Psycho-Social Stress and the Use of Coping Responses in University Students

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PSYCHO-SOCIAL STRESS AND THE USE OF COPING RESPONSES IN UNIVERSITY STUDENTS

by

George Hartwein

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VITA

The writer, George H. Hartwein, is the son of Mr. and Mrs. George Hartwein. He was born November 23, 1946 in St Louis, Missouri.

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INTRODUCTION

Considerable research on psycho-social stress has been published during the past decade. A major aim of much of this research has been to discover circumstances that are potentially productive of stress. Another major line of research on stress has dealt with the effects of stress on both affective and somatic reactions. Strangely absent, however, are studies which deal with mechanisms people use to prevent stress or deal with its effects. The current study attempts to link stress and human reactions to it by means of a model incorporating stress, moderating factors which attenuate its effects, affective responses and, finally, somatic reactions to stress. This research is based on and extends similar work published in three other studies.

Caplan (1975) and his associates at the University of Michigan have developed a causal model linking four types of variables. These are the objective environment, the subjective environment, individual responses, and health or illness. This model, developed in an occupational setting, effectively links environmental stresses in the workplace with physical illness.
Johnson and Hartwein (1980) successfully applied Caplan's model to an academic environment. Their study also included more objective measures of personal characteristics thought to moderate the effects of stressful situations. Potential sources of both stress and support outside the academic setting were also included in their study.

Perlin and Schooler (1978) published a report of an extensive survey in which adults were questioned about their reactions to stressful situations. The focal points of the study were the coping strategies people used to combat the potentially harmful effects of stress. They also attempted to determine the effectiveness of different types of coping mechanisms.

The present study incorporates aspects of the Perlin and Schooler study into the framework of the Johnson and Hartwein study. The general causal model developed by Caplan is expanded to include the use of coping techniques studied by Perlin. This model postulates that the link between stress and somatic reactions is moderated by the coping strategies people use, their personal characteristics, and affective responses to the situation. The study essentially replicates Perlin's work in a University population. Data for the study was collected by means of written survey of university students.
Terminology. Before discussing the literature pertinent to the present study, it seems wise to briefly note the terminology used in the discussion. A number of authors have often used the terms stress and strain interchangeably. Some writers use the term stress in the same way others use the term strain. It is important to differentiate between the two.

Throughout the course of this paper, the term stress will refer to those things which are potentially productive of strain. Stress is conceived as a feature of an individual's environment. It is something external to the person. Strain is a state that the person is in as a result of stress. It is not, therefore, external to the individual. It is considered to be the result of inadequate adaptation to stress. A number of writers use the term stress in the same sense that the current paper uses strain. In their terminology a stressor is a feature of the environment which may produce strains. The terminology used in this paper is congruent with that used by Caplan et al. It runs contrary to the usage of Perlin and Schooler, however.

The process by which environmental stresses effect both affective and somatic responses presupposes a general
underlying factor effecting all levels of human activity. Thus it is possible for stresses occurring in one area of an individual's life to have ramifications for other areas of functioning. Hans Selye (1976) and Rene' Dubos (1954) were instrumental in developing this concept in the early 1950's. The idea that environmental stress can effect both affective responses and physical health is implicitly related to this concept.

Relevant past research

Caplin, Cobb, French, Harrison, and Pinneau (1975) reported the findings of an extensive study of occupational stress. They note that there has existed a good deal of confusion in the study of psychological stress and strain. This is, in part, the result of no clear agreement on the types of variables that should be studied or even how they should be defined. Most important, however, is the lack of a clearly defined and generally accepted theoretical framework for the integration of the many and diverse findings of research in this area. In their research, Caplan et al, confined their studies to the area of occupation. The social aspects of this environment were the primary focus of their report. In reporting the results of their research, they used a theoretical framework which they evolved in the process of organizing the findings of other research on stress and its effects on health.
Important variables. Caplan et al, categorize the variables of interest into six groups. The first of these is the global objective environment. The global objective environment refers to the entire world external to the individual. This environment has a real and tangible existence. It has concrete and measurable properties that exist apart from anyone's perceptions of it.

The subjective environment. The subjective environment, in contrast, is part of the person's perceptions. Caplan equates it with Lewin's (1951) "psychological environment". This environment is not directly observable. Rather, it must be inferred from an individual's actions and verbal reports. Caplan et al, stress that the distinction between the two is not restricted to the methods used to assess them. One world is external and the other internal to the person. More importantly, they are governed by different laws and processes.

While physical stresses tend to effect one's health directly, social variables tend to exert their influence through the subjective environment. Thus a person's work load has an effect to the degree that the person perceives themselves as over-worked.

Responses. The third category of variables, responses, consists of a person's reactions to their environment.
Three types of responses to stress were included in their analysis. Behavioral responses include such things as smoking or overeating. Measures of three affective responses, depression, anxiety, and irritability, were used in the study. Such things as an upset stomach or headaches are examples of the third group, somatic responses.

**Health and illness.** The authors included both physical and mental health measures in the health-illness category. These variables represent the final results of the cycle that started with a stressor in the physical environment. The presence of an illness is considered to indicate an inadequacy in the protective mechanisms available to any one person.

The effects of stress are moderated by a number of other variables. The protective or moderator variables included in Caplin's study are primarily related to social factors or stressors in the environment. Caplan included two classes of moderator variables in his study, social support and the individual's personality.

**Social support.** Social support is defined very broadly by Caplan. It includes any number of tangible assets such as medical insurance, financial supports such as public aid and one's income in addition to traditional kinds of social support. Love, affection, and sympathy are familiar examples of this type of social support.
The person. The final variable group, the person, includes more enduring aspects of an individual such as one's genetically determined physical traits. Such acquired personal characteristics as ego strength, persistence, and any number of personality traits are included under the category of the person. The key feature of person variables, be they acquired or inherited, is their non-transitory nature.

Less stable features of an individual are included under the category of responses. The distinction between these two may at times be considered somewhat arbitrary. When does a extended period of grief become a stable part of one's emotional makeup? The key to this distinction, in this writer's estimation, lies in the presence or absence of a particular precipitating event or events. Extreme grief may be linked to an event such as the death of a loved one, for example.

Types of Relationships in the Model. Caplan structures his model in terms of the types of relations between different classes of variables in the model. The first type of relation Caplan discusses is a direct causal relationship between two variables. The effect of the variable thought to be the cause is not in any way moderated by another variable. Rather, it acts directly on the dependent variable. An example of such a relationship might the relationship
between the global environment and the subjective environment.

The second group of relationships involves the presence of an intervening variable. In such a relationship, a causal variable would act on a dependent variable only through a third variable. This moderating or intervening variable would be effected by the causal variable. It in turn would have an effect on the dependent variable. For example, a father's income might not have a direct effect on the son's income. It is likely, however, that the father's income will have an effect on the son's education. A father who is "well heeled" can afford to send his children to better schools. As a result of a higher quality education, the son will be more likely to get a higher paying job.

A variable might have a direct effect on another variable as well as an indirect effect on that variable. In the example above, the father's income has an indirect effect on his son's income though education. The father's income may also have a more direct effect on his son's income. The father's wealth may, for example, have an even stronger effect on a company's willingness to hire the son than does the son's education. Of course, it is possible that a causal variable may have a number of indirect effects on a dependent variable. These may conceivably involve any number of intervening variables.
The last class of relationships involved in the model are those which include conditioning variables. Caplan makes an important distinction between moderator variables and conditioning variables. A conditioning variable may not be effected directly by a causal variable. This variable may have a decided effect on the relationship between two other variables, however. Suppose, for example, that a widow had a fairly large insurance settlement from her late husband's death. Suppose, also, that she were laid off from her job. Normally there would be a close relationship between losing one's job and a decline in their standard of living. The availability of money from another source such as the insurance settlement would greatly soften the blow of such an event. The loss of one's job would in no way effect the conditioning variable, income from other sources. The income from other sources would have a decided effect on the relationship between loss of job and decline in standard of living, however.

Hypotheses in the Caplan Study Caplan and his associates tested four major hypotheses relevent to the present research. The first hypothesis was that job stresses would produce strains in the individual. It was predicted that a certain amount of specificity would be present in these relationships. Certain jobs stresses would precipitate certain strains. The second general hypothesis was that per-
sonality variables would have an effect on the level of strain shown by an individual. The third hypothesis stated that persons with greater psychological, physiological, and behavioral strains would show a greater level of reported illness. Lastly, they suggested that the goodness of fit between the individual and job stress would be more closely related to strains than either the characteristics of the job or the person. Caplan and his associates also investigated the relationship between different jobs and the strains produced by them. They found a number of differences between jobs. The results of this analysis are not directly applicable to the current research, however.

Results - Hypothesis One. The first hypothesis was strongly supported. The data reported dealt with the second step of Caplan's model, the subjective environment. The effect of the global or objective environment was not actually assessed. Caplan suggests that the results of previous research (Kraut, 1966; French and Caplan, 1972) show that the subjective environment is a more important predictor of strain than is the objective environment. He states "it is what the person perceives in his work environment which counts more than the actual objective stress."

A number of both psychological and somatic responses were measured. In general, the measures of strains were correlated with one another. Caplan concludes that the
strains are closely more related to job dissatisfaction than they are to the actual characteristics of the job. This is, of course, to be expected in view of the theoretical model used in the study. Job pressures and stresses were postulated to have their effect through a number of intervening variables. The authors cautiously suggest that the relationship between the measures of strain and work dissatisfaction are causal. Given the cross-sectional nature of the data, causal inferences were not substantiated, of course.

A number of characteristics of the job that were related to strain were also found to relate to one another. Three variables that tended to form a cluster were boredom, dissatisfaction with the workload, and overall job satisfaction. The number of variables related to workload dissatisfaction included unwanted overtime, boredom, and poor person-job fit with regard to job complexity. Workload dissatisfaction was also a major component of overall job dissatisfaction.

Other characteristics of the job were found to relate closely to low job status. These included under-utilization of one's skills, low participation in decision making, and ambiguity about one's future job security. Two measures of goodness of fit between workers and their job demands were also associated with these characteristics as well as low job status. The first was the lack of fit between the work-
er's abilities and the complexity of the job. The other measure was related to the person's responsibility for other persons. All these characteristics were found together in the same jobs. They were also strongly correlated with boredom. These findings emphasized the importance of the correspondence between an individual's capabilities and wants and overall job dissatisfaction.

Another finding of this research was that the level of support that one received was negatively related to the reported level of depression. This was true for both support from one's immediate superior and from others on the job.

No relationship was found between behavioral responses such as smoking and any of the measures of stress or affective responses. Neither was any direct connection found between perceived stresses and physiological responses such as pulse rate or blood pressure.

Results - Hypothesis Two. No support was found for the second hypothesis, that personality characteristics would have an effect on a person's level of strain. The authors expected that the interaction between personality factors and job demands would be much stronger than the direct effects of personality variables. As a result, it was not unexpected that their analysis found little or no
effect. The authors do suggest, however, that such variables are more likely to serve as conditioning variables. Only a moderate degree of support was found for the third hypothesis; that strains led illnesses.

**Results - Hypothesis Four.** The last hypothesis, that the person environment fit would be more closely related to strains than either the subjective or the objective environment is rather strongly supported. Six measures of the person-job fit were used. These were correlated with measures of job satisfaction. These were more closely related to strain than measurements of actual environment.

**Applications to an Academic Environment.**

Johnson and Hartwein (1980) applied the model developed by Caplan to an academic environment. In addition to providing a test of Caplan's model in a different setting, the authors made a significant addition to the model. Caplan placed all types of responses in the same category. Within the occupational framework, the subjective environment directly effects reactions to work such as boredom and job dissatisfaction. This in turn impacts directly on the three categories of responses: behavioral, affective, and somatic.

**Modification of Caplan's model.** Unlike Caplan, Johnson and Hartwein do not treat all three classes of responses
as being directly impacted on by work or school satisfaction. Rather, the causal chains they propose include affective responses as an intermediate step between job perceptions and somatic responses. It should be repeated that Caplan failed to find a clear relationship between behavioral responses and other responses or measures of health and illness. Therefore the authors did not include measures of behavioral responses in their research.

The Johnson and Hartwein Study. This study adapted most of the variables used by Caplan to a student population. In addition, they were able to obtain a number of objective measures of variables that were not available for inclusion in the earlier study. These included measures of actual workload and academic aptitude as well as the student's perceptions of their workload. The student's expected academic performance and actual performance were measured.

The study also extends Caplan's research by including variables outside the academic environment which may have an effect on the student's adaptation in the academic world. These included the number of hours worked each week, and other outside responsibilities such as keeping house or watching children.
The final variable emphasized in their research was the student's perceived control over their lives. Other researchers (Lewinsohn, 1974; Seligman, 1974) have found this variable to be of importance in the understanding of affective disorders, especially depression.

**Results.** They discovered a number of patterns of inter-correlations corresponding to those found by Caplan and his colleagues. Six causal chains were found in the study. The first of these linked academic aptitude, performance, perceived control, and depression. The student's math ATC was most closely related to the actual academic performance of the student. This variable is more closely related to the actual G.P.A. than is the expected G.P.A. The student's expected G.P.A. is also closely related to the student's feelings of control. This in turn is related to feelings of depression. Lewinsohn's (1974) behavioristic theories of depression postulate depression as a major determinant of the inability to elicit positive reinforcements (such as grades) from the environment. In line with the results reported by Caplan, anxiety and depression were related to somatic complaints.

This causal chain was not related to the other linkages found in the study. In particular, there is no apparent link between this chain and the satisfaction chain discussed below. The researchers suggest that the findings of
Lawler (1973) may help to explain these results. Lawler disputed the common notion that job satisfaction leads to worker productivity. He suggested that the two are actually independent of one another unless the the rewards leading to job satisfaction are contingent upon productivity.

Pressure causal chain. The second causal chain connects outside work pressure and irritation. This cluster of variables also relates the lack of parental financial support to the amount of outside work the student does. This, in turn, is related to the degree to which the students feel their outside activities hamper their studies. More importantly, these are related to feelings of overwork and pressure to do well in school. These finally affect the level of irritation experienced. These results are congruent with those found by Caplan. The variables most closely related to irritation in the Caplan study were workload dissatisfaction and conflict of the the work role with other activities. While perceived control was closely related to feelings of irritation, it had little connection with other variables in this cluster. Hence it was excluded from this causal chain.

Irritation was not related to somatic complaints. The other measures of affective responses were rather closely related to somatic complaints, however. The data therefore casts some doubt on the viability of including
measures of irritation in the model. It does not seem to be related to somatic responses in the same manner that anxiety and depression are.

**Overall Satisfaction.** Satisfaction with the university is the main theme of the next grouping of variables found in the study. The major components of overall satisfaction were how interesting the students found their classes, how challenging the classes were, and how much school administration and teachers listen to them. These variables were thought to be close counterparts of variables closely related to boredom and hence overall job satisfaction in the Caplan study. The central variable related to overall satisfaction was the interest that their classes held for the student. Irritation was negatively correlated with satisfaction with the university. Satisfaction is also related to the general support that students receive from their teachers and parents. One's control over their own life was also related to satisfaction with the university.

The model used by Johnson and Hartwein assumes that the direction of causality in this chain flows from to satisfaction to depression. The findings of both Lewinsohn (1974) and Beck (1973) would suggest alternative hypotheses. The work of Lewinsohn suggests that depression is a precursor of inadequate performance i.e. the inability to evoke reinforcement from the environment. It seems quite plausi-
ble that this would lead to dissatisfaction. Beck also offers support for an alternative hypothesis. He suggests that persons who are depressed simply don't register the same level of enjoyment from normally satisfying activities as do other people. This viewpoint does not clearly suggest a causal flow in either direction. Rather, it becomes more of a chicken-egg dilemma.

Intent to Return. An interesting corollary to the above discussion was found in the fourth causal chain reported by the authors. Only two variables were found to relate to the expectation of returning to the university the next fall. These were the overall satisfaction with the school and the degree of support received from other students. Academic and financial matters were not related to the intent to return in the fall.

Control chain. The fifth causal theme centered around the control the student's feel over their lives. Control, whether the student's had declared a major, clarity about their academic future's and their future career's were all inter-correlated. This seems quite reasonable in view of the importance of academic matters to a university population.

Affective responses as a moderator. Partial support was found for the inclusion of affective responses as a mod-
erater between environmental responses and somatic complaints. Included in this causal chain was the student's control over their lives. It was hypothesized that control would be related to the student's environment. Control would, in turn, be related to affective responses. Affective responses are then related to the level of somatic complaints reported by the student. Control tended to be interpreted in terms of the positive responses that one was able to evoke from the environment. In support of this conceptualization of control, the study found that control was related to academic success, support from teachers, students, and administration, and overall satisfaction. Negative feelings such as overwork or being hampered by outside duties were not significantly related to control. Thus, this interpretation seems to be supported by the data.

Control was related to all three measures of emotional response. Irritation, depression, and anxiety were all moderately inter-correlated. The patterns in the data closely corresponded to those found in the Caplan study. The magnitudes of the correlations were also quite close. Two of these, depression and anxiety, were related to somatic complaints. Control, however, is not related to somatic responses. Like the depression grouping of variables, the direction of causality in this cluster cannot be determined. It is likely that a vicious circle in which
affective responses and control feed on one another is in effect.

Research on Coping Strategies

Leonard Perlin and Carmi Schooler (1978) published the results of a large survey dealing with stress and the strategies people use to combat its effects. Perlin and Schooler gathered their data from 2300 interviews with adults between 18 and 65 years old. The subjects were selected from households in the census-defined Chicago urban area by means of a cluster sampling procedure.

The authors confined their study to more institutionalized strain producing factors rather than traumatic events. The roles that were studied are those that most consistently and frequently interject themselves into people's lives. These areas included occupational roles, marital relations, household finances and management, and parental and family relations. Indeed, these areas of endeavor are those most likely necessary for the continuation of a normal existence.

The study gathered three types of information from respondents. The subjects were asked about potential life stress in major life areas. The second type of information collected by the study concerned the types of things people do to combat stress in the four major life areas. Lastly
people were asked about the strains that they experienced in these areas.

**Goals of the Perlin and Schooler study.** The research had three major goals. The first of these was to identify the major stress producing factors in each of the life areas. A total of 11 factors were found in the four life areas of the study. Three of these were in the parenting area, three in the marital area, one in household economics, and four in the work environment.

Perlin and Schooler used self reports from the respondents to measure of the strain experienced from life stresses. In this part of their report they drew a careful distinction between reactions to stress and other negative emotional states. Strain is defined as a limited state brought about as a reaction to specific events. In this sense it is distinguished from other negative emotional states such as extreme anxiety or depression which also may be regarded as reactions to ongoing or extreme stress. They are however regarded as more global and lacking in a particular focus.

**Dimensions of Coping.** The second major aim of the research was to delineate the structure of coping behavior that people use in dealing with stress. Perlin and Schooler
identified three different dimensions of coping behavior. A fundamental distinction was made between three types of resources available to an individual attempting to deal with life stresses. Social resources refer to the network of personal inter-relationships people are involved in and which, at least potentially, offer support helpful in easing the possible deleterious effects of life stresses. In general, social resources were considered beyond the scope of the paper and hence were excluded from their analysis. Psychological resources are those enduring personality characteristics which in large measure determine the manner in which a person deals with a broad range of different events, some stressful and some pleasurable. Specific coping responses are those behaviors available to an individual in response to specific stressful life events. Perlin and Schooler emphasize the differentiation between what people do (coping behaviors), what people are (personality factors), and the resources available to them (such as social support).

**Personality Factors:** Perlin and Schooler included measures of three independent personality factors in their study. Self-esteem refers to the overall positive regard one has for oneself. Self-denigration reflects the degree to which individuals hold negative attitudes towards themselves. The measures of both these factors were derived by
Rosenberg (1965). The third personality factor, mastery, is conceptually very similar to the familiar concept, locus of control. This factor measures the degree to which individuals regard their life as in their own hands as opposed to under the control of outside influences.

Coping Responses: Three major categories of coping responses were identified. The first type of response to stress attempts to change the situation from which the stress arose. Were one faced with a number of unexpected bills, they might attempt to alleviate the stress such a situation might arouse by seeking a second or part-time job.

The second type of coping strategy available to an individual would result in an action designed to perceptually control the meaning of a stressful situation after it has occurred. The essential feature of this type of response, is that the individual attempts to evaluate the situation as "not as bad as it seems". Use of mechanisms such the "count your blessings" approach are representative of this type of coping strategy. Faced with the mounting bills in the example above, a person might attempt to control their meaning by comparing themselves with others who are less fortunate.

The third type of coping mechanism attempts to ease the effects of a stressful situation by means of management
of the stress after it has occurred rather than deal with the situation or its meaning. Perlin states that such a mechanism essentially enables people to accommodate to existing stress without being overwhelmed by it. A person may face the pile of bills with an attitude such "as everything will work out all right in the end". The familiar "that's life" is another example of this type of coping strategy. It should be noted that the authors conclude that this type of mechanism is different from the other two in that it is not directed at any particular stressor or situation. Rather, it is more of a stress management tool. The same perceptual orientation may be used to alleviate strain brought on by a number of different problems all at the same time. The non-specificity of this type of strategy makes the explication of concrete examples of such behavior difficult. There is seldom any clear sign that the behavior being exhibited at any moment is an example of such a coping strategy. For example, Perlin and Radabaugh (1976) have shown that people have used alcohol as a means of alleviating stress. Such behavior can, of course, be used for a number of different functions.
Types of Coping Responses

Type I - Situation altering responses: These responses attempt to change the situation leading to stress, for example, finding a second job to meet rising debts.

Type II - Meaning altering responses: Type II responses are aimed at changing the perceptual meaning of a situation. Making positive comparisons with the plight of others is a good example.

Type III - Strain management responses: Responses that are used to adjust to already existing strain are considered type III responses. Drinking heavily or being passive and simply bearing the situation are examples of this type of stress management response.

Specific coping techniques. A total of 19 separate factors or coping strategies were identified (the authors state that there are 17 but by actual count of the factors listed in their appendices there are 19). Four factors of the first type were found. The second type of coping strategy, altering the perceptual meaning of an experience, was decidedly the most prevalent type of coping response. While most of the coping factors of the first type were found in only one life area, two factors of the second type were operative in all four life areas. One very common example of this type of coping mechanism is making positive comparisons of oneself or situation with others. For example hardships that a person living in a deteriorating neighbor faces very day may be paled to insignificance when the frame of reference is Bombay or areas in Bangladesh. The authors
also include temporal comparisons in this category. Difficulties that are considered an improvement over the past or as an indication of better times to come can be faced more easily. For example, the problems brought on by the current inflationary cycle, are not nearly as bad as those caused by the depression of the thirties.

Another coping device that was found to operate in all four life areas was selective ignoring. A person using this technique would generally focus their attention on some more positive aspect of the situation. By doing so, the person is more easily able to trivialize the objectional features of a situation. Two other coping factors similar to selective ignoring were found in the areas of occupation and household finances. These were the devaluation of money and substitution of rewards. In all three types of responses the person is able to avoid the harmful consequencies of a less than optimal situation by differentially weighting other aspects of the situation. The person places greater value on those aspects of the situation in which they enjoy more success. Four factors used primarily to adjust to existing strains were found. Emotional discharge vs. controlled reflection and passive forbearance vs. self-assertion were both found in the marital relations area. Potency vs. helplessness in parenting and optimistic faith in household economics were the other two examples of type III responses.
Effectiveness of Stress Management Factors. The final aim of the research was to assess the effectiveness of the coping mechanisms that were found. Perlin and Schooler were also interested in comparing the effectiveness of coping mechanisms with that of coping resources, i.e. personality factors. In addition they analyzed the differences in effectiveness between the three types of coping strategies. Differences in the effectiveness of coping strategies between the four life areas and between different groups of people, i.e. male-female, rich-poor, were also analyzed.

The effectiveness of various coping strategies was evaluated by means of regression analyses. First stress was regressed on strain in each life area. The coping strategies were then added to the regression equation. The effect of each strategy could be assessed by noting the reduction in the regression co-efficient of stress on strain as that variable was added to the model. The relative strength of each strategy was determined by comparing the regression weights of each coping variable when all the other coping responses were added to the model first.

Coping techniques were found to have much different levels of effectiveness in the four life areas used in the study. Coping strategies were definitely most effective when used in the marital relations area. Coping techniques
were second most effective in parenting and family matters. The effectiveness of coping responses in the household economics area was slightly less than in parenting. Coping techniques provided no significant reduction in strain in the occupational life area.

Efficiency of personality factors. The relative efficiency of the three psychological resources was also determined. The greatest reductions in strain accounted for by personality traits were in the areas of marital relations and household economics. The regression of low self-denigration on strain in the marital relations area was .20. Mastery had a co-efficient of .14. Clearly the weakest personality variable in the area of marriage was self-esteeem. Personality variables had a similar effect in household economics. The reduction in strain provided was the same as was found in the marital area.

Personality variables had a less powerful effect on strain in the parenting area. Low self-denigration had a regression co-efficient on strain of .20, the same as it did in the marital area. The mastery variable had a co-efficient of .18. Self-esteeem was again the least effective trait.

The occupational area was once again more resistant to the moderating effects of coping than the other life
areas. The low self-denigration variable was most effective in this area. It was clearly more helpful in reducing strain than either self-esteem or mastery.

As opposed to the coping strategies, the personality factors were assessed across all four areas in the study. This allowed a clear hierarchy of effectiveness to be discerned. Low self-denigration was clearly the most potent trait. It was the highest in all four areas. Mastery appeared to be the second most important variable. It was the second most effective in the prevention of strain in three of the four life roles. In the occupation area it was third. However it was still quite close in this area. In the areas where mastery was more effective than self-esteem, it was so by a much larger margin.

**Conflict with Caplan's findings.** It should be noted at this point that Perlin's results run contrary to the findings reported by Caplan. Caplan found no effect for the four personality variables included in his study. These were type A personality, flexibility, and two measures of need for social approval. There seems to be little similarity between these variables and those used in Perlin's study. It is, therefore difficult to make meaningful comparisons.
Comparison of coping and personality factors: The question of which is more effective, what a people do or what they are, was not clearly resolved by this study. Personality factors were more effective in two areas, coping behaviors in the other two areas. Responses were more effective in marital relations and parenting areas. Psychological resources were more important in the areas of household economics and occupation. The differences were not particularly large in parenting or household economics.

Use of Coping by Different Groups: The final analysis compared the usage and effectiveness of coping strategies by different groups. The respondents were grouped on four variables. These were sex, age, education, and income. The authors correlated the use of particular coping strategies with the trait in question. They also correlated different grouping variables with the possession of the three psychological traits.

Men were found to both display helpful personality factors and use coping responses more than women. For all three psychological factors the correlations of traits with sex were statistically significant. The highest correlation was only .11, however. Just slightly over one percent of the variance was explained. Eight of the coping strategies were found to be used more by men. In only two of these did sex account for more two percent of the variance. Three
coping responses were exercised more often by women. All three of these were selective ignoring. However, selective ignoring is actually a harmful response in two of the three areas in which they are used more often by women. While these differences were statistically significant, they were very small.

The effects of age, education, and income were more much pronounced. No overall superiority could be found in any age group. There were clear differences found in individual coping factors and personality variables. For example, older persons showed higher mastery and lower self-de-nigration scores. They made less use of certain coping responses, however. Thus strengths in one personality factor or coping technique were compensated for by less use of coping strategies in other areas.

Wealthier and better educated people enjoyed a clear advantage in the exercise of effective coping strategies. They also had higher scores on helpful personality factors.
The Current Study

This paper combines the different aspects of stress and reactions to it discussed by Perlin, Caplan, and Johnson and Hartwein. The model proposed by Caplan does not include coping strategies. Perlin's research did not include somatic reactions to stress. Both somatic reactions and coping will be included in the current work. The current study will, of necessity, not include measures of actual physical illnesses. Johnson and Hartwein found that the population they studied was relatively free from physical illnesses. Measures of health simply would not have provided enough useful information for inclusion in the study. The same is, of course, true of the present study. The potential measures of mental health that were available such as visits to the student counseling center posed a number of problems concerning matters of confidentiality. As a result, they were not included in the research.

Stress Management Styles. The four major life areas studied by Perlin were occupational concerns, marital relations, family and children, and household finances. The student counterparts to these were academic careers, dating or marital relations, and relations with parents. Household finances were not considered an appropriate area to include
in the current study. Few of the students are married or maintaining a household in the same sense as a household is maintained by a married couple. This is especially true for dorm students and those living with their parents. This probably is not a meaningful life area for most students.

**Measures used in the Study.** Measures of three different somatic responses are included in the study. These were anxiety, irritation, and depression. The measures of anxiety and irritation were the same as those used by Caplan. The six item depression scale used by Caplan was included in the questionnaire. It was not used as the main measure of depression, however. Instead, the 21 item Beck (1973) depression scale was used. This scale was thought to provide a more reliable measure of depression. The measures of somatic responses used in the Johnson and Hartwein study were used verbatim in the current research.

The measures of personality variables used by Perlin and Schooler were also included verbatim in the current study. The measures of coping responses used in their study were included with as little change in wording as possible. The only changes were those to fit the question to the student's environment. For example, a question dealing with the adult's spouse would have the word "spouse" changed to "boyfriend or girlfriend".
Many of the demographic variables Perlin used to compare the use and effectiveness of coping techniques were not found to be useful with the present population. No analyses were done on the differences in the respondent's educational level. There are simply no meaningful differences in the education of the subjects in this study. Likewise, there are no real differences in the student's ages. It seemed unwise to include analyses for the class (freshman, sophomore, etc.) of the student as this would likely be influenced by selection effects.

Other demographic variables were included in the study that were thought to be more salient to the current population. These were used in the same way as the demographic variables in Perlin's study. Earlier research (Hartwein and Johnson, unpublished) with a very similar population has shown that the residence of the student has a dramatic effect on the nature of the support structure of the student. Thus, it is thought that this is an important variable to include in the analysis. The inclusion of academic aptitude is quite reasonable in view of its influence on success in school. Indeed, the best predictor of actual G.P.A. in the Johnson and Hartwein study was the student's A.T.C. score.

Hypotheses tested The first phase of the present study ascertains the relationship between a number of per-
sonality and demographic traits, the use of coping strategies, and the levels of affective and somatic responses. Four important trait and demographic variables were included in the study. These were the student's sex, their residence, their total workload, and their academic aptitude. This phase of the study used the same analysis procedure followed by Perlin. The variables in question were simply correlated with one another.

An important question that will be answered by this correlational analysis will be the relationship between the personality variables and the use of coping strategies. Higher levels of the personality variables that Perlin found effective in combatting stress and strain should diminish the need to use coping techniques.

The uses of coping responses in different situations can also shed light on the overall coping styles exhibited by the students. The frequencies of coping response uses can be correlated across types I, II, and III. The use of coping behaviors across the three life areas will also be correlated.

An important difference expected between the current study and that of Perlin and Schooler is that few if any major differences are thought to be related to sex. There are two major reasons for this. The academic community is
generally more liberal than the general population. It follows that academia is also more egalitarian and less prone to dictate traditional roles for females. It is expected that women will be are less restricted in the use of different types of coping techniques than would be the case in society in general.

In most occupational situations those abilities important for success are more commonly found in men than in women. This includes any number of traits from physical strength needed for success in manual labor jobs to personality traits such as aggressiveness. This situation is not present in the academic environment, however.

No meaningful differences in overall intellectual abilities have been found between men and women, the main ability that has a bearing on success in school. Thus, it seems reasonable to assume that woman will compete on more even terms with men than is likely in the general population.

Further analysis briefly examined the relationship between between affective responses and the level of somatic symptoms reported. Johnson and Hartwein have shown that there is a correspondence between the reported affective measures and the number of somatic complaints.
The Second Phase of the Analysis

The second phase of the data analysis will replicate Perlin's effectiveness analysis in the academic area. Data on the levels of stress present in the environment are available from the survey. The analyses comparing the relative effectiveness of the two dimensions of coping will include personal traits and coping strategies. The academic and school life area should produce interesting results. It is expected that responses aimed at altering the situation will prove more beneficial in successfully completing one's academic work. Whether these responses are also effective in dealing with stress itself remains to be seen. Such responses may be quite successful in aiding academic endeavors but actual exacerbate the affective problems in the situation.

It is expected that the analyses will yield a number of different results than those found by Perlin, however. The populations that were studied were different, of course. More important is the fact that in the three life areas included in the study, the relationship between the students and their environment is thought to be different than the corresponding person-environment relationships found in Perlin's study.

In particular, the academic life area in this study is thought to be amenable to input from the student. This is thought to be true for a number of reasons. Many of the
institutionalized rewards available in the academic world are largely dependent on a combination of the ability of and effort expended by the student. The most obvious of these are the student's grades. Other, more personal, rewards such as the acquisition of knowledge or the feelings of successful accomplishment are also dependent on the student's effort and ability. This is not the case Perlin and Schooler found in the occupational role, their counter-part to the student's academic career.

The first phase of data analysis examined the different patterns of coping behaviors and affective and somatic responses in all three areas of the student's life. This analysis will be able to examine the effectiveness of different coping dimensions while controlling for the level of stress present in the person's life. This is of particular importance since it is likely that the use of coping strategies reported is largely a function of the amount of stress encountered. People who encounter little stress are less likely to have need of coping techniques. This is not the case with the personality factors postulated to moderate the effects of stress. Personality traits are much more stable than a person's responses to a situation. A person will likely have a repertoire of responses they can call on in any given situation. These responses are only present as the result of some stimulus event, however.
METHOD

Participants. The subjects in this study were 370 lower division students enrolled in a major Midwestern university. The largest group were freshmen. They comprised about 70 percent of the sample. Approximately 25 percent of the sample were sophomores. The rest were upper classmen. All were enrolled in an introductory psychology course. The sample was comprised of about 40 percent males and 60 percent females. Nearly all of the students were between 17 and 22 years of age. The students were from four separate classes taught by three different instructors.

Procedure. The data used in the present study is a subset of the information collected by a larger co-operative effort dealing with the effects of stress in the academic environment. The subjects were given eight separate questionnaires over the course of the fall semester. The first questionnaire was administered on the first day of class. Questionnaires two through seven were given starting the third week of class and presented every two weeks thereafter. The final questionnaire was presented on the last day of class. Only those questions relevant to this study are discussed here.
The experimenters introduced the "University Attitude Questionnaire" by explaining that they wanted to obtain the students' opinions of university life as well as information about their personal feelings. Directions on filling out the questionnaire were given and examples of the types of questions presented. The importance of being honest was stressed. The students were assured that their responses would be held in the strictest confidence. It was explained that the consent form accompanying the questionnaire needed to be signed in order for certain information, notably their final grades, to be obtained from their student records. The students were told that they would be given a number of follow-up questionnaires over the course of the semester. Questions were called for. The first questionnaire was then presented. The remaining questionnaires were presented with similar instructions.

Questionnaires. The first questionnaire was an expanded version of that used by Johnson and Hartwein (1980). Data collected from the survey included the sex of respondent and their residence (with their parents, in the dorm, or an apartment). The total work load that a student carried was assessed by asking the the number of credit hours carried, the number of hours worked each week, and the number of hours spent in non-paid work activities such as volunteer work or taking care of children. Respondents also
used a five point scale to rate how much they felt their outside activities hampered their school work.

The survey included a number of questions about the student's expectations of and plans for their career and academic future. They were also asked what G.P.A. they expected to receive for the current semester. A question on the student's locus of control was included.

The affective responses of the students was also measured. They were asked how often they felt: jittery, nervous, calm, angry, aggravated, annoyed, sad, unhappy, blue, good, cheerful, or depressed. The first three items were combined as a measure of anxiety. The second three items measured aggravation or irritation. The last six measured depression. The Beck (1973) depression scale was also included in the questionnaire.

The students were asked about a number of somatic responses that they might have experienced. They checked how often they; felt dizzy, had an upset stomach, experienced a loss of appetite, had trouble sleeping, had sweaty hands, felt their heart beating fast, or had headaches during the past month. These somatic measures and the affective measures are the the same used by Caplan (1975).

The bi-weekly questionnaires. The bi-weekly questionnaires were a very abbreviated version of the first
questionnaire. The somatic and affective scales were repeated. The locus of control question was also included. These short surveys were used primarily to construct measures of affective and somatic variability.

The final questionnaire. A final questionnaire was presented on the last day of class. This questionnaire was also a modification of the Johnson and Hartwein questionnaire. Students again rated the degree to which they felt their outside responsibilities hampered their school work. They were also asked if they felt over-worked by, challenged by, and interested in their class work. The students were again asked how often they felt in control of their life and what G.P.A. they anticipated. Measures of satisfaction with the university included the student's overall satisfaction with Loyola, how satisfied students were with their social life, and their intentions to return to Loyola next semester. The scales measuring affective responses and somatic complaints were included. The Beck (1973) depression scale, the study habits scale were also repeated.

The final portion of the questionnaire was an adaptation of the survey used by Perlin and Schooler (1978). Perlin's survey was administered to adults in established households. As a result, many of the questions used in that survey were not applicable to the population being studied. Only those questions dealing with the levels of strain expe-
rienced, personality factors, and the use of coping strategies were included.

The questions used from Perlin's study were adapted with as little change in wording as possible. In each of the three life areas a set of questions was presented which asked how often the respondent did certain things in response to problems in that life area.

In each of the three areas students answered questions comparing themselves with others in terms of the problems they face. Another set of questions assessed the person's overall emotional or affective feelings about their academic career, social and parental situations.

Two sets of questions were included which were not specific to any life area. These provided measures of strategies used for "perceptually controlling the meaning" of life stresses and "keeping the emotional consequences (of life stresses) within bounds". A number of indices were derived from these questions. A measure of emotional or affective strain was computed for each of the three life areas in the study. In addition, measures of the use of coping techniques were derived. The specific coping responses included in the study are listed below.
Social Life Coping Techniques
Negotiation
Making Positive Comparisons
Selectively Ignoring Bad Aspects of a Situation
Controlled Reflectiveness vs. Emotional Discharge
Self-Assertiveness vs. Passive Forebearance

School Coping Responses
Making Positive Comparisons
Selectively Ignoring Bad Aspects of a Situation
Taking Optimistic Actions
(to alleviate the source of a problem)

Parental Area Coping Responses
Making Positive Comparisons
Selectively Ignoring Bad Aspects of a Situation
Self-Reliance vs. Advice seeking

These were also combined to give measures of the use of types I, II, and III responses, school, parental, and social responses as well as a total coping response score.

In addition to these a number of other composite scores were calculated. A over-all school stress score was calculated. This factor incorporated school work factors as well as other aspects of the student's social life and general happiness with university life. This factor may be viewed as measure of the overall adjustment to and/or problems with school life. A school over-work score and a person-environment fit score which related the student's aptitude to their course load. Somatic and affective response scores were also computed. Two types of affective response scores were calculated from the data. The general affect scores were calculated from the questions first used by
Caplan and later Johnson and Hartwein. They are referred to as general affect scores in the remainder of the paper. The total affect score is a combined index derived from these scores. The affect scores taken from Perlin's survey apply only to a single life area. The questions were phrased to limit the response only to dating, parents or school. These are called life area specific responses or strains in the rest of the paper. The longitudinal data in the survey also allowed the calculation of affective reactivity or variability scores. These were somatic, depression, irritation and anxiety variability scores.

After the end of the semester the students' actual G.P.A. and their A.C.T. aptitude scores were collected from the student record files. These aptitude scores as well as the demographics were all loosely grouped as level-one variables during the subsequent analyses. Each of these variables was a fairly direct assessment of a factual condition. As such, they belong on the lower end of the causal sequence advanced in the study.

The relationships between specific variables in the study are illustrated in Figure 1. The arrows on the linkages indicate the direction of causality.
## Figure I.
### Specific Variables in Study
#### School Life Area

<table>
<thead>
<tr>
<th>Objective Environment</th>
<th>Intervening Variables</th>
<th>Subjective Environment</th>
<th>Stress Management or Moderator Variables</th>
<th>Affective Reactions</th>
<th>Physical Reactions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Work-Class Load</td>
<td>Scholastic Aptitude</td>
<td>Overall School Stress</td>
<td>Personality Factors</td>
<td>School Strain</td>
<td>Somatic Reactions</td>
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<td></td>
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<td>Coping Responses</td>
<td>Total Affect</td>
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**Note:** The table outlines specific variables in the study related to school life, including objective and subjective environments, stress management, and affective and physical reactions.
RESULTS

Problems were encountered in the interpretation of the results of phase one of the analysis. A very large number of correlation co-efficients were generated in the analysis. In addition, the study contained nearly 400 cases. The result of these two factors is that generally accepted levels of statistical significance are inappropriate for this study.

Correlations of only 0.10 are statistically significant at an alpha level of 0.05 if all 370 cases are included. This level of correlation explains only one percent of the variance, however. Because well over 1500 correlations were produced, a considerable number of these would be significant at even at the 0.01 level merely by chance. For these reasons, it was decided that a correlation of 0.20 would be the minimum that would be considered "meaningful". This level explains four percent of the variance in a variable. In general, correlations that are statistically significant but lower than 0.20 will be noted. Information on the degrees of freedom and alpha levels will not be given though.
LEVEL ONE AND OTHER VARIABLES

The relationship between level one variables and other variables in the study was not strong. In most instances it failed to reach statistical significance. There were few meaningful relationships between demographic variables and any of the variables postulated to mediate the effects of stress on affective or somatic reactions; coping responses and personality factors.

Inter-relationships of Level One Variables: In general, there were few significant inter-relationships between level one variables. A small number of significant differences were found between demographic groupings, however. Dorm students had much heavier total load than did students living in an apartment. Those living with their parents had even heavier total loads. These differences were highly significant statistically \( F(2,189) = 24.69, \ p = 0.0000 \). The differences in the student's total load were the result of longer job hours and volunteer or unpaid work. There were no major differences in the class loads between the groups. No other correlations between the level one variables in the study were significant at the 0.025 level.
Level One Variables and Strain Moderating Factors

Coping Responses and Level One Variables. It should be re-iterated at this point that in some cases two or more specific coping techniques were combined to give an index of a more general type of coping response. For example, positive comparisons and selective ignoring in the dating and social life area were combined to give an index of meaning altering or type II behaviors in dating. These were also combined with their equivalent behaviors in the other life areas to produce an overall index of the use of type II coping responses. In a number of cases the components of an index may be correlated with criterion but the overall index will not be correlated. Such cases will be pointed out.

A particular coping response such as the use of positive comparisons in dealing with social problems will be referred to as an individual coping response. When type I, II, and III responses are referred to, they will be combined across all three life areas unless otherwise stated. For example, type I dating behaviors are synonymous with negotiation in dating. Type I behaviors will be all type one behaviors combined across life areas. Dating responses will refer to all coping responses used in the student's social life. This terminology will hopefully avoid confusion.
The use of coping techniques was only weakly related to the demographic variables included in the study. A number of relationships were in the expected direction. In some cases they were fairly consistent across different coping responses in different life areas. With few exceptions, they failed to reach statistical significance, however.

Men used coping responses more often than did women. The differences in their total coping scores did not approach statistical significance, however. Males reported a greater tendency to use situation altering strategies than did the females in the study. They also used more type II coping responses (changing the perceptual meaning of the situation). Neither of these tendencies approached statistical significance, however. While women used more type III responses than did the males, this relationship did not approach significance. Type III coping responses are used to adapt to stress after it has been manifested.

Females used type III coping responses when dealing with their parents significantly more than did males \(F(1,187) = 7.54, \ p = 0.006\). This was the only individual coping response in which the difference between males and females approached significance. These results provide clear support for the hypothesis that the more liberal atmosphere of the university allows women greater freedom to exercise options in handling problems.
The use of coping responses was not related to the residence of the student. In this survey, the differences in the support structure between dorm and commuter students found in the Johnson and Hartwein study did not effect the use of the different of coping techniques.

Although the total coping score as well as types I, II, and III scores were positively correlated to the total load that a student was carrying, none of the correlations approached statistical significance. This clearly provides support for Caplan's contention that the effects of environmental stress are not of themselves as meaningful as is perceived stress. Students did not seem to make greater use of coping strategies in direct response to their work-load. The relationship between the use of coping responses and feelings of overwork and other school related stress was somewhat stronger than the correlation with the actual work-load.

A small but statistically reliable relationship was found between the use of coping techniques and the student's scholastic aptitude. Those who had greater aptitude used coping strategies less. Although the correlation between total use of coping techniques and aptitude was statistically significant, none the correlations with type I, II, and III behaviors was significant.
Demographics were not related to the personality variables replicated from the Perlin and Schooler study. None of the correlations reached statistical significance.

**Level one variables and affective responses.** Unlike coping behaviors, affective responses showed a number of meaningful correlations with the demographic variables in the study. With the exception of the student's aptitude score, all of the demographic variables in the study displayed statistically significant and, often, predicted relationships with the affective measures in the study. For the most part, these correlations tended to be in the same direction as those found in the Perlin study. The strength of the relationships also displayed a degree of similarity. In most cases, the values of the correlations were less than 0.20, however.

Sex was related to a number of affective and reactivity measures in the study. Significant but small correlations were found with two of the three measures of general affective response. Men reported both less anxiety and less depression than women. These differences were too small to be of major import, however. No differences were found in the level of irritation. Males were somewhat less likely to experience school-related or parent-related strain than were females. Sex was also related to all three measures of affective reactivity included in the study. In each case,
males were found to be less variable on the affective state measures in the study. The combined affective response score was unrelated to sex. The correlation did not approach statistical significance. Likewise, there was no correlation to be found between sex and either measure of school related stress.

Though a number of the correlations with sex reached statistical significance, only a limited amount of the total variance was explained. The largest correlation was -.184. This explains only about four percent of the total variance. Because of the relatively large number of respondents in the survey this correlation co-efficient was significant at $p = 0.006$.

Even though these correlations are fairly small, they do provide some evidence to reject the hypothesis that no differences would be found between males and females in this population. All of the correlations cited were statistically significant. Also of importance is the fact that the correlations were all in the same direction. Women reported a higher level of affect than did the men in this population.

Only one significant relationship was found between the student's residence and the affective measures in the study. The level of parental strain was greater for students living away from home ($F(2,187) = 3.603$, $p = 0.029$).
The total load the student carried was also related to affective measures in the survey. The strongest relationship indicated that those students carrying a smaller load were less likely to experience school related overwork stress than were less burdened students \( r(99) = -0.474, p = 0.000 \). There was no correlation between the total load and overall school related stress. A significant but weak negative correlation between the total load and parental strain was found \( r(183) = -0.145, p = 0.027 \). The correlation of workload with the total affect score approached statistical significance but was less than 0.20. Again, no relationship was found with either stress measure.

The question, "How often do you feel in control of your life?" was not closely related to the level one variables in the study.

**Level One Variables and Somatic Responses:** Very few meaningful correlations were found between demographics and somatic responses. No significant statistics were produced when the student's total load, residence, or scholastic aptitude were tested with somatic responses. Males were shown to have a lower level of somatic responses than were the women in the study. This relationship had a modest correlation of \(-0.223\) \( d.f. = (205), p = 0.001 \). No correspondence was found with the level of somatic reactivity, however.
Moderating Variables - Affective and Somatic Reactions

The personality variables used by Perlin and Schooler were fairly closely related to the emotional indices in the study. Of 33 possible correlation co-efficients, only ten did not reach significance at 0.05. Of greater importance, well over half of these were larger than 0.20 and 15 were over 0.30. This was clearly one of the strongest patterns of correlations found in the entire survey.

As the analysis progressed, a very clear pattern of correlations developed. The magnitude of the correlations of personality variables with other variables was always very similar. Self-esteem and mastery were correlated in the opposite direction of self-denigration. Perlin's variable, mastery, was also rather closely related to the variable "control" from the Johnson and Hartwein study.

Because of this similar close pattern of correlations, it was decided that a factor analysis on these four variables would be appropriate. The results were as predicted. All four variables loaded quite heavily on a single personality factor. Almost three-quarters of the total variance among these variables was attributable to this factor.
In more closely examining the components that made up this factor, it seems reasonable to label it as relating to feelings of self-worth and potency. This variable was included where appropriate in all subsequent steps of the correlation analysis.

There were only very small differences in the ability of the three personality variables to explain the variance in emotional responses. The major pattern that emerged from the correlations was that mastery, low self-denigration, and self-esteem were very consistently related to affective responses in the same direction. The Pearson's $r$ values also showed a close correspondence in magnitude. A fairly strong pattern of correlations existed between the general personality factor and affective responses. These correlations were somewhat stronger than with the individual personality variables.

**Strain Variables:** Strain experienced in specific life areas corresponded with low levels of mastery and self-esteem. High self-denigration was correlated positively with strain. Correlations of Perlin's three personality variables with school and social life strain were all approximately 0.35 or greater. The correlations were also about 0.35 for self-denigration and mastery with parental strain. The correlation of parental strain with self-esteem was less than 0.20.
The general affective response variables also showed a high degree of correlation with Perlin's personality variables. The Beck Depression Scale and irritation corresponded rather closely with personality variables. The absolute values of the correlations with irritation were all approximately 0.30. The Pearson's r values for the correlations of the Beck depression scale with personality variables were greater than 0.45. The correlation of the Beck scale with self-esteem reached 0.54. This correlation accounts for nearly 30 percent of the variance in the level of depression experienced. Interestingly enough, personality variables were not related to the level of depression as measured by the bi-weekly scales. None of the correlations with anxiety were higher than 0.20. Table I below details the correlation analysis of personality variables and emotional responses. Positive personality factors corresponded to low levels of adverse affective responses.

There were no meaningful relationships between personality variables and the levels of variability in emotional responses. The largest correlation, while statistically significant, was only 0.126.

Overall school stress had a number of meaningful correlations with personality factors. The correlations with mastery, self-denigration, and self-esteem were 0.433, -0.336, and 0.254 respectively (d.f. (119) p = 0.000).
Table Ia.
Personality Variables and Affective Responses

<table>
<thead>
<tr>
<th>Total Strain</th>
<th>Social Strain</th>
<th>School Strain</th>
<th>Parental Strain</th>
<th>Overall School Strain</th>
<th>School Overwork</th>
</tr>
</thead>
<tbody>
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</tr>
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<td>(279)</td>
<td>(279)</td>
<td>(279)</td>
<td>(119)</td>
<td>(120)</td>
</tr>
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<td>P=0.000</td>
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</tr>
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<td>(248)</td>
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<td>(248)</td>
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<td>(153)</td>
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<td>(279)</td>
<td>(279)</td>
<td>(279)</td>
<td>(119)</td>
<td>(120)</td>
</tr>
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<td>(119)</td>
<td>(120)</td>
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R-value / Number of Cases / Significance
Table Ib. Personality Variables and Affective Responses

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<thead>
<tr>
<th></th>
<th>Total Affect Score</th>
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<th>Bi-weekly Depression Scale</th>
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<tr>
<td>Mastery</td>
<td>-0.4068 (247)</td>
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<td></td>
<td>P=0.000</td>
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</tr>
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<td>Locus of Control</td>
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<td>-0.4227 (332)</td>
<td>0.0755 (336)</td>
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<tr>
<td></td>
<td>P=0.000</td>
<td>P=0.000</td>
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<td>Self-Denigration</td>
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<td>Self-Esteem</td>
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<td>-0.0537 (280)</td>
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<tr>
<td></td>
<td>P=0.000</td>
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<td>General Personality</td>
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R-value / Number of Cases / Significance
Table Ic.
Personality Variables and Affective Responses

<table>
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<tr>
<th></th>
<th>Anxious Reactivity</th>
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<tr>
<td></td>
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<td>(279)</td>
<td>(279)</td>
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<td></td>
<td>(201)</td>
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<td>(336)</td>
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<td></td>
<td>P=0.087</td>
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<td>(190)</td>
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<td>P=0.298</td>
<td>P=0.098</td>
<td>P=0.123</td>
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<td>Self-Esteem</td>
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<td>-0.0090</td>
<td>-0.0004</td>
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<tr>
<td></td>
<td>(190)</td>
<td>(280)</td>
<td>(280)</td>
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<tr>
<td></td>
<td>P=0.181</td>
<td>P=0.441</td>
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<td>(248)</td>
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<td>Factor</td>
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<td>P=0.028</td>
<td>P=0.039</td>
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</tbody>
</table>

R-value / Number of Cases / Significance
The correlation with the general personality factor was 0.437 (d.f. = 119, p = 0.000) The second stress variable, school overwork was not related to any of the personality variables in the study.

**Control and Affective Responses:** The locus of control, a variable found to be of considerable importance in the Johnson and Hartwein study was also related to a number of measures of affective responses in the current study. The strongest correlations were with measures of depression and irritation. Persons with a greater sense of control over their life experienced less depression \( r(332) = -0.423, p = 0.000 \). These students also had lower indices of irritation \( r(106) = -0.480, p = 0.000 \). The correlation with anxiety was a small but significant 0.18. The strongest correlation was with overall school related stress. This was a rather high 0.564 (d.f. = 152, p = 0.000). Control also had modest correlations with school related strain \( r(248) = 0.274, p = 0.000 \) and social life strain \( r(248) = 0.258, p = 0.000 \). Control was not correlated with any of the measures of affective variability.

**Personality Variables and Somatic Reactions:** Somatic responses were moderately correlated with personality variables. The general personality factor was again more closely related to somatic variables than were the individual personality scores \( r(247) = 0.310, p=0.000 \). All of
the correlations of individual personality scores with somatic reactions were between 0.22 and 0.28. As with affective responses, a high level of felt mastery was accompanied by a low number of adverse somatic responses ($r (251) = 0.280, p = 0.000$). Low self-denigration and high self-esteem were associated with a small number of somatic symptoms.

The correlations with affective and somatic reactions lend plausibility to the causal schema underlying the stress-somatic reaction continuum. Personality factors are clearly related to affective responses. They are also related to somatic reactions. As is expected, the correlations with somatic reactions are smaller than those with affective responses.

The general personality factor was modestly related to the degree of variability in somatic responses ($r (186) = 0.220, p = 0.001$). Mastery was negatively related to a high level of variability in the level of somatic reactions ($r (251) = 0.258, p = 0.000$). The correlation between somatic reactivity and low self-denigration was a significant but small 0.166. The correlation with self-esteem failed to reach significance.

**Coping Responses and Affective and Somatic Responses.** A number of moderate correlations between coping techniques
and affective reactions were found. Strain in the student's dating and social life showed the greatest correspondence with the use of coping strategies. Measures of general affective levels understandably show fewer meaningful relationships with measures of coping behaviors than do area specific strain indices. The Beck depression scale generally corresponded more closely to coping activities than measures of anxiety or irritation. The measures of affective reactivity in the survey also failed to show any strong correlations with the use of coping behaviors.

**Overall Coping Scores and Affective Reactions.** The total affective response score was modestly correlated with a small number of coping techniques. Total affect corresponded modestly with both school coping \( r (97) = 0.242, p = 0.008 \) and parental coping \( r (97) = 0.255, p = 0.006 \). It also correlated modestly with meaning altering coping \( r (97) = 0.279, p = 0.003 \). The correlations of overall coping scores with parental and social life area strains were stronger than with other affective measures. A correlation of \( 0.341 \) \( (d.f. = 279, p = 0.000) \) was found between the total coping score and dating strain. Dating strain was rather closely related to the overall use of type I coping behaviors. The correlation of 0.441 was unexpectedly high since most of the situation altering responses were not directed toward problems in the students dating life. Type III
behaviors also showed a relatively high correlation with dating strain \( r (279) = 0.349, \ p = 0.000 \). No correlation was found with meaning altering responses.

Parental strain was more strongly related to type II coping than to other coping types \( r (279) = 0.319, \ p = 0.000 \). The correlation with all coping responses combined was only 0.15.

The correlations between school related strain and the total coping score, situation altering and strain management coping responses failed to reach statistical reliability. The correlation with meaning altering responses was a modest \( -0.225 \) (d.f. = 279, \( p = 0.000 \)).

No relationship between the total coping score and overall school related stress was found. This was the result of a moderate negative correlation with type II responses \( r (279) = -0.319, \ p = 0.000 \) being cancelled out by opposite but weaker correlations with type I and III techniques. A very similar set of correlations was found for school overwork and coping responses. Again, a modest correlation was found with type II coping \( r (119) = 0.287, \ p = 0.001 \).

There were no significant correlations between the coping variables and the measures of variation in affective reactions. Few meaningful relationships between the measures of overall coping responses and the non-specific affective
variables were found. Only the correlation of meaning altering coping with irritation \( r(99) = 0.230, \ p = 0.011 \) and depression \( r(247) = 0.236, \ p = 0.000 \) were large enough to be of any import.

**Life Area Specific Coping Responses and Life Strains.** A large number of meaningful correlations between specific coping responses and both general and life area specific emotional reactions were found. It might be expected that correlations between a coping response in one life area and affective reactions in another life area would not usually be significant. There were, however, a number of reliable relationships between measures of overall affective states and the use of specific coping strategies. Most of these relationships were only of moderate strength. Correlations with coping techniques specific to a given life area were generally stronger than these.

Parental strain had the largest number of significant correlations with coping responses. Correlations of type II and type III parental coping responses with parental strain were both above 0.35.

Self-reliance vs. seeking of advice, the only strain management behavior included in the survey, accounted for nearly 20 percent of the variance in parental strain \( r(279) = 0.442, \ p = 0.000 \). The use of type III coping techniques accompanied a lower level of parental strain.
There was a moderately strong correlation of -0.370 (d.f. 279, p = 0.000) between parental strain and type II coping behaviors. Meaning altering parental coping strategies were used more frequently by those experiencing a higher level of parental strain. The correlation between the use of positive comparisons and parental strain was a relatively strong 0.570 (d.f. = 279, p = 0.000). This was combined with a near zero correlation between selective ignoring and strain to give the moderate -0.370 correlation for all strain management behaviors combined.

All type I, II, and III social coping strategies were significantly correlated with parental strain. In every case the use of the coping techniques corresponded with a lower level of strain. None of these correlations were strong. The largest was only 0.171. No school coping techniques were significantly related to parental strain.

School strain was only weakly correlated with the combined coping response types in the survey. School strain was significantly related to both situation altering and meaning altering school coping responses. However, the largest correlation was only 0.157. The strongest correlation was with the use of type II parental coping behaviors. While a total of six of the 11 individual coping responses were significantly related to school strain, the strongest of the relationships had a correlation of only 0.188.
Dating or social strain corresponded a good deal more closely with coping responses than did school strain. All three types of dating responses were significantly related to dating strain. The weakest of the relationships, that between type II behaviors and strain, had a correlation coefficient of only 0.145. This weak correlation was the result of combining a stronger correlation of positive comparisons \( r (279) = -0.372, p = 0.000 \) with a somewhat weaker and opposite positive correlation with selective ignoring \( r (124) = 0.275, p = 0.001 \).

The use of negotiation in dating, the only type I behavior in this area, was negatively related to strain in the social life area. This correlation was a fairly strong 0.458 (d.f. = 279, \( p = 0.000 \)). Type III coping techniques were also clearly related to the lack of strain. This correlation was not as strong as that with type I behaviors \( r (279) = 0.348, p = 0.000 \). The use of all dating coping techniques combined was negatively connected to strain in this life area \( r (279) = 0.323, p = 0.000 \). No correlations greater than 0.20 were found between dating related strain and coping behaviors not specifically related to this life area.

A number of individual coping responses showed correlations with school related strain. No dating behaviors were related to school strain. Both situation altering (119) =
0.229, \( p = 0.006 \) and meaning altering (\( r(119) = 0.304, p = 0.000 \)) school coping techniques were related to school stress. Type II parental coping techniques were correlated to strain to about the same degree (\( r(119) = 0.316, p = 0.000 \)).

No individual coping responses were meaningfully related to the level of anxiety. While there were several statistically reliable correlations, none were as high as 0.20. There were a number of larger correlations with the level of irritation, however. School coping type II, parental coping type II, positive comparisons in school and parental relations, and parental selective ignoring had correlations between 0.20 and 0.30 with irritation. School coping type II, parental coping type II and positive comparisons in school had correlations greater than 0.24 with the Beck depression scale. No significant correlations were found between individual coping responses and the measures of affective variability.

No correlation was found between either school overwork or overall stress and the total school coping score or the social coping score. Modest correlations were found with parental coping responses, however. The correlation with overall stress was \(-0.316 \) (d.f. = 119, \( p = 0.000 \)). That with overwork was \(-0.261 \) (d.f. = 120, \( p = 0.002 \)).
The Inter-relationship of Moderator Variables. There were a number of interesting patterns of correlations between the use of different coping strategies. There does not seem to be any meaningful relationship between the uses of different school or parental coping techniques. This is true for specific as well as combined coping scores. This stands in clear contrast to the pattern of correlations between dating responses.

The r-values for the correlations of the use of types I, II, and III social coping techniques with each other were all greater than 0.750. Although the use positive comparisons in dating did not correlate with the use of other individual dating responses, the correlations between the other four coping behaviors were all greater than 0.76.

All correlations between the uses of overall types I, II, and III behaviors were strong. Type I behaviors were positively correlated overall with type II (r (279) = 0.457, p = 0.000) and type III (r (279) = 0.658, p = 0.000). Type II responses were also correlated with type III (r (279) = 0.510, p = 0.000). There were no meaningful correlations between the use of coping in one life area with combined or individual techniques in other areas.

These correlations would suggest that persons who make use of coping strategies make use of all three types.
The pattern that emerges is one of lack of discrimination or selectivity in the use of coping. Only in the social life area was there any correspondence between various coping behaviors. Even there, there was a clear tendency to use all techniques fairly indiscriminately. The very high correlations (all above 0.750) indicate that if a person uses dating responses they tend to use all in similar degree.

Some correlations were found between the use of coping and the personality variables included in the survey questionnaire. The use of meaning altering strategies was negatively correlated with mastery, self-esteem, and low self-denigration. All three correlations were in the mid-twenties. The personality variables were not correlated with the use of other types of coping strategies. The expected correspondence between a strong personality and failure to use coping behaviors was only weakly manifested.

By far the strongest correlations involving the moderating variables were among the personality variables. Mastery was correlated positively with low-self denigration ($r (279) = 0.632, p = 0.000$) and high self-esteem ($r (279) = 0.447, p = 0.000$). The correlation with control was $0.548$ (d.f. = 248, $p = 0.000$). Low self denigration is positively related to self-esteem ($r (279) = 0.563, p = 0.000$) and control ($r (248) = 0.379, p = 0.000$).
Apparently, there are a number of connections within the different types of stress management resources. There appears to be no connection between the use of coping and personality resources, however. This serves to refute the hypothesis that the use of coping techniques will depend on the presence of other means of combating stress.

Moderator Variables and Somatic Responses. There were no direct connections between the uses of coping techniques and levels of somatic responses or variability in somatic reactions. All correlations between individual as well as combined measures of coping behaviors were less than 0.20.

The correlations of somatic reactions with personality variables were somewhat stronger than with coping. Mastery was related to a lack somatic symptoms. Somatic reactions were coupled with self-denigration and low self-esteem. All three correlations were in the mid-twenties. Mastery was also moderately correlated with low variability in somatic symptoms.
AFFECTIVE VARIABLES AND SOMATIC RESPONSES.

Affective levels showed a moderately strong degree of relationship with the measures of somatic reactions. Levels of irritation and depression were related to somatic symptoms. A low degree of depression was found with a fewer number of somatic complaints ($r (334) = 0.443, p = 0.000$). Likewise, a low level of irritation was accompanied by a low level of complaints ($r (106) = 0.395, p = 0.000$). High scores on the depression and irritability variables were correlated with a high degree of variability in the number of somatic complaints. There was no evidence of a connection between levels of anxiety and somatic effects.

A rather strong correlation exists between the total affect score and the number of unpleasant somatic reactions ($r (104) = 0.511, p = 0.000$). There was also a correlation of $0.397$ (d.f. $= 104$, $p = 0.000$) for somatic reactivity and total affect.

There was a modest correlation between school related strain and somatic reactions ($r (251) = 0.253, p = 0.000$). A weaker correlation was found with parental strain ($r (208) = 0.208, p = 0.000$). School strain was also related to a low level of variation in somatic complaints. The correspondence between overall school stress and somatic reactions
was rather low ($r (152) = 0.251$, $p = 0.001$). Its correlation with somatic reactivity was a much stronger $-0.451$ ($d.f. = 105$, $p = 0.000$). The were no meaningful correlations between somatic variables and the other stress measure, school overwork.

**Inter-relationship of Affective Variables.** There was a pattern moderate inter-relations between levels of affect in the study. School related stress and strain showed fairly strong correlations with other measures in the study. All three indices of general emotional levels were inter-correlated with other affect scores. Dating and parental strain and the measures of emotional variability were much less strongly correlated with other affect variables. The correlations among the measures of affect were decidedly the strongest in the study.

Both measures of school related stress were meaningfully related to both the affect and strain scales in the survey. The correlations of overall school stress with school strain, general anxiety, irritation, and the Beck depression scale were all 0.43 or higher. The correlation with the overall affect score was a strong $-0.592$ ($d.f. = 48$, $p = 0.000$). That with school overwork was a much weaker, but still significant $-0.347$ ($d.f. = 48$, $p = 0.008$). The correlations with the separate affect measures were also a good deal weaker, but again, still meaningful.
Overall school stress was rather closely linked to school strain \( (r (119) = 0.504, \ p = 0.000) \). Weaker but still statistically significant correlations of approximately 0.22 were found for dating and parental strain. Overwork was related to school strain \( (r (120) = 0.290, \ p = 0.001) \), but not to the other two measures of strain.

Overall school stress was correlated 0.30 with the anxiety reactivity score. The other measures of variability were not related to overall school stress. School overwork was correlated about 0.21 with all three measures of affective reactivity.

All three measures of affective responses were fairly strongly related to the life area specific strain scores. School strain was most strongly related to the Beck depression scale. The correlation was a fairly strong 0.527 \( (d.f. = 247, \ p = 0.000) \). School strain had correlation co-efficients of 0.29 to 0.37 with parental and dating strain, and anxiety and irritation. No relationships were found with affective reactivity.

Parental strain was only modestly correlated with irritation and depression. Both correlations were in the mid twenties. Dating strain was related fairly closely to the Beck depression scale. The correlation of 0.392 was decidedly the highest correlation of dating strain with any of the affect scales.
The general affect scores were also rather closely related with one-another. Anxiety was very closely correlated with irritation. The correlation co-efficient of 0.898 (d.f. = 106, p = 0.000) was the largest found in the survey. The correlation of anxiety with depression was only a modest 0.25. Anxiety was also closely related to variability in the level of anxiety (r (206) = 0.445, p = 0.000). It was not correlated to other measures of variability in the survey.

Irritation was rather closely connected to scores on the Beck depression scale. The correlation was 0.496 (d.f. = 104, p = 0.000). It was also related to variability in the student's level of anxiety (r (106) = 0.467, p = 0.000). Overall school stress and school overwork were correlated with one-another to a fair degree (r (152) = 0.454, p = 0.000).

The correlations between somatic responses and affective responses reaffirm the earlier findings of Johnson and Hartwein. The pattern of relationships which have emerged clearly support the conceptual framework originated by Caplan and furthered here.
THE EFFECTIVENESS OF STRESS MODERATORS

A number of interesting findings resulted from the use of Perlin's analysis to determine the effectiveness the two classes of stress moderators. A number of fairly strong correlations were found between stress, affective responses, somatic reactions, and the moderator variables.

A number of variables postulated to be of importance in the study did not prove to be useful. In particular, the actual grades obtained by the students were not affected by the other measures in the survey. The students' actual grades correlated with only a few other variables in the study. None of these variables were of major importance to the central issues of the research. Quite surprisingly, the student's grades were not related in any meaningful way to their aptitude as measured by their ACT scores. While the correlations were significant statistically, the actual values were rather low. The grades received was therefore of little use as a dependent variable in any of the proposed analyses.

The only measures that were meaningfully correlated with grades were the student's score on measures of their study habits, their grades last semester and their estimation of their final GPA. While poor study habits measured
at the end of the semester was moderately correlated with grades ($r (335) = -0.353, p = 0.000$), the same measure collected at the first of the year was not related to grades. The student's grades during the past semester had an equally strong correlation with grades ($r (71) = 0.346, p = 0.002$). The student's estimation of their GPA was strongly correlated with the actual grades ($r (334) = 0.687, p = 0.000$).

The residence of the student was another variable that did not meet expectations. Few meaningful correlations were found with the student's residence. Those that were significant were, again, not of importance in the final analyses. The pattern of differences in the support structure found earlier by Hartwein and Johnson simply did not appear in the current analysis.

The effectiveness analysis was patterned closely after that used in the Perlin study. The first step of the analysis was to enter the independent variable first in a multiple regression equation. The procedure then entered variables in a forward step-wise fashion. The variable explaining the greatest portion of the remaining variance was entered next until all variables were in the equation.

The order determined by this procedure was then used in the following steps of the analysis. First the independent variable such as a school related stress factor was
entered in the equation. On the next step both the independant variable and the most powerful moderator variable were entered simultaneously. In each succeeding step an addition variable was included in the order suggested by the stepwise procedure.

A total of 10 separate analyses were run. There were several dependant, independant, and moderator variables used in the analysis. The dependant variables included the amount of school related strain and the overall affective response score. Because of its failure to correlate with other variables in the study, the students actual grades were not included as a dependent variable in the final analysis as originally planned. The independant variables included in the final analysis were the two school related stress factors. When the effectiveness of personality variables was compared with coping behaviors, the overall personality factor score was used. The frequency of each of the individual coping scores were simply added to provide the index of overall coping scores.

The major finding produced by the analysis was that personality variables had a far stronger effect than did any of the coping factors included in the study. This effect was so strong that in most cases it washed out the effects of the other variables almost entirely. There was some evidence of the effect of coping behaviors when these variables
were entered without the inclusion of personality variables in the equation.
INDIVIDUAL ANALYSES

The independent variables chosen for the analysis were the two measures of school stress. The dependent variables included were the total affect score and the school related strain measure. Both strain management factors, coping behaviors and personality variables were included in the analyses. In addition, an analysis was run to compare the effectiveness both stress management resources. Two analyses were run with the total affect score as the dependent variable. Coping responses were grouped according to types I, II, and III as well as by school, social, and parental responses.

Overall School Stress and Strain

There was a fairly strong direct correlation between overall school stress and levels of strain. This provided a good deal of potential reduction in strain attributable moderator variables.

Coping Techniques: The use of coping strategies had hardly any measurable effect on the relationship between stress and strain. Because the overall school stress involved several facets of the student's life, seven of the individual coping behaviors were included in this analysis. The strongest coping technique in the equation, selective
ignoring in the area of parental relations, was not statistically significant. The increase in the amount of variance explained was just over two percent in spite of the fact that seven variables were entered in the equation. For the summary of these results, see Table II.

**Personality Factors.** As is the case in the other analyses, personality variables had a much stronger effect than coping strategies Self-denigration was the strongest of the three factors in this equation. The change in the r-squared value was a rather moderate nine percent. This is lower than most of the other analyses which included personality variables. See Table III for details on the analysis.

**Both Moderator Variables.** As is the case with the other analyses, the personality factor completely obscured the effect of coping variables in the analysis. The increase in variance explained was a modest six percent. This is the weakest effect for an analysis which incorporates the personality factor. See Table IV.

**Over-work Stress and School Strain**

The direct correlation of school over-work and strain was only moderate. This relationship was not nearly as strong as that with overall school stress. It was expected that there would be less of an effect demonstrated for moderator variables than in those analyses where there was a
<table>
<thead>
<tr>
<th>Moderator Variable</th>
<th>Entered on Step:</th>
<th>Strain</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>R-Squared</th>
</tr>
</thead>
<tbody>
<tr>
<td>Over-All Stress</td>
<td></td>
<td>0.504</td>
<td>0.504</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.254</td>
</tr>
<tr>
<td>Parental Positive Comparisons</td>
<td></td>
<td>0.509</td>
<td>0.487</td>
<td>-0.070</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.259</td>
</tr>
<tr>
<td>School Positive Comparisons</td>
<td></td>
<td>0.509</td>
<td>0.482</td>
<td>-0.070</td>
<td>0.019</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.259</td>
</tr>
<tr>
<td>Social Positive Comparisons</td>
<td></td>
<td>0.517</td>
<td>0.479</td>
<td>-0.063</td>
<td>0.004</td>
<td>-0.093</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.268</td>
</tr>
<tr>
<td>Parental Selective Ignoring</td>
<td></td>
<td>0.518</td>
<td>0.474</td>
<td>-0.063</td>
<td>-0.007</td>
<td>-0.092</td>
<td>-0.019</td>
<td></td>
<td></td>
<td></td>
<td>0.268</td>
</tr>
<tr>
<td>Parental Self-Reliance</td>
<td></td>
<td>0.526</td>
<td>0.470</td>
<td>-0.037</td>
<td>-0.022</td>
<td>-0.096</td>
<td>-0.017</td>
<td>0.098</td>
<td></td>
<td></td>
<td>0.277</td>
</tr>
<tr>
<td>School Optimistic Action</td>
<td></td>
<td>0.526</td>
<td>0.467</td>
<td>-0.036</td>
<td>-0.022</td>
<td>-0.096</td>
<td>-0.019</td>
<td>0.100</td>
<td>0.013</td>
<td></td>
<td>0.277</td>
</tr>
<tr>
<td>School Selective Ignoring</td>
<td></td>
<td>0.527</td>
<td>0.469</td>
<td>-0.036</td>
<td>-0.027</td>
<td>-0.097</td>
<td>-0.025</td>
<td>0.101</td>
<td>0.008</td>
<td>0.028</td>
<td>0.278</td>
</tr>
</tbody>
</table>
Table III.
SCHOOL OVER-ALL STRESS AND SCHOOL STRAIN
Personality Variables

<table>
<thead>
<tr>
<th>Moderator Variable</th>
<th>Entered on Step:</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>R-Squared</th>
</tr>
</thead>
<tbody>
<tr>
<td>Over-All Stress</td>
<td>Strain</td>
<td>0.523</td>
<td>0.523</td>
<td></td>
<td></td>
<td>0.263</td>
</tr>
<tr>
<td>Mastery</td>
<td></td>
<td>0.533</td>
<td>0.471</td>
<td>0.117</td>
<td></td>
<td>0.284</td>
</tr>
<tr>
<td>Self-Esteem</td>
<td></td>
<td>0.565</td>
<td>0.459</td>
<td>0.016</td>
<td>-0.215</td>
<td>0.319</td>
</tr>
<tr>
<td>Self-Denigration</td>
<td></td>
<td>0.587</td>
<td>0.455</td>
<td>-0.121</td>
<td>0.244</td>
<td>-0.145</td>
</tr>
</tbody>
</table>
Table IV.
OVER-ALL STRESS AND SCHOOL STRAIN
All Moderating Factors

<table>
<thead>
<tr>
<th>Entered on Step</th>
<th>Beta Weights</th>
<th>R-Squared</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Strain</td>
<td>1</td>
</tr>
<tr>
<td>Over-All Stress</td>
<td>0.523</td>
<td>0.523</td>
</tr>
<tr>
<td>Personality Factor</td>
<td>0.561</td>
<td>0.422</td>
</tr>
<tr>
<td>Total Coping Score</td>
<td>0.562</td>
<td>0.410</td>
</tr>
</tbody>
</table>
stronger correlation between the dependant and independant variable.

**Coping Factors.** A rather small percentage of the variance was accounted for by entering coping strategies in the regression equation with school over-work. The increase in explained variance was only about two percent. The most potent of the coping strategies was the use of positive comparisons. The results of the analysis are included in Table V below.

**Personality Factors.** The personality variables analysis showed much stronger effects on the stress-strain relationship than did the coping techniques analysis. The strongest moderator variable in this analysis was self-denigration. Mastery was the first variable entered in the equation. The r-squared value changed from 0.108 to 0.282 even though only three moderator variables in the equation. The results of this equation are summarized in Table VI.

**Both Moderator Variables:** When both types of moderators were entered into the equation, the personality factor totally dominated the analysis. Indeed, the final beta weight for the personality factor was actually stronger than that of the stress variable. The total percent of variance explained was increased by over 150 percent. Table VII contains the results of the analysis.
<table>
<thead>
<tr>
<th>Moderator Variable</th>
<th>Entered on Step:</th>
<th>Beta Weights</th>
<th>R-Squared</th>
</tr>
</thead>
<tbody>
<tr>
<td>Over-work</td>
<td>Strain</td>
<td>1 2 3 4</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.290    0.290 0.089</td>
<td></td>
</tr>
<tr>
<td>Positive Comparisons</td>
<td></td>
<td>0.328  0.277 -0.154</td>
<td>0.107</td>
</tr>
<tr>
<td>Optimistic Actions</td>
<td></td>
<td>0.333  0.269 -0.148 0.060</td>
<td>0.111</td>
</tr>
<tr>
<td>Selective Ignoring</td>
<td></td>
<td>0.333  0.268 -0.148 0.061 -0.002</td>
<td>0.111</td>
</tr>
</tbody>
</table>
Table VI.

SCHOOL OVER-WORK AND SCHOOL STRAIN
Personality Variables

<table>
<thead>
<tr>
<th>Moderator Variable</th>
<th>Entered on Step:</th>
<th>Beta Weights</th>
<th>R-Squared</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Strain</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Over-work</td>
<td></td>
<td>0.350</td>
<td>0.350</td>
</tr>
<tr>
<td>Mastery</td>
<td></td>
<td>0.483</td>
<td>0.338</td>
</tr>
<tr>
<td>Self-Esteem</td>
<td></td>
<td>0.518</td>
<td>0.336</td>
</tr>
<tr>
<td>Self-Denigration</td>
<td></td>
<td>0.531</td>
<td>0.329</td>
</tr>
</tbody>
</table>
Table VII.
SCHOOL OVER-WORK AND SCHOOL STRAIN
All Moderating Factors

<table>
<thead>
<tr>
<th>Moderator Variable Entered on Step:</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th>R-Squared</th>
</tr>
</thead>
<tbody>
<tr>
<td>Over-work</td>
<td>0.350</td>
<td>0.350</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.122</td>
</tr>
<tr>
<td>Personality Factor</td>
<td>0.527</td>
<td>0.325</td>
<td>0.394</td>
<td></td>
<td></td>
<td></td>
<td>0.277</td>
</tr>
<tr>
<td>Total Coping Score</td>
<td>0.540</td>
<td>0.296</td>
<td>0.368</td>
<td>0.128</td>
<td></td>
<td></td>
<td>0.292</td>
</tr>
</tbody>
</table>
Total Affect and Overall School Stress

Since the factor analyses revealed that the overall school stress factor also encompassed other areas of the student's life, an analysis was run using this as the independent variable and the total affect score as the dependent variable. Overall school stress was rather closely related to the composite affective responses score. The effect of the personality factor was quite pronounced. Little effect was found for the coping behaviors, however.

Coping Responses. Coping responses were grouped by life area and types I, II, and III. Neither grouping produced any important increase in the amount of variance explained. Less than two percent additional variance was explained when coping in all three life areas were included in the analysis. School coping responses were the strongest of the three, however. See Table VIII below. The additional explanatory power attributable to coping responses grouped by type was slightly more than when grouped by area. It was still less than two percent, however. Nearly all of the additional explanatory power was due to type II coping strategies. Table IX has additional details about the analysis.

Personality Variables. Personality factors were responsible for a large increase in explained variance when entered in the school stress and strain equation. The actual
Table VIII.
TOTAL AFFECT SCORE AND OVERALL SCHOOL STRESS
Coping Strategies Grouped by Life Area

<table>
<thead>
<tr>
<th>Moderator Variable</th>
<th>Total Affect</th>
<th>Beta Weights</th>
<th>R-Squared</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall School Stress</td>
<td>0.408</td>
<td>-0.497</td>
<td>0.247</td>
</tr>
<tr>
<td>School Coping Behaviors</td>
<td>0.511</td>
<td>-0.482</td>
<td>0.114</td>
</tr>
<tr>
<td>Parental Coping Behaviors</td>
<td>0.515</td>
<td>-0.461</td>
<td>0.104</td>
</tr>
<tr>
<td>Social Coping Behaviors</td>
<td>0.515</td>
<td>-0.460</td>
<td>0.105</td>
</tr>
</tbody>
</table>
Table IX.

TOTAL AFFECT SCORE AND OVER-ALL SCHOOL STRESS
Coping Strategies Grouped by Type

<table>
<thead>
<tr>
<th>Moderator Variable Entered on Step:</th>
<th>Total Affect</th>
<th>Beta Weights</th>
<th>R-Squared</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1 2 3</td>
<td></td>
</tr>
<tr>
<td>Over-all School Stress</td>
<td>0.497</td>
<td>-0.491</td>
<td>0.247</td>
</tr>
<tr>
<td>Type II Coping Behaviors</td>
<td>0.509</td>
<td>-0.463 0.112</td>
<td>0.259</td>
</tr>
<tr>
<td>Type I Coping Behaviors</td>
<td>0.516</td>
<td>-0.428 0.169</td>
<td>-0.103</td>
</tr>
<tr>
<td>Type III Coping Behaviors</td>
<td>0.517</td>
<td>-0.425 0.183</td>
<td>-0.080 -0.045</td>
</tr>
</tbody>
</table>
increase was about 28 percent. Self-esteem contributed the greatest amount of explanatory power. Self-denigration also contributed a good deal of strength to the equation. Both of these variables had decidedly larger beta weights in the final equation than did the independent variable. See Table X below.

All Moderator Variables. The personality factor dominated the final analysis, of course. Of some importance is the fact that beta weight of the independent variable was reduced to less than a third of the weight of the personality factor. The overall addition in variance accounted for was about 24 percent. See the Table XI for details of the analysis.

To recap the results briefly, coping behaviors had very little effect in any of the analyses. In contrast, personality variables nearly tripled the explained variance in some of the analyses. The overall school stress and school strain analysis showed the least impact from the moderator variables. When all factors were entered the explained variance increased a mere six percent.
Table X.
TOTAL AFFECT SCORE AND OVERALL SCHOOL STRESS
Personality Variables

<table>
<thead>
<tr>
<th>Moderator Variable Entered on Step:</th>
<th>Total Affect</th>
<th>Beta Weights</th>
<th>R-Squared</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall School Stress</td>
<td>0.435</td>
<td>-0.435</td>
<td>0.247</td>
</tr>
<tr>
<td>Self-Esteem</td>
<td>0.651</td>
<td>-0.305</td>
<td>0.501</td>
</tr>
<tr>
<td>Self-Denigration</td>
<td>0.687</td>
<td>-0.248</td>
<td>0.359</td>
</tr>
<tr>
<td>Mastery</td>
<td>0.689</td>
<td>-0.266</td>
<td>0.368</td>
</tr>
</tbody>
</table>
Table XI.
TOTAL AFFECT SCORE AND OVERALL SCHOOL STRESS
All Moderating Factors

<table>
<thead>
<tr>
<th>Moderator Variable</th>
<th>Entered on Step:</th>
<th>Total Beta Weights</th>
<th>R-Squared</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Affect 1 2 3</td>
<td></td>
</tr>
<tr>
<td>Recent Life Events</td>
<td>0.435</td>
<td>-0.435</td>
<td>0.189</td>
</tr>
<tr>
<td>Personality Factor</td>
<td>0.651</td>
<td>-0.196 -0.540</td>
<td>0.424</td>
</tr>
<tr>
<td>Total Coping Score</td>
<td>0.651</td>
<td>-0.196 -0.539 -0.007</td>
<td>0.424</td>
</tr>
</tbody>
</table>
DISCUSSION

The survey was a qualified success in providing support for both the individual hypotheses and the general model of environmental stress and its effects on human beings. A major qualification is mandated by the overwhelming effects of the personality variables included in the analysis, however. For the most part the study failed to replicate results of the Perlin study with a student population.

Perlin found a number of differences in the use of coping techniques attributable to the sex of the person. This study suggested that there would be few differences in the use of coping responses attributable to sex. Very few differences were significant.

The study did find a number of correlations between the use of coping techniques and the stress and strain variables in the survey. This is, of course an important prerequisite to determining the effectiveness of coping factors. It is clear that the use of coping factors corresponds to both the presence of stress factors and emotional strains. What was not established was any temporal or causal relationship. As mentioned later, it is not clear whether coping techniques are elicited by environmental
stress or are a response to the affective reactions caused by stress. In the later case, coping behaviors would serve as a balm to lessen affective strains caused by stress. In addition, it is entirely possible that different types of responses are used in response to stress than are used for strain. Perlin's type III strategies were used primarily to adjust to strain after it has manifest itself. Type I factors were used to deal with problems causing the stress. It seems plausible to suggest that type I behaviors are more likely to be causally attributable to stress while type III behaviors are the results of emotional strain.

The main finding of this study was that personality variables accounted for nearly all of the variance accounted for in the effectiveness analyses used. This stands in sharp contrast to the findings of the Perlin and Schooler study. Perlin's analysis revealed a decided effect for the personality variables included in the study. This effect was of comparable strength to that of the coping effects included in his study, however.

There are a number of potential reasons why the current study failed to replicate the results found in the earlier research. There seems to be reasonable evidence to suggest that the results found were not attributable to measuring problems with the variables in the survey.
It is true that those variables taken directly from the Perlin and Schooler survey had stronger correlation with one-another than they did with those variables taken from the Johnson and Hartwein study. However, there were also strong correlations between variables from both surveys which were conceptually equivalent. For example, the correlation between the total affective responses score and the total strain score derived from the Perlin survey was a fairly strong 0.489 (d.f. = 97, p = 0.000). There was an even closer correspondence between Perlin's variable, mastery, its counter-part, control (r (248) = 0.541, p = 0.000). This would tend to counter the possibility that the strong correlations between variables from the Perlin survey were artifactual.

Another possibility for the lack of effects attributable to coping behaviors was the different methods used to collect the information in each study. The original Perlin study used personal interviews in its data collection process. This seems to be a fairly important methodological difference between the two studies. An interviewer has the capacity to draw more information from a respondent by explaining unclear items and encouraging responses. In addition to this, the coping response questions from the Perlin survey were modified to more appropriately fit the current subject population. In contrast, the personality
factor questions were quoted directly from the original Perlin survey. It seems possible that this could account for some of the differences between the two surveys.

There were a smaller number of coping responses included in the current study than in the Perlin study. Some of the coping response variables were simply not applicable to the student population. This, of course, had a decided effect on the outcome of the different analyses. Even if there were an equivalent effect level for the two sets of variables, the analysis which included a greater number of variables would show a stronger effect due simply to the capitalization on chance favoring the larger analysis.

All of the above factors may be cited as contributing to the lack of correspondence between the results of the two studies. However, it seems that the effects of these factors are decidedly inadequate to explain differences of the magnitude found. The most likely effect of these factors would be to simply reduce the strength of the relationships found in the first study. It would not be expected that the entire character of the relationship would be changed so dramatically, however. It seems more reasonable to attribute the current results to the differences in the populations than to the possible methodological differences between the studies.
One possible conclusion to be drawn from the survey is that the effects of environmental strains in the student population are subject to only minimum moderation from any responses from the student. This would suggest a slight modification in the model proposed earlier in this paper. Personality factors might be viewed as more like a filtering system which operates prior to the influences of social support and coping strategies. In such a schema, the effects of the objective physical or social environment would still work through the individual's perceptions to give rise to the subjective environment. The strain producing potential of such factors may further be moderated by the personality of the individual. Only then would the effects of an environmental pressure be manifested. Rather than being considered a separate dimension of coping as Perlin suggests, the person's personality would work as one of the factors determining the subjective environment. In this sense, it may be closely equated to the the ACT scores. They both serve as factors determining the actual impact of the physical or objective environment. It is at this point that coping factors may work to alleviate the harmful effects. The intransitory nature of personality factors also lends plausibility to this idea. Given that personality variables are a stable aspect of the person's make-up it follows that they precede both environmental stress and any reactions to them. That is, they become a factor in the per-
ceptual processes that determine the subjective environment from the objective environment.

While the above explanation seems plausible, the nature of the relationship between the students and their environment would detract from the soundness of this argument. The academic environment (especially academic achievement) is directly influenced by the efforts of the student. The social aspect of the environment is less likely to be influenced by input from the student, however. Nonetheless, such a modification of the model fails to account for the differences found in the two studies. One is still left with the conclusion that there is a fundamental difference in the two populations.

A second potential modification of the model is suggested by the current study. It seems possible that the use of various coping techniques may come into play as much in response to felt strain as to the stress actually responsible for that strain. Perlin's categorization of type I and III mentioned earlier in this section reinforces this idea. The lack of any significant differences in the correlations of coping factors with stress or strain suggest this as a potential explanation. This is, of course, speculation on the part of the writer. Confirmation would require further research.
All of the above suggestions provide plausible alternative reasons for the failure to replicate Perlin's results. The most probable explanation for the differences still remains the character of the two populations under study. In addition to the simple age factor, there are a number of clear and meaningful differences in the life situations of the two populations. The respondents in Perlin's study were all established adults. They had already found jobs or were homemakers. It seems reasonable to assume that they were, for the most part, past the adolescent period of their life.

The student population is very different from this group. In many ways university life can be considered an extension of one's adolescence. A large number of the students in the survey lived with their parents or in university housing. Both these atmospheres provide a relatively protected environment. In addition, the majority of the students receive financial assistance from their parents, scholarships, grants or loans. The effect of these two factors is to provide an atmosphere in which the individual does not really need to deal with life pressures in the same way as do independent adults. Even their functioning within the academic community is somewhat protected. Most academic environments are relatively forgiving. Work which is not completed on time is given reprieves. Absense and other
infractions are excused or over-looked. The academic community is certainly more lenient when compared to the work-a-day world.

One may speculate that the college student in this survey has simply not learned to cope with problems in the same manner that the respondents in Perlin's study have. This is born out by the results of the correlational analysis of the study. No meaningful patterns were found in the correlation of coping strategies and environmental stresses other than that a greater amount of stress was accompanied by a higher level of coping activity. There seemed to be little differentiation in the use of these behaviors, however. No correspondence was found when, for example, academic life coping behaviors were inter-correlated. The use of one coping behavior in a given life area was not predictive of the use of other coping behaviors in that same life area. The only meaningful correlations found were when types I, II, and III coping responses were correlated. This would suggest an undifferentiated response to pressure. The student would respond to an environmental stress, but only in a general manner. The use of all three types of coping would increase. This fairly close correlation indicates that a lack of discrimination in the use of coping. The extremely high correlations between all social coping responses reinforces this notion. This response was not shown to be effective, however.
The analysis did not suggest any interrelationship between the two dimensions of coping proposed by Perlin, personality factors and coping behaviors. There were no meaningful correlations between the use of coping responses or personality variables. There was a fairly large number of correlations between the use different types of coping techniques. There was also close correlations between all personality factors. It would appear that the personality factors and coping techniques act independently. At the same time, if one coping behavior was used a good deal, it is likely that the others would be used also.

Although the academic environment is much more protected than the outside world, it should be remembered that this is the first time that many of the students have been away from home. While the level of accountability is much less than the real world, college still represents a significant step for most students. If, in fact, the students have developed a means of coping, it may to some degree, be rendered less effective by virtue of the somewhat different environment into which they are thrust.

The fact that this is the first time the students are out on their own (at least relatively), may be responsible for any number of additional problems in dealing with their life. The fact that most of the students in the survey were first term freshmen would exacerbate this situation.
Two factors originally thought to be useful in explicating the nature of stress failed to produce results. The student's grades failed to exhibit any meaningful correlation with other important variables. The residence of the student was expected to significantly effect the general support structure of the respondents. This and its expected effect on the student's stress management styles failed to materialize.

On a more positive note, support was found for a number of the findings of the Caplan and Johnson and Hartwein studies. The connection between environmental events and affective and somatic reactions was clearly re-affirmed. Of particular importance was the connection drawn between general life events and reactions to them. This study further validates the generality of the model used in the Johnson and Hartwein study. While the original study used the model implicitly, the relationship between the objective environment the subjective environment and the reactions to it were not fully explored. This study fully tested all aspects of the model.

The connection between the objective environment, the subjective environment, and their effects was given support in the finding that the person environment fit was more closely related to perceived stress than was the actual environment (as measured by the student's total load).
In addition the validity of the model was also tested with a second set of variables. The use of the student's workload and its subsequent effects on the well-being of the individual provided further support for the general model. While the effects of coping factors were not given much credence, the course of events from the total work load was clearly established.

In summary, it can be concluded that the study provided a good deal of support for the model that was advanced. At all steps, the connections in the model were found. In addition, a number of the specific hypotheses suggested were supported. The effectiveness of coping behaviors in ameliorating the effects of stress were only minimal. Personality variables demonstrated by far the major and in some cases, only moderating effect on stress variables.
REFERENCES


Dubos, R., Man Adapting, Yale University Press, New Haven; 1965


The thesis submitted by George Hartwein has been read and approved by the following committee.

Dr. Homer H. Johnson, Director
Professor, Psychology, Loyola

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The final copies have been examined by the director of the thesis and the signature which appears below verifies the fact that any necessary changes have been incorporated and that the thesis is now given final approval by the Committee with reference to content and form.

The thesis is therefore accepted in partial fulfillment of the requirements for the degree of Master of Arts.

Date: December 31, 1981

Director's Signature: [Signature]