. Total years of experience in nursing: _____
   (Add lines 4 and 6)
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 blacken in the appropriate circle 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.

1. I feel calm
2. I feel secure
3. I am tense
4. I am regretful
5. I feel at ease
6. I feel upset
7. I am presently worrying over possible misfortunes
8. I feel rested
9. I feel anxious
10. I feel comfortable
11. I feel self-confident
12. I feel nervous
13. I am jittery
14. I feel "high strung"
15. I am relaxed
16. I feel content
17. I am worried
18. I feel over-excited and "rattled"
19. I feel joyful
20. I feel pleasant

CONSULTING PSYCHOLOGISTS PRESS
577 College Avenue, Palo Alto, California 94306
Rotter Internal-External Locus of Control Scale

Instructions: Please answer these items carefully but do not spend too much time on any one item. Be sure to find an answer for every choice. Circle the letter of the item which you choose as the statement more true. In some instances you may discover that you believe both statements or neither one. In such cases, be sure to select the one you more strongly believe to be the case as far as you are concerned. Also, try to respond to each item independently when making your choice; do not be influenced by your previous choices.

1. a) Children get into trouble because their parents punish them too much.
   b) The trouble with most children nowadays is that their parents are too easy with them.

2. a) Many of the unhappy things in people's lives are partly due to bad luck.
   b) People's misfortunes result from the mistakes they make.

3. a) One of the major reasons why we have wars is because people don't take enough interest in politics.
   b) There will always be war, no matter how hard people try to prevent them.

4. a) In the long run people get the respect they deserve in this world.
b) Unfortunately, an individual's worth often passes unrecognized no matter how hard he tries.

5. a) The idea that teachers are unfair to students is nonsense.

b) Most students don't realize the extent to which their grades are influenced by accidental happenings.

6. a) Without the right breaks one cannot be an effective leader.

b) Capable people who fail to become leaders have not taken advantage of their opportunities.

7. a) No matter how you try some people just don't like you.

b) People who can't get others to like them don't understand how to get along with others.

8. a) Heredity plays the major role in determining one's personality.

b) It is one's experiences in life which determine what they're like.

9. a) I have often found that what is going to happen will happen.

b) Trusting to fate has never turned out as well for me as making a decision to take a definite course of action.

10. a) In the case of the well prepared student there is rarely, if ever, such a thing as an unfair test.
b) Many times exam questions tend to be so unrelated to course work that studying is really useless.

11. a) Becoming a success is a matter of hard work, luck has little or nothing to do with it.
b) Getting a good job depends mainly on being in the right place at the right time.

12. a) The average citizen can have an influence in government decisions.
b) This world is run by the few people in power, and there is not much the little guy can do about it.

13. a) When I make plans, I am almost certain that I can make them work.
b) It is not always wise to plan too far ahead because many things turn out to be a matter of good or bad fortune anyhow.

14. a) There are certain people who are just no good.
b) There is some good in everybody.

15. a) In my case getting what I want has little or nothing to do with luck.
b) Many times we might just as well decide what to do by flipping a coin.

16. a) Who gets to be the boss often depends on who was lucky enough to be in the right place first.
b) Getting people to do the right thing depends upon ability, luck has little or nothing to do with it.
17. a) As far as world affairs are concerned, most of us are the victims of forces we can neither understand, nor control.
   b) By taking active part in political and social affairs the people can control world events.

18. a) Most people don't realize the extent to which their lives are controlled by accidental happenings.
   b) There really is no such thing as "luck."

19. a) One should always be willing to admit mistakes.
   b) It is usually best to cover up one's mistakes.

20. a) It is hard to know whether or not a person really likes you.
   b) How many friends you have depends upon how nice a person you are.

21. a) In the long run the bad things that happen to us are balanced by the good ones.
   b) Most misfortunes are the result of lack of ability, ignorance, laziness, or all three.

22. a) With enough effort we can wipe out political corruption.
   b) It is difficult for people to have much control over the things politicians do in office.

23. a) Sometimes I can't understand how teachers arrive at the grades they give.
   b) There is a direct connection between how hard I study and the grades I get.
24. a) A good leader expects people to decide for themselves what they should do.

b) A good leader makes it clear to everybody what their jobs are.

25. a) Many times I feel that I have little influence over the things that happen to me.

b) It is impossible for me to believe that change or luck plays an important role in my life.

26. a) People are lonely because they don't try to be friendly.

b) There's not much use in trying too hard to please people, if they like you, they like you.

27. a) There is too much emphasis on athletics in high school.

b) Team sports are an excellent way to build character.

28. a) What happens to me is my own doing.

b) Sometimes I feel that I don't have enough control over the direction my life is taking.

29. a) Most of the time I can't understand why politicians behave the way they do.

b) In the long run the people are responsible for bad government on a national as well as on a local level.
Nursing Stress Scale

Directions: Below is a list of situations that commonly occur on a hospital unit. For each item indicate by means of a check (✓) how often on your present unit you have found the situation to be stressful to you. Your responses are strictly confidential.

1. Breakdown of computer:
   ____ A. Never
   ____ B. Occasionally
   ____ C. Frequently
   ____ D. Very Frequently

2. Criticism by a physician:
   ____ A. Never
   ____ B. Occasionally
   ____ C. Frequently
   ____ D. Very Frequently

3. Performing procedures that patients experience as painful:
   ____ A. Never
   ____ B. Occasionally
   ____ C. Frequently
   ____ D. Very Frequently
4. Feeling helpless in the case of a patient who fails to improve:
   ___ A. Never
   ___ B. Occasionally
   ___ C. Frequently
   ___ D. Very Frequently

5. Conflict with a supervisor:
   ___ A. Never
   ___ B. Occasionally
   ___ C. Frequently
   ___ D. Very Frequently

6. Listening or talking to a patient about his/her approaching death:
   ___ A. Never
   ___ B. Occasionally
   ___ C. Frequently
   ___ D. Very Frequently

7. Lack of an opportunity to talk openly with other unit personnel about problems on the unit:
   ___ A. Never
   ___ B. Occasionally
   ___ C. Frequently
   ___ D. Very Frequently
8. The death of a patient:
   ___ A. Never
   ___ B. Occasionally
   ___ C. Frequently
   ___ D. Very Frequently

9. Conflict with a physician:
   ___ A. Never
   ___ B. Occasionally
   ___ C. Frequently
   ___ D. Very Frequently

10. Fear of making a mistake in treating a patient:
    ___ A. Never
    ___ B. Occasionally
    ___ C. Frequently
    ___ D. Very Frequently

11. Lack of an opportunity to share experiences and feelings with other personnel on the unit:
    ___ A. Never
    ___ B. Occasionally
    ___ C. Frequently
    ___ D. Very Frequently
12. The death of a patient with whom you developed a close relationship:
   ___A. Never
   ___B. Occasionally
   ___C. Frequently
   ___D. Very Frequently

13. Physician not being present when a patient dies:
   ___A. Never
   ___B. Occasionally
   ___C. Frequently
   ___D. Very Frequently

14. Disagreement concerning the treatment of a patient:
   ___A. Never
   ___B. Occasionally
   ___C. Frequently
   ___D. Very Frequently

15. Feeling inadequately prepared to help with the emotional needs of a patient's family:
   ___A. Never
   ___B. Occasionally
   ___C. Frequently
   ___D. Very Frequently
16. Lack of an opportunity to express to other personnel on the unit my negative feelings toward patients:
   ___ A. Never
   ___ B. Occasionally
   ___ C. Frequently
   ___ D. Very Frequently

17. Inadequate information from a physician regarding the medical condition of a patient:
   ___ A. Never
   ___ B. Occasionally
   ___ C. Frequently
   ___ D. Very Frequently

18. Being asked a question by a patient for which I do not have a satisfactory answer:
   ___ A. Never
   ___ B. Occasionally
   ___ C. Frequently
   ___ D. Very Frequently

19. Making a decision concerning a patient when the physician is unavailable:
   ___ A. Never
   ___ B. Occasionally
   ___ C. Frequently
   ___ D. Very Frequently
20. Floating to other units that are short of staff:
   _____ A. Never
   _____ B. Occasionally
   _____ C. Frequently
   _____ D. Very Frequently

21. Watching a patient suffer:
   _____ A. Never
   _____ B. Occasionally
   _____ C. Frequently
   _____ D. Very Frequently

22. Difficulty in working with a particular nurse(s) outside the unit:
   _____ A. Never
   _____ B. Occasionally
   _____ C. Frequently
   _____ D. Very Frequently

23. Feeling inadequately prepared to help with the emotional needs of a patient:
   _____ A. Never
   _____ B. Occasionally
   _____ C. Frequently
   _____ D. Very Frequently
24. Criticism by a supervisor:
   ____ A. Never
   ____ B. Occasionally
   ____ C. Frequently
   ____ D. Very Frequently

25. Unpredictable staffing and scheduling:
   ____ A. Never
   ____ B. Occasionally
   ____ C. Frequently
   ____ D. Very Frequently

26. A physician ordering what appears to be an inappropriate treatment for a patient:
   ____ A. Never
   ____ B. Occasionally
   ____ C. Frequently
   ____ D. Very Frequently

27. Too many non-nursing tasks required, such as clerical work:
   ____ A. Never
   ____ B. Occasionally
   ____ C. Frequently
   ____ D. Very Frequently
28. Not enough time to provide emotional support to a patient:
   ___A. Never
   ___B. Occasionally
   ___C. Frequently
   ___D. Very Frequently

29. Difficulty in working with a particular nurse(s) on the unit:
   ___A. Never
   ___B. Occasionally
   ___C. Frequently
   ___D. Very Frequently

30. Not enough time to complete all of my nursing tasks:
   ___A. Never
   ___B. Occasionally
   ___C. Frequently
   ___D. Very Frequently

31. A physician not being present in a medical emergency:
   ___A. Never
   ___B. Occasionally
   ___C. Frequently
   ___D. Very Frequently
32. Not knowing what a patient or a patient’s family ought to be told about the patient’s condition and its treatment:
   _____ A. Never
   _____ B. Occasionally
   _____ C. Frequently
   _____ D. Very Frequently

33. Uncertainty regarding the operation and functioning of specialized equipment:
   _____ A. Never
   _____ B. Occasionally
   _____ C. Frequently
   _____ D. Very Frequently

34. Not enough staff to adequately cover the unit:
   _____ A. Never
   _____ B. Occasionally
   _____ C. Frequently
   _____ D. Very Frequently
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