STRESS APPRAISAL AND COPING STRATEGIES AS A FUNCTION OF ACADEMIC ACHIEVEMENT AMONG COMMUNITY COLLEGE STUDENTS

by

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CHAPTER ONE

INTRODUCTION

As society strives to increase opportunities for its citizens, higher education increasingly finds itself opening its doors to a diversity of student's with and expanding range of characteristics. College class rolls include more female students, more older students, and more underprepared students than ever before. Hodgkinson (1983) contends that "higher education will have to get used to a smaller contingent of white, middle-class students from suburban backgrounds in their entering classes, and will have to provide new programs in order to attract minorities, older adults, and programs offered in conjunction with industry, the military, and other users of educational services" (p.1). This diversity of student populations and educational programs creates an increase in the number and diversity of factors that contribute to academic performance.

By adopting an open admissions philosophy, community colleges identified themselves as the forerunner specializing in higher education for nontraditional students and diverse populations. Cohen and Brawer (1982) summarized the community colleges' involvement with a diverse student population in the following manner:

> The community colleges reached out to attract those who were not being served by traditional higher education, who could not afford the tuition, who could not take the time to attend a college on a full-time basis, whose ethnic background had constrained them from participating, who had inadequate preparation in the lower schools, whose educational progress had been interrupted by some temporary condition, who had become obsolete in their jobs or who had never been trained to work at any job, who needed a connection to obtain a job, who were confined in prisons, physically handicapped, or otherwise unable to attend classes on a campus, or who were faced with increased leisure time (p. 21).

While the egalitarian attitude adopted by the community college has led the way in offering higher education to nontraditional students, four year schools and universities have also experienced an increase in student diversity. Federal funds earmarked for the education of minorities, women, the disadvantaged, and the poor, have created a market for the inclusion of students into what had previously been highly selective programs. Over time, such an inclusion changes the character and the responsibility of higher education. That responsibility is to stay attuned to the elements and factors that contribute to changes in the

learning styles of an increasingly diversified student population.

Statement of the Problem

By opening its doors to a host of new students (Cross, 1971), higher education assumed responsibility for looking beyond the traditional factors of academic performance. Creating access to higher education is only the beginning of a much larger mission. Once students are admitted, it is the task of the institution to provide educational programs and strategies to enhance probabilities of academic success. An investigation of the relationship between stress, coping strategies, and academic performance is one dimension in assuming that responsibility.

Purpose of the Study

The purpose of this study was to identify the extent to which community college students are stressed at specific points during a semester, how that stress changes over the period of one semester, and what coping strategies are chosen to address the stress appraisal of individual students. As it is used here, stress appraisal refers to student perception of the relative stress of a given situation. A second purpose was to explore the relationships between important demographic variables,

stress appraisal, coping strategies, and academic achievement.

The specific purposes were:

1. To investigate the cognitive-transactional theory of stress developed by Lazarus (1966) and Lazarus and Folkman (1984). This study was designed to determine if community college students undergo a cognitively oriented, process-centered experience of stress and coping as identified in the Folkman and Lazarus research.

2. To examine the relationship between perceived stress, coping strategies, and academic achievement.

3. To compare stress and coping strategies among community college students under age 25 with community college students aged 25 and over.

4. To compare stress and coping strategies among male and female community college students.

5. To compare stress and coping strategies among community college students of two different levels of academic preparedness.

Significance of the Study

A variety of influences impact upon academic achievement. While several variables have been studied and related to academic achievement, little information exists about the impact of stress and coping strategies on community college students. Because of their open admission

policies, community colleges are more likely than other institutions of higher education to admit students who lack high promise of academic success. Acquiring information on how students address stress and adopt coping strategies will place educators in a better position to determine how the educational needs of this diverse and nontraditional student population might best be met.

This study is significant because it examines factors not usually measured with academic achievement -- namely, stress and coping strategies -- across groups of different gender, age, and level of academic preparedness. The findings will be of assistance to both two and four year educators advising both traditional and nontraditional students. By finding statistically significant relationships between these stated variables and academic achievement, this study will contribute to the orientation programs, advising responsibilities, class scheduling, and counselling programs which colleges offer to their incoming students.

Research Questions

1. What is the relationship between stress appraisal, coping strategies, and academic achievement?

2. Do community college students reveal a cognitively oriented, changing, process-centered experience of stress and coping strategies?

3. Are community college students of different academic levels stressed differently and do they exhibit different coping strategies at three different stages of stress presentation during an academic semester?

4. Are community college students of different age groups stressed differently and do they exhibit different coping strategies at three different stages of stress presentation during a academic semester?

5. Are male and female community college students stressed differently and do they exhibit different coping strategies at three different stages of stress presentation during an academic semester?

To address the five research questions proposed in this study, ten research statements were derived. Research statements allow for the independent examination of stress appraisal and coping strategies with each of the student variables being studied. Two research statements were required for each of the five research questions. Each research statement was examined at three points in time across the semester of data collection. The following are a list of the research statements.

Research Statements

Research Statement One: There are no differences among four categories of stress appraisal in relation to academic achievement for community college students. Measurements

of stress appraisal occur at three presentations of a Stress Questionnaire:

A. First week of the semester (T_0)
B. Prior to first major test (T_1)
C. After test grades are returned (T_2)

Research Statement Two: There are no differences among three categories of coping strategies in relation to academic achievement for community college students. Measurements of coping strategies occur at three presentations of a Ways of Coping Check List:

A. First week of the semester (T_0)
B. Prior to first major test (T_1)
C. After test grades are returned (T_2)

Research Statement Three: There are no differences in stress appraisal for community college students at three presentations of a Stress Questionnaire:

A. First week of the semester (T_0)
B. Prior to first major test (T_1)
C. After test grades are returned (T_2)

Research Statement Four: There are no differences in coping strategies for community college students at three presentations of a Ways of Coping Check List:

A. First week of the semester (T_0)
B. Prior to first major test (T_1)
C. After test grades are returned (T_2)

Research Statement Five: There are no differences between transfer students and developmental students in stress appraisal. Measurements of stress appraisal occur at three presentations of a Stress Questionnaire:

A. First week of the semester (T_0)
B. Prior to first major test (T_1)
C. After test grades are returned (T_2)

Research Statement Six: There are no differences between transfer students and developmental students in coping strategies. Measurements of coping strategies occur at three presentations of a Ways of Coping Check List:

A. First week of the semester (T_0)
B. Prior to first major test (T_1)
C. After test grades are returned (T_2)

Research Statement Seven: There are no differences between traditional age college students (25 or under) and nontraditional age college students (over 25) in stress appraisal. Measurements of stress appraisal occur at three presentations of a Stress Questionnaire:

A. First week of the semester (T_0)
B. Prior to first major test (T_1)
C. After test grades are returned (T_2)

Research Statement Eight: There are no differences between traditional age college students (25 or under) and nontraditional age college students (over 25) in coping strategies. Measurements of coping strategies occur at three presentations of a Ways of Coping Check List:

A. First week of the semester (T_0)
B. Prior to first major test (T_1)
C. After test grades are returned (T_2)

Research Statement Nine: There are no differences between male and female community college students in stress appraisal. Measurements of stress appraisal occur at three presentations of a Stress Questionnaire:

A. First week of the semester (T_0)
B. Prior to first major test (T_1)
C. After test grades are returned (T_2)

Research Statement Ten: There are no differences between male and female community college students in coping strategies. Measurements of coping strategies occur at three presentations of a Ways of Coping Check List:

A. First week of the semester (T_0)
B. Prior to first major test (T_1)
C. After test grades are returned (T_2)

Limitations of the Study

Several limitations of this study should be noted as one considers the results and conclusions. Every effort has been made to minimize the number and effect of these factors.

1. The study is confined to the state of Virginia.

2. The study includes only those students of higher education enrolled in the Virginia Community College System during the fall semester of 1988.

3. The sample is limited to students enrolled in mathematics classes at the time of data collection.

4. The sample may not represent the full diversity of community college enrollments.

5. The instruments used are comprised of self-report items.

6. Measurement error must be assumed to exist in the instruments used.

7. The study is conducted over the relatively short time frame of one semester.

Definition of Terms

Because the meaning of several terms used throughout this study may not be self-evident, the following are operational definitions of these terms:

Academic achievement refers to student performance as measured by specific course grades. Academic achievement in this study is measured at two points. The first point is measured around the first major math test in the course and the second measure is comprised of the student's final grade for the course.

Academic preparedness is determined by level of mathematics class in which the student is enrolled. By

advisement of college personnel, students enroll in either developmental or regular transfer level courses. Students enrolled in developmental classes are considered to be lower in academic preparedness while students enrolled in transfer level courses are considered to possess average or above average levels of academic preparedness.

Academically Underprepared students are those with distinctive characteristics that are perceived by the academic community to place them at a disadvantage in contention with students who enter college with the academic skills necessary for success in college (Rouche, 1967, 1972; Rouche & Kirk, 1973; Moore, 1970, 1971, 1976; and Kraetsch, 1980).

Age is a demographic variable determined by the subject's self-report and is categorized in this study by the groupings of 1) twenty-five years or younger, and 2) over twenty-five years.

Coping strategies are determined by student self-report responses made to the Ways of Coping Check List. The three primary coping strategies generated by the Ways of Coping Check List instrument and used in this study are Emotion Focused coping, Problem Focused coping, and Social Support coping.

Developmental course is a course or a selection of special courses and services designed to remedy student deficiencies preparatory to entering into a regular (degree,

diploma, or certificate) program of the college. The term developmental class is used specifically in this study to refer to mathematics classes with material content below the college transfer level.

Gender is a demographic variable determined by the subject's self-report and is categorized as either male or female.

Stress appraisal refers to student self-report responses made to the Stress Questionnaire. The four stress appraisals identified by the Stress Questionnaire are Anticipatory Threat Emotions, Anticipatory Challenge Emotions, Outcome Harm Emotions, and Outcome Beneficial Emotions.

Stress Questionnaire is a pencil and paper measure consisting of fifteen items associated with individual stress appraisal. The Stress Questionnaire uses a Likert-type scale to measure the degree or intensity of each item.

Transfer course or class is a college level course or class (generally a mathematics class in this study) that is taught at community colleges and is transferable to senior institutions as full college credit.

T_0, T_1, and T_2 are symbols used in this study to indicate certain points of time during the semester of data collection. T_0 indicates the first week of the semester, T_1 indicates no more than two days prior to the first major

test of the semester, and T_2 indicates the occurrence of data collection after test grades were received.

Ways of Coping Check List is a pencil and paper measure consisting of forty items associated with coping strategies. Respondents mark only those items consistent with their current situation and/or behaviors.

Organization of the Study

This study is presented in five chapters. Chapter two consists of a review of the research and literature related to the theoretical perspectives associated with stress appraisal, coping strategies, and factors associated to academic achievement. The research methodology, instrumentation, and treatment of data are described in Chapter three. Chapter four reports the results and findings of the study. Summary, conclusions, and recommendations for further study are presented in Chapter five.

CHAPTER TWO

REVIEW OF RELATED RESEARCH AND LITERATURE

The purpose of this study was to explore the relationship between stress, coping strategies, and academic achievement. This chapter includes a review of the literature and related research from which the conceptual framework of the study was derived.

The ability to accurately predict who might experience academic success in college has long been of concern to educators. Grades, persistence, and academic learning have traditionally been criteria for college success. Over the years, numerous research studies have related intellective factors such as achievement tests and high school grades to academic success. However, the factors involved in academic achievement are many and do not easily lend themselves to being quantified. During the 1960's a surge of literature concerning nonacademic predictors of academic achievement (Coombs & Davies, 1967; Crane, 1964) reflected the growing interest in this area of education. A variety of potential predictors were researched for their impact upon college success. Measures of test anxiety (Bronzaft, 1968; Carlson & Ryan, 1969; Carrier & Jewell, 1966; Crandall, 1969; Desiderato & Koskinen, 1969; Pervin, 1967; Spielberger, 1966) were among the most popular of the nonacademic variables studied. In general, these studies showed that

anxiety may affect achievement in either direction. Anxiety generally has positive effects up to a point (that point depending on the person), but beyond this point it becomes detrimental.

In their work designed to assist college counselors in guiding incoming students, Bloom and Peters (1961) offered a less than encouraging perspective on predicting academic achievement:

> The problem of predicting college success has probably received more public attention than any other single problem in education . . . The reasons for this intense interest are clear. In our society the transition from school to college is one of the most critical choice points in the life of the individual.
>
> . . . The problem in academic prediction is to prevent errors and to cut waste so that real educational challenges can be offered and mastered
>
> . . . In spite of the many studies which have been made in order to find accurate predictors of college success, little progress toward improved prediction has been noted.
>
> . . . For most colleges, the odds are still 50-50 or less that an entrant will graduate, ie., for every 100 students admitted to college, 50 or more will drop out before graduation (p. 8).

It should be noted that Bloom and Peters were speaking to counselors of institutions practicing selective admissions. Community colleges, on the other hand, are very likely to experience even greater odds against student success (as measured by graduation rates) because of their increased population diversity and open admission policies. Deegan and Tillery (1985) illustrate the odds against achievement in stating that the "intent of most community colleges to provide an opportunity for advanced education to the adult population at large without regard to prior educational achievement produces a body of students that spans a broad range of academic achievement" (p.59). With an increased range of demonstrated academic performance, higher education finds itself with a wider variety of factors impacting upon academic achievement. It is among that wider variety of factors that the items included in this study are found -- namely, stress and coping strategies.

One of the most obvious sources of stress in education is the desire to obtain high grades. Drawing research from the Carnegie Surveys, Arthur Levine (1980) points out that "only one of eight students claims not to care about grades" (p. 69). From the same work, Levine reveals that the "majority of undergraduates say that they are not doing as well academically as they would like" and that "they are under a great deal of pressure to get high grades" (p. 70).

Course grades are designed to be the measurement of educational performance and determines the student's success in college. For the student, college success is dependent on a series of stress producing tests and examinations. Understanding the dynamics of examination stress is a primary factor to understanding academic achievement, possibly even more so among nontraditional students.

In one of the earlier studies of examination stress, Mechanic (1962) describes the reactions of graduate students facing a critical examination:

> As the examination approached and as student anxieties increased, various changes occurred in behavior. Joking increased, and, while students still sought social support and talked a great deal about examinations, they began specifically to avoid certain people who aroused their anxiety. . . When the examinations are nearly upon the student, anxiety is very high, even for those rated as low-anxiety persons, although students do fluctuate between confidence and anxiety. Since studying is difficult, the student questions his motivation, interest, and ability in the field. . . They attempted to defend themselves against their feelings by behaving in a silly, manic way, and avoidance joking became very prominent. It appears that for the student supreme confidence at

this point was considered not only presumptuous, but sacrilegious. (pp. 142-44)

Mechanic's research reveals two important observations in the process of stress appraisal and coping strategies. First, the degree of stress reaction increases as the date of the critical examination approaches. Secondly, the kinds of behaviors used to cope with the stress changes as the examination grows nearer. These observations by Mechanic and others (Pearlin, Lieberman, Menaghan, and Mullan, 1981) promulgate the existence of a process-oriented theory of stress that is dynamic and changing rather than a static and fixed trait characteristic.

STUDENT VARIABLES

The question being explored here is how that process-oriented theory of stress might vary among groups of students that differ in age, gender, or level of academic preparedness. The literature concerning these student variables has, for the most part, focused on academic achievement and much of the research has shown these variables to have inconclusive relationships with academic achievement. For example, some research (Alfred & Lum, 1988) indicates a moderately negative correlation between age and long-term academic achievement while others (Johnson & Walberg, 1989) reveal moderately positive correlations. Other examples of differing results are shown in the area of

gender variables. Several researchers (Betz, 1978; Llabre & Suarez, 1985) report that females had higher anxiety levels than did males in mathematics courses while other researchers (Brush, 1978; Resnick, Viehe, & Segal, 1982) find no significant differences between males and females. It comes as no surprise to find academic achievement and level of academic preparedness to have a positive correlation. One would logically expect students of higher academic preparedness to be more likely to exhibit higher academic achievement. It is more difficult, however, to determine from the literature how different levels of academic preparedness might be stressed differently. The following pages report a review of the literature concerning the student variables of age, gender, and level of academic preparedness.

AGE

One of the most frequent concerns of adults returning to college is the fear that they are too old to be able to learn. A further complication is the fear that they will not be able to keep pace with the younger students. The potential embarrassment of not being capable because of age is certainly a source of stress that may contribute to the academic performance of the older, nontraditional student. According to Johnson and Walberg (1989), "Many of these older students feel quite inferior when they return to

school after an absence of several years. They feel they are in a poorer position than recent high school graduates whom they imagine to have finely tuned study skills and the most current knowledge" (p. 59).

The relationship between age and stress in academic achievement has been reported by several researchers. Betz (1978) found that older, nontraditional age women exhibited higher levels of math anxiety than did their younger age student counterparts. Other studies, however, have found age to be a beneficial factor in dealing with stress, coping strategies, and academic achievement. Johnson and Walberg (1989) found that age has a positive influence on academic achievement up to the age of forty-one. When older students do not do well academically, their poor performance may be attributed to other nonintellective factors. Johnson and Walberg suggest, "a favorable view of education prompts them (older students) to enroll in the community college, but because they may lack time to manage properly or they have enrolled for more hours than they can handle, they may perform poorly" (p. 54).

Similar results were found by Wright, Smith, and Burger (1978) in their cross-sectional comparison of older and younger male students. Wright et al., (1978) reported that older students "appear to be more able than the younger students to produce the kinds of judgments, decisions, and behavior patterns that are necessary to avoid or reduce the

incidence of poorer grades" (p.214). Their research summarized the relationship between age and academic achievement by stating that "older students, perhaps simply as a result of having lived longer, have acquired certain skills (probably motivational as well as cognitive) that enable them to deal more efficiently with their college experience" (p.214).

GENDER

Traditionally, there has been a common belief that a gender difference exists concerning the performance and achievement in mathematics classes. General stereotypes have long maintained that males exhibit higher achievement in mathematics than do females. Much of the literature and research in this area tends to support the traditional stereotype. Studies frequently indicate that women have higher verbal achievement while men have higher achievement in mathematics and science (Levine & Ornstein, 1983). In fact, social scientist are increasingly finding that females have lower mathematics achievement because teachers expect less of them, because socialization differences induce a fear of success among females, and because they do not perceive mathematics as being important in their future careers (Pedro, Wolleat, Fennema & Becker, 1981; Safilios-Rothschild, 1979; Tobias & Weissbrod, 1980). While these factors may contribute to gender differences in mathematics

performance, they do not rule out the possibility that the differences are a result of how males and females are stressed differently and utilize different coping strategies.

Research concerning the relationship of gender differences in perceived stress, coping strategies, and mathematical performance has largely fallen under the title of math anxiety. In their book Mind Over Math, Kogelman and Warren (1978) explain math anxiety as "an intense emotional reaction to math based on past experiences. This reaction guides and controls (the student's) approach to math to such an extent that doing math becomes extraordinarily difficult if not impossible" (p. 9).

Studies designed to determine gender differences in math anxiety have shown mixed results. Many studies (Betz, 1978; Dew, Galassi, & Galassi, 1983; Llabre & Suarez, 1985; and Tobias, 1976, 1979) have found levels of math anxiety to be higher among females than males. Other researchers (Brush, 1978; Dreger & Aiken, 1957; Resnick, Viehe, & Segal, 1982) have found no significant differences in the levels of math anxiety between males and females. Discrepancies in these studies indicate a need for continued research. Of specific interest is how stress appraisal and coping strategies interact with academic performance and how males and females differ in that capacity.

ACADEMIC PREPAREDNESS

The concept of academic preparedness is most frequently addressed in the literature in terms of academic ability and its use as a predictor variable to academic success. In this regard, the existing literature indicates that cognitive ability, particularly reading comprehension ability, and students' attitudes toward education are the most valuable predictors of effective and successful academic performance (Carney & Geis, 1981; Walberg, Pascarella, Haertel, Junker, & Boulanger, 1982). However, the literature is not as complete with research relating academic ability, a function of academic preparedness, to student levels of stress.

It is not difficult to assume that a relationship exists between a student's level of academic preparedness and his or her level of stress in a particular course. It seems quite natural that the better one is academically prepared to meet the demands of a particular course, the less stress one would experience as a result of class assignments, tests, or exams. Inversely, higher levels of stress seem likely to be experienced as a result of being insufficiently prepared for the course.

The existence of effective or productive coping strategies also seem likely to be related to academic preparedness. Larson, Alvord, and Higbee (1982) confirm the apparent relationship between academic preparedness and

academic achievement in their research. In their study on problems related to academic performance, they found that "average students reported more problems with preparing for and/or taking examinations than did the honor students" (p. 339). The researchers suggested the reason for the difference in the number of reported problems by students was that "average students have less ability to handle stress" than do honor students. (p. 339). This suggestion supports the notion that a student who is academically prepared for a particular course is probably a student who experiences fewer problems as a result of having developed effective coping strategies to address the demands of that course.

The question of the relationship between academic preparedness, perceived stress, and coping strategies has been addressed throughout the literature in a variety of ways. Research on anxiety has been one of the most common approaches to this issue. Studies by Kirkland (1971) concluded that there is a negative correlation between level of ability and level of anxiety. Kirkland also points out that extreme levels of anxiety are likely to interfere with test performance while mild degrees of anxiety tend to facilitate test performance. Other studies (Lenning, Munday, Johnson, Well, & Brue, 1974) support the concept that, "anxiety generally has positive effects up to a point (that point depending on the person), but beyond this point

is becomes detrimental" (p.9). In essence, several researchers (Kirkland, 1971; Lenning et al., 1974) suggests that academically underprepared students are more likely to experience higher levels of stress and therefore are more likely to exhibit poorer test performance.

Research has also shown that stress reduction is best facilitated when combined with increased ability levels. Bander, Russel, and Zamastny (1982) compared two student groups enrolled in the same mathematics course. The first group received cue-controlled relaxation techniques while the second received cue-controlled relaxation techniques combined with mathematics study skills and test taking techniques. Both approaches produced declines in generalized test anxiety, but the group that was taught mathematics study skills and test taking techniques showed the most significant improvement. The research of Bander et. al., suggests that the issues of academic underpreparedness and stress are intertwined and must both be addressed before impacting change on academic achievement. Likewise, research by Blustein et al., (1986) on overall academic performance suggest that "remedial activities for students in academic difficulty should include a dual focus on reading comprehension ability and attitudes toward education" (p. 248). The inclusion of both ability and attitude in their recommendation supports the

concept that academic success is a result of both intellective and nonintellective factors.

STRESS APPRAISAL AND COPING STRATEGIES

There has been a recent surge in the research on how coping strategies impact upon the relationship between stress appraisal and behavioral outcomes. The advancement of knowledge in this area has been dependent on the progressive understanding of exactly what is meant by the term stress.

In his historical review of the concepts of stress, Mason (1975) reports the use of the term as early as 1914 by Walter B. Cannon. Cannon used phrases such as "great emotional stress," "stress of excitement," or "times of stress" (Mason, 1975, p. 7). The significance of this early usage of the term stress is that it establishes stress as an emotional factor rather than solely a medical concept. Within this emotional realm, stress has generally been evaluated as being either a process or a structural characteristic of the individual.

PROCESS ORIENTED MODEL OF STRESS

Folkman and Lazarus (1988) define stress as a major life event in which the person's well-being is at stake and which is also greater than normal coping skills generally handle. Coping is a term generally used by Folkman and

Lazarus to describe the thoughts and actions people use to thwart stressful situations in their lives. Coping can be done in two ways. The first strategy is termed problem-focused coping, in which the person concentrates on changing, eliminating, or successfully overcoming the stressful event. The second strategy is termed emotion-focused coping and is enacted when the person concentrates on controlling the distressing feelings he or she is experiencing concerning the stressful situation. Studies (Folkman and Lazarus, 1980, 1988; Folkman, Lazarus, Dunkel-Schetter, DeLongis, and Gruen, 1986) have shown that these two types of coping strategies are almost always used in the face of stress and that all other types of coping seems to overlap these two strategies.

Folkman and Lazarus have approached the topic of stress and coping with the intention of integrating concepts of the classical perception theorists and the personality-centered theorists of the 1940's and 1950's. The classical theorists were primarily concerned with the matter of how people comprehend what is around them well enough to function and survive in society.

Personality-centered theorists, on the other hand, were more concerned with the fact that people perceive, assign meaning, and remember events differently from one another. Their concerns focused on the differences in individuals rather that the theoretical sameness of people.

Personality-centered research focuses primarily on issues geared to the individual such as perceptual defense and avoidance of information. Clearly, the classical and personality-centered theorists had strikingly different perspectives on the relationship of stress and coping.

Folkman and Lazarus (1980) have suggested that these two contrasting theories can be successfully integrated to create a more complete and beneficial whole. They describe the process of coping as a sort of in-between or mediator of emotion and the stress process. They view the coping process as occurring in a sequence of stages with coping strategies being the mediator of the sequence.

The role of coping skills as a mediator of emotion and stress was further established in the stressful dynamics study conducted by Folkman, Lazarus, Dunkel-Schetter, DeLongis, and Gruen (1986). These researchers identified the sequence of stages individuals experience in the process oriented model of stress. First, the stressful event is subjectively perceived by the individual. Following this perception, two forms of appraisal take place. Primary appraisal, which involves the person's decision as to how the event affects his or her well-being, immediately becomes the focus of concern. Secondary appraisal follows primary and involves the individual's evaluation of potential options for coping with the perceived stressful situation. In the secondary appraisal, evaluation of options include an

assessment of personal skills with which to address the situation and an assessment of available resources one may be able to call forth. During the actual coping phase of process oriented stress, individuals will participate in either problem-focused coping or emotion-focused coping. Finally, reappraisal involves a review of the sequence and the outcome experienced by the individual. New emotions and perceptions arise as the individual considers new insights gained from the appraisal and coping processes.

One variable studied as a factor of their process oriented theory of stress was age (Folkman, Lazarus, Pimley, & Novacek, 1987). The general hypothesis forwarded by the researchers was that differences in age of individual subjects would alter the way those individuals cope with stress. To study their theories of age differences in coping with stress and of coping as being a mediator of stress, Folkman et al. (1987) conducted research on a younger group of people, aged 35 to 54 years, and on an older group aged 65 to 74. All of the subjects were interviewed once a month for six months. During the interviews they were questioned extensively about stressful events recently occurring in their lives. The data collected supported Folkman and Lazarus' theory of age as a factor of coping differences. The younger group consistently reported using more confrontive coping, planful problem solving, and sought more support than did the older

group. On the other hand, the older group used more distancing, tended to accept more responsibility, and used more positive reappraisal than the younger group. This same research also revealed that the source of stress changed with age. Younger people reported being worried primarily about money matters and work problems while older people expressed more concern with health related issues. This difference seems only natural as each group addresses the varying concerns of their respective stage of life. Both groups were equally stressful over family members, but the younger group focused their concern over children while the older group seemed more concerned with siblings.

The research of Folkman et al. (1987) challenged the traditional view of stress and coping which states simply that people regress in cognitive and, therefore, coping skills as they grow older. They have also challenged the notion that males and females have different developmental trajectories of stress and coping strategies over their life span. These subsequent studies confirmed Folkman and Lazarus' (1980) earlier statement that coping patterns and strategies are generally appropriate to the individual's state of life. In general, they found that younger people considered their stressful situations more malleable than did the older group, and that this malleability was the key to the older groups different strategies of coping.

To explore their theory that coping was a mediator of the stress cycle, Folkman, Lazarus, and Schaefer (1979) used a research design later followed by Folkman et al.(1987) in the age difference research. This research on coping as a mediating factor revealed four types of coping to be strongly associated with changes in emotion and stress. The first of these four types, planful problem-solving, enables the person facing stressful situations to help bypass the problems associated with stress by making plans which cause an altering of the situation in the future. Folkman et al. (1979) found planful problem-solving to virtually always be beneficial to the individual facing a stressful situation. Confrontive coping, the second type, is styles of behavior whereby people release anger toward their perceived source or cause of the stress. Confrontive coping was actually more likely to create a worsening of the individuals emotional state. The third coping strategy, positive reappraisal, revealed a positive effect on the younger group studied, but caused significantly more negative emotions and reactions among subjects in the older group. It is likely that the different effects of positive reappraisal as a coping strategy stems from the two (age-different) groups perceptions of stressful situations as being malleable. The final type of coping strategy, distancing, involved behaviors, such as escapism and fantasy, designed to remove oneself from the situation. No real positive effects were

shown to result from a distancing strategy in any of the groups studied, suggesting that people fair better when they experience interaction during stressful encounters. The identification of these four type of coping lend support to Folkman's et al. (1979) conclusion that coping is a mediator of stress and emotion in the process oriented theory of stress.

This entire series of research studies conducted by Folkman, Lazarus, and others addresses similar issues to those under study in this research. Namely, that stress is an on-going process, that coping strategies change over time during the stressful encounter, that age and gender are factors of both coping strategies and stress appraisal, and that cognitive factors influence stress appraisal and coping strategies.

CHAPTER THREE

METHODS AND PROCEDURES

This chapter describes the design, methods, and procedures of the study including the locations, subjects, research design, general procedures for collection of data, instrumentation, and analysis of data.

Locations

This study was conducted at six different locations throughout the state of Virginia. These six locations represent five different institutions (one institution had two participating campuses) within the Virginia Community College System. The institutions were J. Sargeant Reynolds Community College (Downtown Campus), Southside Virginia Community College (Christanna and Daniel Campuses), Southwest Virginia Community College, Tidewater Community College (Portsmouth Campus), and Wytheville Community College.

The selection of these particular institutions for inclusion in the study was based on geographic location within the state, size of school, whether the service region was urban or rural, and convenience of data collection. The criterion of a fairly even geographical distribution throughout the state was met by selecting two institutions in western Virginia (Southwest and Wytheville), two

institutions in central Virginia (J. S. Reynolds and Southside), and one institution from eastern Virginia (Tidewater). Size criteria were met by the selection of two relatively small schools (Southside and Southwest), one medium size school (Wytheville) and two large schools (J. S. Reynolds and Tidewater). Southside, Southwest, and Wytheville are considered by the Virginia Community College System as more rural community colleges while J. S. Reynolds and Tidewater are considered more urban. Finally, convenience was a factor determined by the presence of institutional personnel willing to assist in data collection and the approval of administrative officials at the institution. One institution was removed from the study because of a lack of willing personnel to assist in data collection and a second location was removed because the president of the institution did not approve participation in the study.

Subjects

Selection of subjects for this study was based on enrollment in mathematics classes at one of the six community college locations. A total of 13 mathematics teachers were recruited at the six campus locations and agreed to administer the research instruments to a total of 25 mathematics classes. A total of 385 students completed all the data and instruments in the study. An additional

181 students completed the demographic survey administered during the first week of classes but are not included in the total because of withdrawal from the class or because of missing data. Instruments were administered at four different times during the semester. Students absent during any of these administrations were removed from the analysis of the study. They were, however, included in the additional 181 students with demographic data only.

A small number of students (less than 25) completed one or more of the instruments but did not complete the demographic data survey and were therefore dismissed from the study. These students registered late for the course and did not attend until after the demographic data had been collected. The instruments completed by these students were removed from the study because of the inability to identify the students and because they had not signed the necessary release form granting use of their responses and grades in the study. Two instructors took it upon themselves to remove these students from the study before the raw data were returned. The 385 students who completed all requested data and signed release forms comprised the final number of subjects in the study.

Course Selection

Mathematics classes were selected for the study to facilitate a fairly uniform level of examination stress.

Two basic assumptions are made in regard to mathematics examinations. First, mathematics tests are likely to produce as much, or more, stress as any college subject, and secondly, mathematics examination stress is likely to be equally prevalent at different locations. Noting the preponderance of anxiety in mathematics courses, Kogelman and Warren (1978) state that the reactions to mathematics are often so strongly negative that it "makes testing math ability impossible, because often all that can be assessed is the test-taker's math anxiety" (p. 1). The assumptions made about mathematics examination stress in this study are made in response to statements similar to those of Kogelman and Warren.

Students enrolled in the mathematics classes were asked to participate in the study during class time and were informed they could refuse without penalty. Participating students also signed a release form allowing the researcher access to their examination and final course grades.

Research Design

This study followed the research design of Folkman and Lazarus (1985). The primary themes of the Folkman and Lazarus model are that (1) stressful encounters are dynamic, unfolding processes, (2) people experience complex and often contradicting emotions during these encounters, and (3)

despite some commonly shared reactions, individual differences in coping strategies continue to exist.

The design used in this study centers on the stress point of the first major mathematics test or examination given in the fall semester. The assumption made in selecting this point is that the first major mathematics test of a new semester is generally perceived by many students to be stressful.

Data Collection Procedures

To examine the changes that occur during the stages of a stressful encounter, instruments to measure both stress appraisal and coping strategies were administered at three different intervals of the semester. The first measurement was taken during the first week of classes (T_0). The second measurement was administered no earlier than two days prior to the first major test given in the semester (T_1). The third measurement was administered after test grades were posted and no later than five days after the first major test (T_2). In addition to these measurements of stress appraisal and coping strategies, questionnaires for measurement of subject expectancy and confidence were administered immediately prior to the first major test. Immediately after students completed the mathematics test, a questionnaire for measuring the students' perceived level of test difficulty was administered. The instruments of

expectancy, confidence, and difficulty were included to discover any discrepancies in the comparison of various courses. These instruments were not designed to be a primary nor integral part of the study, and because no grade discrepancies were found between the different mathematics classes, the instruments were not needed.

At the end of the term, instructors provided numerical percentage scores for each student for the first major test and for the final course grade.

Instrumentation

Two primary instruments were used for the collection of data in this study. First, a Stress Questionnaire (see Appendix B) was completed by each student. This Stress Questionnaire was originally designed and used by Folkman and Lazarus (1985). Students were asked to describe their feelings at the time of instrument administration. A list of fifteen terms serve as constructs to which students respond on a seven point Likert-type scale (1 = not at all; 7 = extremely). Students circled one number (1 through 7) for each item listed. Terms such as worried, angry, confident, fearful, anxious, relieved, etc., allow for assessment of the student's stress appraisal with respect to the first major mathematics test being administered in the course.

The second primary instrument used in this study was the Ways of Coping Check List (WCCL) (see Appendix F). This measure of coping was derived from Lazarus' transactional model of stress (Aldwin, Folkman, Shaefer, Coyne and Lazarus, 1980; Folkman and Lazarus, 1980). The Ways of Coping Check List is a self report measure consisting of forty statements that are characteristic or descriptive of how the individual student responded to either a recent or current stressful event. In this study, students were instructed to respond to the Ways of Coping Check List with respect to a mathematics test as the current stressful event (See Appendix D).

The three major coping styles derived from the forty statements of the Ways of Coping Check List are "problem-focused coping -- the management of the source of stress", "emotion-focused coping -- the regulation of stressful emotions" (Vitaliano, Russo, Carr, Maiuro, and Becker, 1985, p. 4), and social-support coping -- the interactive response to stress.

Items on the Ways of Coping Check List that are identified as problem-focused factors include: "Bargained or compromised to get something positive from the situation"; "Made a plan of action and followed it"; "Came up with a couple of different solutions to the problem"; and "Came out of the experience better than I went into it." In all,

there are fourteen responses descriptive or characteristic of the problem-focused coping strategy.

Emotion-focused factors comprise twenty of the forty Ways of Coping Check List statements. Included in the emotion-focused coping strategies are the categories of Wishful Thinking ("Hoped a miracle would happen"; "Wished I could have changed what had happened"), Blamed Self ("Realized I brought the problem on myself"; "Criticized or lectured myself"), and Avoidance ("Went on as if nothing had happened"; Tried to forget the whole thing").

For the purposes of this study, the sub categories of Wishful Thinking, Blamed Self, and Avoidance have been collapsed into the single heading of Emotion Focused Coping. Also, Social Support Coping has been converted from a sub category of emotion focused coping to a major category of its own. These changes were made in response to the observation of Vitaliano et al. (1985) that "certain scales contained items which appeared to lack face validity" and that intercorrelations between the scales made it "difficult to assess coping multidimensionally" (p. 4).

Social Support Coping comprises the remaining six Ways of Coping Check List statements. Included in the social support strategies are the items "Accepted sympathy and understanding from someone", "Talked to someone about how I was feeling", and "Asked someone I respected for advice and followed it."

The Ways of Coping Check List was administered along with instructions that prompt students to identify current or recent stressful events associated with the mathematics class in which they are enrolled. The cognitive and behavioral coping strategies listed on the Ways of Coping Check List were then responded to by the student in reference to the time interval of either beginning an academic term (T_0), preparing for a difficult test (T_1), or after test grades were received (T_2).

Other instruments used in this study to gather data include a Student Profile Questionnaire (Appendix A), a measure of the student's expected test grade and perceived level of test confidence (Appendix G), and a measure of perceived level of test difficulty (Appendix H). The Student Profile Questionnaire is an instrument designed specifically for this study. It served to inform students of the purpose of the study, identify students by social security number, class, and school, gather demographic data, and provide a permission form for obtaining test scores and course grades. The measures of test expectation and confidence were administered immediately before the scheduled mathematics test. The measures asked two questions respectively: "What percentage of the problems on this test do you expect to get correct?" and "The confidence I have in making this previous statement is:." The first question allowed students to circle one percentage (listed

in units of tens) between 40% and 100%. The second question requests that students respond on a Likert-type scale from 1 (extremely low) to 7 (extremely high).

The perceived level of test difficulty was administered immediately after the first major mathematics test. Students were asked "How difficult was this test" and then requested to circle one response on a Likert-type scale from 1 (not difficult at all) to 7 (extremely difficult). The measures of expectation, confidence, and test difficulty serve as possible explanations for any disparity in levels of stress appraisal by a particular class. The data did not show any extremely high or low stress appraisals by mathematics course or school location and consequently, the instruments were not needed for explanation.

The final critical measurements in this study, test scores and course grades, were collected from instructors at the end of the term. All test scores and course grades were submitted in numerical form. This numerical format was used to control for the probability of different grading scales being used to assign course letter grades.

Analyses of the Data

This study set out to determine the relationship between stress appraisal, coping strategies, and academic achievement among selected community college students in the state of Virginia. An analysis of the data frequency

indicated that 385 subjects completed all survey and questionnaire information. Students who did not fully complete all requested information were removed from the study. The two reasons for not completing the required information were that the student had withdrawn from the class or had missed critical class periods when the instruments were administered. Students with incomplete data totaled 181, or 32.2% of the total sample. Comparisons of students with complete and students with incomplete data are reported in the descriptive analysis of the study in Chapter Four.

The first analytical procedure applied to the data was the chi-square statistic to determine if there was indeed a statistically significant difference between those students completing the study and those who did not complete all the required data (See Table 1). In addition to demographic variables age, gender, and level of academic preparedness were selected to reveal distribution of the sample respondents. Several demographic variables were ultimately collapsed into smaller categories because of the presence of very small frequencies in some cells. Age was originally collected in four categories but was collapsed into two. Also, mathematics courses in business mathematics and statistics were removed because they did not consistently indicate a particular level of academic preparation. Tables and accompanying statistics for the chi-square procedure

were obtained by using the SAS subprograms PROC PRINT and PROC FREQ.

Following the chi-square procedure, a series of independent T-test procedures were applied to the data. These procedures were conducted to determine if there were significant statistical differences in the relationships between the subscale scores of the Stress Questionnaire and the Ways of Coping Check List instruments with the variables of age, gender, and level of academic preparedness. Each of these instruments were administered at three different intervals during the semester. The independent T-test procedure was applied to the subscale scores of each instrument at all three of the semester intervals (T_0, T_1, and T_2) using the SAS subprogram PROC TTEST.

Analyses of the data for the Ways of Coping Check List was conducted using a repeated measures analysis of variance procedure. This procedure allowed for an analysis of a process oriented theory of coping (Folkman and Lazarus, 1985) by examining how community college students might change coping strategies over the period of a semester. The SAS subprograms of PROC MEANS and PROC GLM were used for the analysis of variance procedure.

Finally, a multiple regression procedure was used in the analyses of the Stress Questionnaire data to determine its consistency to the process oriented theory of Folkman

and Lazarus (1985). The SAS subprogram of PROC REG was used for the regression procedure.

These four levels of statistical procedures allow for an analyses of the data in regard to each of the research statements previously stated. Research statements one and two are addressed using the regression procedure, research statements three and four require an analysis of variance procedure, and research statements five through ten are investigated using the independent T-test procedure.

Chapter Four

Results and Findings of the Study

The purpose of this study was to examine how stress appraisal and coping strategies change over a period of stress related events and how they are related to academic achievement in community college students. The study population was restricted to students enrolled in the Virginia Community College system during the Fall Semester of 1988. Comparisons were made on the basis of gender, age, and level of academic preparedness. This chapter presents the analyses of the research data and is divided into four sections. Section I describes the characteristics of the sample, provides demographic information of the respondents in the study, and compares students who completed the study with those who did not complete. Section II presents the comparison of subscale scores for both stress appraisal and coping strategies among various groups of students using T-test analysis procedures. Section III presents analyses of the relationship between academic achievement and stress appraisal and analyses of the relationship between academic achievement and coping strategies. Multiple regression procedures are used to analyze the predictive value of the four subscales of the Stress Questionnaire on academic achievement. Analysis of variance procedures are used to analyze the association various coping strategies, as

measured by the three subscales of the Ways of Coping Check List, have with academic achievement. Section IV presents analyses of the data concerning changes in stress appraisal and coping strategies over a period of a one semester mathematics course.

Section I : Characteristics of the Sample and Respondents

The population for this study included all Virginia community college students enrolled in mathematics courses for the fall semester of 1988. A sample of 566 students were taken from twenty-five mathematics courses on six different college campuses. Of the total sample, 181 (32.2%) of the subjects did not provide completed instrumentation or demographic data. Data collection involved four phases at four different time intervals. Only those subjects providing complete data in all four phases of data collection were used in the statistical analysis of the study. Thus, the primary findings are based on 385 usable sets of data, or 67.8% of the total sample.

Table 1 provides a comparison between the 385 students with complete data and the 181 students with incomplete data. A Chi-Square procedure was conducted on the data to determine if the distribution of students among the primary variables being studied was significantly different from expected distributions. Table 1 shows no reliable difference between students for the variables of age ($p =$

0.536) or (p = 0.078), and a statistically significant difference (p = 0.008) for the variable of course type. The variable of course type identifies students as being in either developmental or transfer courses and is used in this study as the operational definition of level of academic preparedness.

The Chi-square probability of 0.008 and a numerical comparison of the variable of academic preparedness seems to indicate that students with lower levels of academic preparedness were more likely to not have completed the study because of missing data or withdrawal from the course. From the limited information provided, it appears that students less prepared for academic work are less likely to attend class regularly and less likely to complete the mathematics course.

The Chi-square probability of 0.078 and a numerical comparison of the two variables of gender in Table 1 indicates some difference between the groups, although not at the statistically significant level (0.05) being used in this study. The data analysis reveals that more females enrolled in the courses (373 females to 193 males) and that more females (110) than males (71) had incomplete data.

Table 2 shows the percentage comparison of subjects with complete and incomplete data. Categories such as race, number of work hours, number of hours enrolled, and first time in college were collected in addition to the data

primarily being used in this study. These additional categories provide extended comparison between complete and incomplete subject data files.

Table 1

Comparisons of Three Demographic Variables Between Students with Complete Files and Those with Incomplete Files

Demographic Variable	Number of Complete Files	Number of Incomplete Files	Total
Age			
25 & under	282	137	419
over 25	103	44	147
Total	385	181	566
Chi-Square Probability = 0.536			
Gender			
Male	122	71	193
Female	263	110	373
Total	385	181	566
Chi-Square Probability = 0.078			
Course Type			
Developmental	163	102	265
Transfer	170	64	234
Total	333	166	499
Chi-Square Probability = 0.008*			

* $p < .05$

TABLE 2

Comparison of Frequencies and Percentages of Demographic Data Between Students with Complete Data Files and Those with Incomplete Data Files

TOTAL	COMPLETE FILE 385 students n	%	INCOMPLETE FILE 181 students n	%
TYPE OF MATHEMATICS COURSE				
1 Developmental	163	42.3	102	56.4
2 Transfer	170	44.2	64	35.4
3 Business	21	5.5	13	7.2
4 Statistics	31	8.1	2	1.1
NAME OF COMMUNITY COLLEGE				
1 JSRCC	49	12.7	29	16.0
2 TCC	107	27.8	58	32.0
3 SsVCC-A	46	11.9	9	5.0
4 SsVCC-B	58	15.1	40	22.1
5 WCC	88	22.9	22	12.2
6 SwVCC	37	9.6	23	12.7
GENDER				
1 MALE	122	31.7	71	39.2
2 FEMALE	263	68.3	110	60.8
AGE AT TIME OF DATA COLLECTION				
1 UNDER 18	38	9.9	11	6.1
2 18-25	244	63.4	126	69.6
3 26-40	81	21.0	35	19.3
4 OVER 40	22	5.7	9	5.0
RACE OR NATIONAL ORIGIN				
1 BLACK	88	22.9	52	28.7
2 WHITE	288	74.8	122	67.4
3 MEXICAN	1	.3	0	0.0
4 AMERICAN INDIAN	1	.3	3	1.7
5 ORIENTAL	4	1.0	1	.6
6 OTHER	3	.8	3	1.7
NUMBER OF HOURS WORKED PER WEEK				
1 0	134	34.8	53	29.3
2 1-10	18	4.7	11	6.1
3 11-20	82	21.3	29	16.0
4 21-30	67	17.4	38	21.0
5 31-40	60	15.6	35	19.3
6 OVER 40	24	6.2	1	.6

TABLE 2 Continued

NUMBER OF HOURS CURRENTLY ENROLLED					
1	1-3	19	4.9	3	1.7
2	4-6	38	9.9	17	9.4
3	7-9	31	8.1	14	7.7
4	10-12	46	11.9	33	18.2
5	13-15	104	27.0	72	39.8
6	OVER 15	147	38.2	42	23.3
FIRST TERM OR COURSE IN COLLEGE					
1	YES	188	48.8	85	47.0
2	NO	197	51.2	96	53.0

For the purposes of this study the age category was collapsed into two groups: students 25 years or younger, and students over 25 years of age. The younger (traditional age) group totaled 282 students and represented 73.2% of the sample. The older (nontraditional age) group totaled 103 students and represented 26.8% of the sample.

Business Mathematics and Statistics classes were removed from analyses using the independent variable level of academic preparedness because of their lack of a clearly identifiable placement in the category. The 52 students enrolled in these two courses represented 15.6% of the sample and were used in other analytical comparisons such as age or gender with academic achievement. Analyses concerning level of academic preparedness are categorized into two course types: Developmental and Transfer. Developmental courses totaled 163 students and represented 48.9% of the sample. Transfer courses totaled 170 students and represented 51.1% of the sample.

Section II: Stress Appraisal and Coping Strategies Among Various Groups of Students

The students' patterns of stress appraisal and coping strategies were analyzed using the variables of age, gender, and level of academic preparedness. Stress appraisal was measured using a Stress Questionnaire with four subscale categories. Coping strategies were measured using the Ways

of Coping Check List which uses three subscale categories. Each instrument was administered at three intervals during the semester. The combination of variables, subscales, and intervals of instrument presentation generate sixty-three (63) comparisons using T-test statistical procedures. Analysis of stress appraisal required thirty-six (36) procedures while coping strategies required twenty-seven (27) procedures.

This section presents the findings for each of the T-test statistical procedures and is divided into two parts. Presented first are the analyses of stress appraisal and secondly, the analyses of coping strategies. Readers should note that the data is not presented in numerical order of the hypotheses. Rather, the research data is structured and presented with respect to the conceptual focus of stress appraisal and coping strategies.

Analyses of Stress Appraisal

Responses on the Stress Questionnaire were originally scored on a Likert-type scale with responses 1 and 2 indicating "not at all", responses 3, 4, and 5 indicating "somewhat", and responses 6 and 7 indicating "extremely". These responses were converted to a -1, 0, +1 scale for more accurate computation of the numerical data. Mean values for the Stress Questionnaire therefore have a minimum value of -

1 (not at all) and a maximum value of +1 (extremely) with 0 representing the median or "somewhat" response.

Comparison of Stress Questionnaire by Level of Academic Achievement

The first set of T-test procedures analyzed students' responses on the four Stress Questionnaire subscales by level of academic preparedness. These procedures address research statement number five: There are no differences between transfer and developmental students in stress appraisal.

Significant differences at the $p < .05$ level were found between transfer and developmental students in three of the four subscale categories. The subscale of Anticipatory Threat Emotion was statistically significant ($p = .0221$) at the second presentation (T_1) of the instrument. Table 3 indicates that transfer students reported experiencing a greater sense of Anticipatory Threat Emotion than did developmental students. Table 4 reveals a significant difference between developmental and transfer students at both T_1 and T_2. AT both intervals developmental students express greater Anticipatory Challenge Emotions than do their transfer counterparts. Table 5 shows no significant differences at any of the presentation intervals between the two groups in the subscale of Outcome Harm Emotions. However, Table 6 indicates the greatest amount of difference between the two groups was found in the Outcome Benefit

Emotion subscale of stress appraisal. Outcome Benefit Emotions are significantly different for developmental and transfer students at each presentation of the stress questionnaire. Developmental students report experiencing a greater degree of emotion concerning the benefit of their completion of the mathematics course. It seems possible that Developmental students perceive completion of the mathematics course to be a greater accomplishment than do their Transfer counterparts. Therefore, Developmental students may tend to view the experience as more beneficial.

Significant differences in analysis of the data allow for the rejection of research statement number five. Several differences between stress appraisal for developmental and transfer students are indicated. The findings suggest that developmental students are more likely to view their enrollment in the course to be potentially beneficial. The beneficial perspective of Developmental students may also account for their higher self-report scores on Anticipatory Challenge Emotions.

TABLE 3

Comparison of Anticipatory Threat Emotions by Level of Academic Preparedness at Three Presentations of a Stress Questionnaire

Presentation	N	Mean	Std Dev.	DF	T	Prob>|T|
T_0						
Develop.	163	-0.2491	0.5621	331.0	1.5223	0.1289
Transfer	170	-0.3390	0.5147			
T_1						
Develop.	163	-0.3435	0.5362	331.0	-2.2993*	0.0221
Transfer	170	-0.2093	0.5703			
T_2						
Develop.	163	-0.3941	0.5372	331.0	-0.4541	0.6501
Transfer	170	-0.3665	0.5720			

* $p < .05$

TABLE 4

Comparison of Anticipatory Challenge Emotions by Level of Academic Preparedness at Three Presentations of a Stress Questionnaire

Presentation	N	Mean	Std Dev.	DF	T	Prob>|T|
T_0						
Develop.	163	0.4644	0.5954	331.0	1.7663	0.0783
Transfer	170	0.3471	0.6161			
T_1						
Develop.	163	0.3107	0.6609	331.0	3.2087**	0.0015
Transfer	170	0.0725	0.6924			
T_2						
Develop.	163	0.3128	0.6633	331.0	2.5339*	0.0117
Transfer	170	0.1253	0.6862			

* $p < .05$
** $p < .01$

TABLE 5

Comparison of Outcome Harm Emotions
by Level of Academic Preparedness at Three
Presentations of a Stress Questionnaire

Presentation	N	Mean	Std Dev.	DF	T	Prob>|T|
T_0						
Develop.	163	-0.8441	0.3485	331.0	-0.0465	0.9630
Transfer	170	-0.8423	0.3648			
T_1						
Develop.	163	-0.7877	0.4053	331.0	-1.6758	0.0947
Transfer	170	-0.7070	0.4692			
T_2						
Develop.	163	-0.6564	0.5006	331.0	0.0211	0.9832
Transfer	170	-0.6576	0.5410			

TABLE 6

Comparison of Outcome Benefit Emotions
by Level of Academic Preparedness at Three
Presentations of a Stress Questionnaire

Presentation	N	Mean	Std Dev.	DF	T	Prob>|T|
T_0						
Develop.	163	0.0874	0.5935	331.0	3.1678**	0.0017
Transfer	170	-0.1191	0.5959			
T_1						
Develop.	163	-0.0858	0.5585	331.0	4.1869**	0.0000
Transfer	170	-0.3500	0.5911			
T_2						
Develop.	163	0.0061	0.7125	331.0	3.4076**	0.0007
Transfer	170	-0.2500	0.6589			

** $p < .01$

Comparison of Stress Questionnaire by Age of Student

The variable of student age is of focal concern in research statement number seven: There are no differences between traditional age college students (25 or under) and nontraditional age college students (over 25)in stress appraisal. Only two of the twelve statistical procedures conducted with this variable indicated a significant difference. Two significant differences occurred with the subscale of Anticipatory Threat Emotion. One at the first (T_0) presentation and one at the second (T_1) presentation of the Stress Questionnaire. Older, nontraditional students expressed more Anticipatory Threat Emotions than did the younger students. However, the mean of the responses registered in the minus value of the scale indicating a less than "somewhat" response for Anticipatory Threat Emotion. Table 7 displays the data with statistical differences. Tables 8, 9, and 10 show no difference (at the $p < .05$ significance level) between the two groups in the remaining subscales of the Stress Questionnaire.

This study fails to permit a rejection of research statement number seven. Ten of the twelve T-test procedures conducted on the data revealed no differences between the two age groups. While differences for the subscale of Anticipatory Threat Emotion were present at T_0 and T_1, comparisons in the ten other T-test procedures do not indicate any significant differences between the two groups.

In addition, the minus values of the mean scores for Anticipatory Threat Emotions at T_0 and T_1 do not favor rejection of research statement number seven. Even when statistical significance is found, the minus values of the mean scores indicate that the reported emotions are less than "somewhat" even for the most threatened group.

TABLE 7

Comparison of Anticipatory Threat Emotions by Age at Three Presentations of a Stress Questionnaire

Presentation	N	Mean	Std Dev.	DF	T	Prob>|T|
T_0						
25 & Under	282	-0.3685	0.5152	383.0	-2.2878*	0.0227
Over 25	103	-0.2294	0.5619			
T_1						
25 & Under	282	-0.3440	0.5341	383.0	-2.0613*	0.0399
Over 25	103	-0.2135	0.5902			
T_2						
25 & Under	282	-0.4002	0.5277	383.0	-1.0938	0.2747
Over 25	103	-0.3302	0.6256			

* $p < .05$

TABLE 8

Comparison of Anticipatory Challenge Emotions by Age at Three Presentations of a Stress Questionnaire

Presentation	N	Mean	Std Dev.	DF	T	Prob>|T|
T_0						
25 & Under	282	0.3653	0.6304	383.0	-2.0287	0.0673
Over 25	103	0.4921	0.5070			
T_1						
25 & Under	282	0.1443	0.6905	383.0	-1.2992	0.1947
Over 25	103	0.2457	0.6418			
T_2						
25 & Under	282	0.1820	0.6820	383.0	-1.6134	0.1075
Over 25	103	0.3073	0.6546			

Table 9

Comparison of Outcome Harm Emotions by Age at Three Presentations of a Stress Questionnaire

Presentation	N	Mean	Std Dev.	DF	T	Prob>|T|
T_0						
25 & Under	282	-0.8631	0.3472	383.0	-0.3767	0.7066
Over 25	103	-0.8485	0.3035			
T_1						
25 & Under	282	-0.7560	0.4309	383.0	0.1811	0.8564
Over 25	103	-0.7650	0.4369			
T_2						
25 & Under	282	-0.6886	0.4938	383.0	-0.6272	0.5309
Over 25	103	-0.6524	0.5224			

TABLE 10

Comparison of Outcome Benefit Emotions by Age
at Three Presentations of a Stress Questionnaire

Presentation	N	Mean	Std Dev.	DF	T	Prob>|T|
T_0						
25 & Under	282	-0.0460	0.5853	383.0	-0.5316	0.5953
Over 25	103	-0.0097	0.6192			
T_1						
25 & Under	282	-0.2544	0.5773	383.0	-1.2824	0.2005
Over 25	103	-0.1674	0.6197			
T_2						
25 & Under	282	-0.1072	0.6823	383.0	0.8567	0.3921
Over 25	103	-0.1747	0.6894			

Comparison of Stress Questionnaire by Gender of Student

The question of how gender may affect stress appraisal is addressed in research statement number nine: There are no differences between male and female community college students in stress appraisal.

Twelve T-test procedures were conducted with the variable of gender. Five of the procedures revealed differences at the $p < .05$ significance level. Table 11 shows gender differences with Anticipatory Threat Emotions at the first (T_0) and second (T_1) presentations of the Stress Questionnaire. Females reveal more Anticipatory Threat Emotions at both T_0 and T_1. Table 12 presents data showing males as experiencing more Anticipatory Challenge Emotions two days prior to their first major test (T_1) and when test scores were returned (T_2). The final difference was found at T_3 for Outcome Harm Emotions where females reported a higher rate of this subscale (see Table 13). No significant differences were found in Outcome Benefit Emotion (see Table 14).

This study rejects research statement number nine. Significant differences between male and female community college students in stress appraisal were found in both of the Anticipatory Emotion subscales. Females tended to be more threatened early in the semester (T_0) and again before the first test (T_1) with Anticipatory Threat Emotions.

Males tended to experience more Anticipatory Challenge Emotions prior to their first major test (T_1) and again when the test grades were returned (T_2). Finally, females revealed a stronger sense of Outcome Harm Emotion after receiving their test grades(T_2). However, Gender was not found to be a significant contributing factor to academic achievement as measured by either the first test grade ($p = 0.8506$) or on final course grade ($p = 0.4337$).

TABLE 11

Comparison of Anticipatory Threat Emotions by Gender at Three Presentations of a Stress Questionnaire

Presentation	N	Mean	Std Dev.	DF	T	Prob>|T|
T_0						
Male	122	-0.4695	0.4217	307.3	-3.9175**	0.0001
Female	263	-0.2671	0.5639			
T_1						
Male	122	-0.4150	0.4358	311.7	-2.8812**	0.0042
Female	263	-0.2600	0.5926			
T_2						
Male	122	-0.4287	0.5466	383.0	-1.1365	0.2564
Female	263	-0.3596	0.5594			

** $p < .01$

TABLE 12

Comparison of Anticipatory Challenge Emotions by Gender at Three Presentations of a Stress Questionnaire

Presentation	N	Mean	Std Dev.	DF	T	Prob>|T|
T_0						
Male	122	0.3908	0.6567	383.0	-0.1874	0.8514
Female	263	0.4031	0.5759			
T^1						
Male	122	0.3171	0.6680	383.0	2.8965**	0.0040
Female	263	0.1038	0.6739			
T_2						
Male	122	0.3578	0.6300	383.0	2.8380**	0.0048
Female	263	0.1495	0.6878			

** $p < .01$

TABLE 13

Comparison of Outcome Harm Emotions by Gender
at Three Presentations of a Stress Questionnaire

Presentation	N	Mean	Std Dev.	DF	T	Prob>|T|
T_0						
Male	122	-0.8950	0.2872	286.4	-1.5426	0.1240
Female	263	-0.8425	0.3551			
T_1						
Male	122	-0.8032	0.3848	273.3	-1.4719	0.1422
Female	263	-0.7376	0.4513			
T_2						
Male	122	-0.7606	0.4307	284.2	-2.3554*	0.0192
Female	263	-0.6410	0.5272			

* $p < .05$

TABLE 14

Comparison of Outcome Benefit Emotions by Gender at Three Presentations of a Stress Questionnaire

Presentation	N	Mean	Std Dev.	DF	T	Prob>|T|
T_0						
Male	122	-0.0471	0.6406	383.0	-0.2419	0.8089
Female	263	-0.0313	0.5722			
T_1						
Male	122	-0.1680	0.6016	383.0	1.4333	0.1526
Female	263	-0.2604	0.5825			
T_2						
Male	122	-0.0655	0.6663	383.0	1.1680	0.2435
Female	263	-0.1534	0.6914			

Analyses of Coping Strategies

Coping strategies were measured using the Ways of Coping Check List as referenced by Folkman and Lazarus (1985). The purpose of using the Ways of Coping Check List in this study was to examine if there were differences in coping strategy styles for different groups of community college students.

The Ways of Coping Check List incorporates three distinct subscales: Problem Focused Coping, Emotion Focused Coping, and Social Support.

Problem Focused Coping involves task oriented behaviors designed to address the conditions of a given situation. Emotion Focused Coping involves wishful, escapist, or self-condemning behaviors that center on self as opposed to centering on the conditions of the situation. Social Support Coping strategies are designated as behaviors designed to gain association, empathy, or support from others. Problem Focused Coping strategies are viewed as the most productive in addressing difficult issues that generally produce stress. Emotion Focused and Social Support Coping strategies are widely used in a variety of coping situations but are not considered as productive as Problem Focused Coping in solving situational problems.

Subscales of the Ways of Coping Check List are scored according to the number of items checked by the student for

each category. The range of group means vary across categories of coping strategies because of an unequal number of items in the categories. This section presents the three subscales of the Ways of Coping Check List at three presentation intervals during the semester of data collection for the variables of level of academic preparedness, age, and gender.

Comparison of Coping Strategies by Level of Academic Preparedness

T-test statistical procedures were used to analyze the relationship between coping and academic preparedness. These procedures examine research statement number six: There are no differences between transfer students and developmental students in coping strategies.

Only one of the nine procedures conducted revealed a statistical difference between developmental and transfer students at the $p < .05$ significance level. Table 15 shows that college transfer students tended to use more Problem Focused Coping during the early portion of the semester (T_0) than did the developmental group. Tables 16 and 17 indicate no significant differences between transfer and developmental groups for either Emotion Focused or Social Support Coping strategies.

Having only one of nine statistical procedures produce a significant difference between the two groups indicates

that the findings do not allow rejection of research statement number six: There are no differences between transfer students and developmental students in coping strategies.

TABLE 15

Comparison of Problem Focused Coping Strategies by Level of Academic Preparedness at Three Presentations of a Ways of Coping Check List

Presentation	N	Mean	Std Dev.	DF	T	Prob>|T|
T_0						
Develop.	163	4.8098	3.1122	331.0	-2.7130**	0.0070
Transfer	170	5.7294	3.0726			
T_1						
Develop.	163	5.2147	3.4439	331.0	1.2257	0.2212
Transfer	170	4.7588	3.3433			
T_2						
Develop.	163	4.1104	3.5118	331.0	-0.8689	0.3855
Transfer	170	4.4294	3.1843			

** $p < .01$

TABLE 16

Comparison of Emotion Focused Coping Strategies by Level of Academic Preparedness at Three Presentations of a Ways of Coping Check List

Presentation	N	Mean	Std Dev.	DF	T	Prob>|T|
T_0						
Develop.	163	3.9079	3.5604	331.0	-1.2393	0.2161
Transfer	170	4.3941	3.5953			
T_1						
Develop.	163	4.2147	3.7789	331.0	-1.0428	0.2978
Transfer	170	4.6411	3.6835			
T_2						
Develop.	163	3.7116	3.6796	331.0	-0.9477	0.3440
Transfer	170	4.0882	3.6835			

TABLE 17

Comparison of Social Support Coping Strategies by Level of Academic Preparedness at Three Presentations of a Ways of Coping Check List

Presentation	N	Mean	Std Dev.	DF	T	Prob>|T|
T_0						
Develop.	163	2.1288	1.5481	331.0	-0.8749	0.3823
Transfer	170	2.2764	1.5307			
T_1						
Develop.	163	1.8957	1.6909	331.0	0.0773	0.9384
Transfer	170	1.8823	1.4547			
T_2						
Develop.	163	1.6012	1.7268	331.0	0.1404	0.8884
Transfer	170	1.5764	1.4866			

Comparison of Coping Strategies by Student Age

The data presented here addressed research statement number eight: There are no differences between traditional age college students (25 years or under) and nontraditional age college students (over 25 years of age) in coping strategies.

T-test procedures with the variable of age produced several areas of significant difference between the groups. Table 18 shows a significant difference ($p = .0027$) in Problem Focused Coping prior to the first major test (T_1). In this finding, students over the age of 25 years report using more Problem Focused Coping before test time (T_1). Also of interest in Table 18 is the difference of $p = .0637$ for Problem Focused Coping after test grades are returned (T_2); however, this statistical difference does not meet the $p < .05$ significance level being used in this study.

Emotion Focused Coping revealed the largest difference between coping strategies for traditional and nontraditional aged college students in the sample. As shown in Table 19, significant differences were found in all three presentation intervals of the coping strategy subscale. Results indicate that traditional age students were more likely to rely on Emotion Focused Coping as a method of addressing the stressful situation of a mathematics course at each interval of data collection.

The independent variable of age also reveals differences in Social Support Coping between the two groups. Prior to taking the first major test (T_1), older, nontraditional students show more Social Support Coping (see Table 20). Also, it should be noted that the level of probability was p = .0736 at the time students received test grades (T_2). The mean for Social Support Coping at T_2 was 4.7572 for the nontraditional students and 4.0815 for the younger, traditional students. It appears likely that older students may have developed family, community, or co-worker networks that support their academic pursuits.

Overall, the T-test procedures for the age variable indicates that different coping strategies are used by the two age groups. Traditional age students employ more Emotion Focused Coping during the early portion of the semester (T_0) while nontraditional students rely more on Problem Focused Coping at T_1 and T_2 and employ more Social Support Coping at the stress interval prior to the first major test (T_1).

The data analyses supports a rejection of research statement number eight: There are no differences between traditional age college students (25 years or under) and nontraditional age (over age 25) in coping strategies. Results show that significant differences do exist in each of the three coping strategies and at each of the key stress intervals.

TABLE 18

Comparison of Problem Focused Coping Strategies by Age at Three Presentations of a Ways of Coping Check List

Presentation	N	Mean	Std Dev.	DF	T	Prob>|T|
T_0						
25 & Under	282	2.1560	1.5245	383.0	-0.7619	0.4466
Over 25	103	2.2912	1.5881			
T_1						
25 & Under	282	1.7198	1.5007	383.0	-3.0182**	0.0027
Over 25	103	2.2621	1.7147			
T_2						
25 & Under	282	1.4751	1.5491	383.0	-1.8597	0.0637
Over 25	103	1.8155	1.6962			

** $p < .01$

TABLE 19

Comparison of Emotion Focused Coping Strategies by Age at Three Presentations of a Ways of Coping Check List

Presentation	N	Mean	Std Dev.	DF	T	Prob>|T|
T_0						
25 & Under	282	4.5390	3.6011	383.0	3.1498**	0.0018
Over 25	103	3.2718	3.1814			
T_1						
25 & Under	282	4.6418	3.7239	383.0	2.9121**	0.0038
Over 25	103	3.4174	3.4457			
T_2						
25 & Under	282	4.1702	3.7129	383.0	2.6126**	0.0093
Over 25	103	3.0776	3.4003			

** $p < .01$

TABLE 20

Comparison of Social Support Coping Strategies by Age at Three Presentations of a Ways of Coping Check List

Presentation	N	Mean	Std Dev.	DF	T	Prob>|T|
T_0						
25 & Under	282	5.1418	2.9817	383.0	-0.7887	0.4308
Over 25	103	5.4174	3.1793			
T_1						
25 & Under	282	4.5673	3.2724	383.0	-3.6443**	0.0003
Over 25	103	5.9514	3.3705			
T_2						
25 & Under	282	4.0815	3.2352	383.0	-17938	0.0736
over 25	103	4.7572	3.3707			

** $p < .01$

Comparison of Coping Strategies by Student Gender

This set of T-test procedures examines how gender impacts upon coping strategies. Research statement number ten asserts: There are no differences between male and female community college students in coping strategies. Two of the three subscales in the Ways of Coping Check List do not show differences between male and female coping strategies. However, the third subscale reveals a significant difference.

Tables 21 and 22 show that male and female college students do not report any significant differences in the use of Problem Focused or Emotion Focused Coping. A significant difference between the two groups is indicated in the subscale of Social Support Coping. The analysis of data, displayed in Table 23, shows that females were more likely than males to employ Social Support Coping strategies during the academic semester. A higher reliance on Social Support Coping was shown by females at all three presentations of the Ways of Coping Check List (T_0, T_1, and T_2).

These results allow rejection of research statement number ten that there are no differences between the two genders. Social Support Coping is significantly different for the two groups at every interval of the data collection period (See Table 23).

TABLE 21

Comparison of Problem Focused Coping Strategies by Gender at Three Presentations of a Ways of Coping Check List

Presentation	N	Mean	Std Dev.	DF	T	Prob>|T|
T_0						
Male	122	5.3524	3.0880	383.0	0.6024	0.5473
Female	263	5.1520	3.0126			
T_1						
Male	122	5.0573	3.2760	383.0	0.4769	0.6337
Female	263	4.8821	3.3902			
T_2						
Male	122	4.0000	3.1201	383.0	-1.0686	0.2859
Female	263	4.3840	3.3522			

TABLE 22

Comparison of Emotion Focused Coping Strategies by Gender at Three Presentations of a Ways of Coping Check List

Presentation	N	Mean	Std Dev.	DF	T	Prob>|T|
T_0						
Male	122	4.3524	3.6316	383.0	0.5759	0.5650
Female	263	4.1292	3.4935			
T_1						
Male	122	4.5000	3.4694	383.0	0.6726	0.5016
Female	263	4.2281	3.7874			
T_2						
Male	122	3.9918	3.6306	383.0	0.4154	0.6781
Female	263	3.8250	3.6788			

TABLE 23

Comparison of Social Support Coping Strategies by Gender at Three Presentations of a Ways of Coping Check List

Presentation	N	Mean	Std Dev.	DF	T	Prob>|T|
T_0						
Male	122	1.9016	1.3930	383.0	-2.5378*	0.0116
Female	263	2.3269	1.5894			
T_1						
Male	122	1.6065	1.5510	383.0	-2.2005*	0.0284
Female	263	1.9487	1.5774			
T_2						
Male	122	1.2459	1.3745	383.0	-2.7060**	0.0071
Female	263	1.2459	1.7148			

* $p < .05$
** $p < .01$

Section III: Relationships between Stress Appraisal, Coping Strategies, and Academic Achievement

This section of the data analyses addresses those portions of the study concerned with the predictive value that stress appraisal and coping strategies may have on academic achievement. Regression procedures were conducted to analyze the effects on academic achievement that are associated with stress appraisal as measured by the Stress Questionnaire. Analysis of variance procedures were conducted to analyze the effects, if any, on academic achievement associated with coping strategies as measured by the Ways of Coping Check List.

Student patterns of stress appraisal and coping strategies are analyzed to determine their effect on academic achievement. The data analyses are divided into two parts: the first part examines stress appraisal while the second part examines coping strategies. The arrangement of subscale combinations and intervals of instrument presentation generate seventeen (17) different analyses of stress appraisal and academic achievement and three (3) different analyses of coping strategies and academic achievement. These analyses have been condensed into three tables for stress appraisal and two tables for coping strategies.

Stress Appraisal

Regression statistical procedures were conducted on the data to analyze the relationship between stress appraisal and academic achievement. A regression procedure was selected to analyze the data because this procedure produces an R-square statistic. The R-square statistic reveals the "percentage of the variance in Y that is associated with, determined by, or accounted for by the variance in X" (Guilford and Fruchter, 1978, p. 358). For this study, R-square analysis is used to determine the proportion of the variation in the dependent variable of academic achievement that is associated with, determined by, or accounted for by the independent variable of stress appraisal.

At each administration of the Stress Questionnaire, students were given a separate score for each of the four subscales identified by the instrument. The Stress Questionnaire subscales were then regressed on the students' final course grade to determine the relationship, if any, between the two scores. Stress Questionnaire subscales were measured in three different ways. First, subscales were independently regressed on course grades (Table 24); secondly, the subscales were combined by category and averaged across three presentations (Table 25); and thirdly, all subscales of the Stress Questionnaire were combined to

determine their cumulative effect on academic achievement (Table 26).

Regression procedures using stress appraisal as the predictor variable of academic achievement addresses research statement number one: There are no differences among four categories of stress appraisal in relation to academic achievement for community college students. When measured independently and regressed on academic achievement, the Stress Questionnaire subscales did not show high levels of association to academic achievement. R-square values for the individual subscales ranged as low as 0.000 for both Anticipatory Challenge Emotions and Outcome Benefit Emotions at T_1 to a high of 0.077 for Outcome Harm Emotions at T_2 (See Table 24). This examination of individual stress subscales at various presentations reveals that even the strongest of relationships between stress and academic achievement (R_2 = 0.077 for Outcome Harm Emotions at T_1) fails to produce reliable predictive value. When measured independently at different presentations, the stress subscales do not significantly explain the variance in academic achievement.

The second measurement of the relationship between stress appraisal and academic achievement averaged the Stress Questionnaire subscale score across the three presentation intervals. Table 25 provides the four R-square values of this measurement. Outcome Harm Emotions again

show the highest degree of explanation (R_2 = 0.054) among the four subscales. Although the R_2 of 0.054 for Outcome Harm Emotions does not present high predictability of academic achievement, it does provide noticeably more explanation than do the other three stress subscales.

The last measurement of stress appraisal and academic achievement combines all four of the subscales at all three presentations and results in one explanatory value. Table 26 shows the combined effect of the Stress Questionnaire to have an R-Square of 0.110. According to the definition of Guilford and Fruchter (1978), eleven percent of the variation in the dependent variable of academic achievement is associated with, determined by, or accounted for by the independent variable of stress appraisal.

Based on the observation that Outcome Harm Emotions were noticeably different from the other Stress Questionnaire subscales in Tables 24 and 25, this study rejects research statement number one: there are no differences among four categories of stress appraisal in relation to academic achievement for community college students. Regression procedures on the data reveal that the Stress Questionnaire possesses a very low association to academic achievement, but that Outcome Harm Emotions show noticeably more association than the other three subscales. The analysis indicates that student concern about a harmful outcome for the course is most likely to be associated with

student grades. In other words, concerns about failing the course (a harmful outcome) tend to have the greatest impact on student performance as measured by traditional testing and grading. However, stress appraisal is associated with only a small portion of the variation in academic achievement.

Table 24

Summary Table for Regression Analysis of Stress Subscales on Academic Achievement at Three Presentations of a Stress Questionnaire

Stress Questionnaire Subscale		Mean	R_2
Anticipatory Threat Emotions			
Presentation	T_0	0.0075	0.009
	T_1	-0.0321	0.010
	T_2	0.1126	0.045
Anticipatory Challenge Emotions			
Presentation	T_0	-0.7496	0.004
	T_1	-0.5615	0.000
	T_2	-0.6111	0.008
Outcome Harm Emotions			
Presentation	T_0	0.7930	0.013
	T_1	0.6503	0.011
	T_2	0.5567	0.077
Outcome Benefit Emotions			
Presentation	T_0	-0.3721	0.004
	T_1	-0.1637	0.000
	T_2	-0.2398	0.045

Table 25

Summary Table for Regression Analysis of Stress Questionnaire Subscale Averages on Academic Achievement

Stress Questionnaire Subscale	Mean	R-Square
Anticipatory Threat Emotions	0.0036	0.031
Anticipatory Challenge Emotions	-0.6228	0.004
Outcome Harm Emotions	0.6211	0.054
Outcome Benefit Emotions	-0.2489	0.016

Table 26

Summary Table for Regression Analysis of Combined Stress Questionnaire Subscales on Academic Achievement

Source	DF	Mean Square	R_2
Stress Questionnaire Subscales	12	744.45	0.110

Coping Strategies

Research statement number two is concerned with the differences among three categories of coping strategies in relation to academic acehievement for community college students. In addressing this research statement, comparisons of coping strategies with academic achievement have been limited to the T_1 presentation of the Ways of Coping Check List. The emphasis for higher education is found at the T_1 presentation. It is at this point that the stressful encounter heightens and it is here that effective coping strategies can have the maximum impact on academic achievement. Mechanic (1962) was among the early researchers to document that the degree of stress reaction increases as the date of an examination approaches. In describing the reactions of graduate students facing a critical examination, Mechanic (1962) notes that "when the examinations are nearly upon the student, anxiety is very high, even for those rated as low-anxiety persons" (p. 143).

Folkman and Lazarus (1985) found that 94% of the subjects in their study of examination stress reported T_1 to offer the highest degree of ambiguity. The ambiguity experienced by students results from the fact that they do not know exactly what will be on the examination nor how well they might do. "In situations that are highly ambiguous, it is difficult to evaluate what the likely outcome will be. . . . Which means that both threat and

challenge emotions are apt to be experienced. . . . Therefore, regardless of the stage of an encounter, as long as the person makes appraisals about an ambiguous future, he or she can experience both threat and challenge emotions" (p. 153). Illustrating how the T_1 period is critical to academic achievement, Folkman (1984) found the "greater the ambiguity, the more inference [based on experiences and personality dispositions] is required and, consequently, the more influence person factors have in determining the meaning of the environmental configuration" (p. 841).

At the T_1 presentation of the Ways of Coping Check List, students were scored on each of the three subscales identified by the instrument. To facilitate comparison of the three different coping strategies subscales to academic achievement, students were assigned to their highest scoring subscale. While each student received a measure for each of the three coping subscales, each student was categorized into his or her highest scoring subscale at T_1 to facilate a comparison of coping strategy to academic achievement. Students with equal scores for two or more of the subscales (n = 10) were removed from the analysis.

Ways of Coping Check List measures are presented in two different analyses. In Table 27, the number of students in each subscale and the mean scores of academic achievement for each subscale are presented. The frequency for coping subscales selected by students indicate a preference for

Problem Focused Coping and Emotion Focused Coping over Social Support. An additional 2.6% of the students showed no singular preference for a particular subscale. A comparison of the academic achievement scores reveals the highest mean score for Problem Focused Coping (79.87), followed by Emotion Focused Coping (76.61) and Social Support (75.69).

A second analyisis of the data, presented in Table 28, presents an analysis of variance statistical procedure to determine if the three Ways of Coping Check List subscales are significantly different. The F Value of 2.07 and a Pr > 0.127 indicates that there is no significant difference among the three subscale groups.

These results fail to allow a rejection of research statement number two: There are no differences among three categories of coping strategies in relation to academic achievement for community college students.

Table 27

Summary Table of Means for Course Grades and Individual Ways of Coping Check List Subscales

Presentation	Ways of Coping Check List Subscale	N	Subscale Mean	Course Grade Mean
T_1	Problem Focused	152	4.8772	79.877
	Emotion Focused	66	4.1433	76.618
	Social Support	102	1.8012	75.695

* Students with equal scores on two or more subscales were removed from the data analysis.

Table 28

Summary Table of Analysis of Variance
for Ways of Coping Check List Subscales

Presentation of Ways of Coping Check List	DF	F Value	Pr > F
T_1 Two Days Prior to First Test	2	2.07	0.127

Section IV : Changes in Stress Appraisal and Coping Strategies

Among the specific purposes of this study was the investigation of a cognitive-transactional theory of stress developed by Lazarus (1966) and Lazarus and Folkman (1984). The data collected in this portion of the study was designed to determine if community college students report a cognitively oriented, process centered experience of stress and coping as identified in the Folkman and Lazarus research.

T-test procedures were conducted on the subscales of both the Stress Questionnaire and the Ways of Coping Check List. Subscale measurements for each of the instruments were compared between the time interval of T_0 and T_1 and again for the time interval of T_1 and T_2. Comparison of the instrument subscales at the sequential time intervals results in a net comparison for the stress appraisal and coping strategy changes between the respective presentations of the instruments. Two-tailed probability of the T-test indicates levels of significance for each of the subscales and net comparison means indicates the direction (+ or -) of change, if any, between the time intervals.

This section presents the findings of the T-test comparisons by time interval for each of the measurement instruments. The combination of individual subscales and

interval of instrument presentation generated eight (8) comparisons of stress appraisal and six (6) comparisons of coping strategies. These fourteen (14) T-test comparisons are presented in summary Tables 30 and 31.

Analysis of Stress Appraisal

Student responses to the Stress Questionnaire were compared at sequential intervals to determine if significant differences exist between the presentation times. This analysis addresses research statement number three: There are no differences in stress appraisal for community college students at three presentations of a stress questionnaire.

Table 29 provides a summary of the eight different T-test procedures conducted on the Stress Questionnaire. Each subscale generates two procedures by comparing (1) the mean subscale score at T_0 with the mean subscale score at T_1 and (2) the mean subscale score at T_1 with the mean subscale score at T_2. Each of the four Stress Questionnaire subscales reveal a statistically significant net mean difference in at least one of the two comparisons.

Anticipatory Threat Emotions were found to be statistically significant ($p = 0.0002$) between the time intervals of T_1 and T_2. The net comparison mean for this time interval of 0.1339 shows an increase in student stress appraisal of threat emotions. The results imply that students experienced an increased perception of threat

emotions upon receiving their first major test grades in the course.

Anticipatory Challenge Emotions were found to be statistically significant ($p = 0.0001$) between the time intervals of T_0 and T_1. A net comparison mean for this time interval of 0.1862 shows an increase in student stress appraisal of challenge emotions. The results imply that students experienced an increased perception of challenge emotions as the mathematics course progressed toward the first major test.

Outcome Harm Emotions were found to be statistically significant at the time interval of T_0 to T_1 ($p = 0.0001$) and at the time interval of T_1 to T_2 ($p = 0.0027$). A net comparison means for these time intervals of -0.1512 and -0.0971 respectively show a decrease in student stress appraisal of harm emotions. These results imply that students experienced a continued decrease in perception of harm emotions throughout the duration of data collection and until the first major test grades were received.

Outcome Benefit Emotions were found to be statistically significant ($p = 0.0001$) between the time intervals of T_0 and T_1. A net comparison mean for this time interval of 0.1942 shows an increase in student stress appraisal of benefit emotions as the mathematics course progressed toward the first major test.

A summary of the results presented in Table 29 reveals that students reported experiencing several changes in the ways they appraised stress. The data shows a statistically significant increase in challenge and benefit emotions up to the point of two days prior to their first major test. Then, after test grades are received by the students, threat emotions show a statistically significant increase while harm emotions show a significant decrease.

The changes in stress appraisal as presented in the summary of the data in Table 29 provide statistical reason to reject research statement number three: There are no differences in stress appraisal for community college students at three presentations of a stress questionnaire.

Table 29

Comparison of Net Differences of the Stress Questionnaire Subscale Means from T_0 to T_1 and from T_1 to T_2

Variable	Net Comparison	Mean	Std Dev	t-value	2-tailed Pr
Anticipatory Threat Emotions	$T_0 - T_1$	-0.0378	0.6300	-1.1771	0.2399
	$T_1 - T_2$	0.1339	0.6938	3.7859**	0.0002
Anticipatory Challenge Emotions	$T_0 - T_1$	0.1862	0.6198	5.8936**	0.0001
	$T_1 - T2$	-0.0303	0.5811	-1.0244	0.3063
Outcome Harm Emotions	$T_0 - T1$	-0.1512	0.5501	-5.3920**	0.0001
	$T_1 - T_2$	-0.0971	0.6308	-3.0216**	0.0027
Outcome Benefit Emotion	$T_0 - T_1$	0.1942	0.6329	6.0196**	0.0001
	$T_1 - T_2$	-0.0519	0.6999	-1.4564	0.1461

** $p < .01$

Analysis of Coping Strategies

Student responses to the Ways of Coping Check List were compared at sequential intervals to determine if significant differences exist between the presentation times. This analysis addresses research statement number four: There are no differences in coping strategies for community college students at three presentations of a ways of coping check list.

Table 30 provides a summary of the six different T-test procedures conducted on the Ways of Coping Check List. Each subscale generates two procedures by comparing (1) the mean subscale score at T_0 with the mean subscale score at T_1 and (2) the mean subscale score at T_1 with the mean subscale score at T_2. Each of the three Ways of Coping Check List subscales reveal a statistically significant net mean difference in at least one of the two comparisons.

Problem Focused Coping strategies were found to be statistically significant ($p = 0.0001$) between the time intervals of T_1 and T_2. A net comparison mean for this time interval of -0.6753 shows a decrease in student response of Problem Focused Coping. The results imply that students experienced a decrease in addressing the situation with Problem Focused Coping as the stressful point of the first major mathematics test expired. Addressing coping using a problem focus appears to have been considered by students to

be more appropriate before, rather than after the test.

Emotion Focused Coping strategies were found to be statistically significant ($p = 0.0057$) between the time intervals of T_1 and T_2. A net comparison mean for this time interval of -0.4364 shows a decrease in student response of Emotion Focused Coping. The results imply that students experienced less coping with an emotion focus after the test than before the test.

Social Support Coping strategies were found to be statistically significant at both the T_0 to T_1 interval ($p = 0.0002$) and at the T_1 to T_2 interval ($p = 0.0001$). The respective net comparison means (-0.3273 and -0.2987) indicates a continuing decrease in Social Support Coping throughout the data collection period.

A summary of the results presented in Table 30 reveals that students reported experiencing several changes in strategies of coping used. The data shows statistically significant changes in each of the subscales during the data collection period. All three subscales decreased after students received grades from their first major test. The subscale of Social Support Coping also decreased from the beginning of class until two days prior to the first major test. From the results of this study, it appears that the primary coping strategies identified by the Ways of Coping Check List shift significantly once the situation passes a critical stress point.

Statistically significant changes in each of the coping subscales allow for the rejection of research statement number four: There are no differences in coping strategies for community college students at three presentations of a Ways of Coping Check List.

Table 30

Comparison of Net Differences for Ways of Coping Check List Subscale Means from T_0 to T_1 and from T_1 to T_2

Variable	Net Comparison	Mean	Std Dev	t-value	2-tailed Pr
Problem Focused Coping	$T_0 - T_1$	-0.2779	3.0530	-0.7862	0.0749
	$T_1 - T_2$	-0.6753	2.9040	-4.5629**	0.0001
Emotion Focused Coping	$T_0 - T_1$	0.1143	3.2965	0.6802	0.4968
	$T_1 - T_2$	-0.4364	3.0774	-2.7822**	0.0057
Social Support Coping	$T_0 - T_1$	-0.3273	1.7145	-3.7455**	0.0002
	$T_1 - T_2$	-0.2987	1.5264	-3.8398**	0.0001

** $p < .01$

Summary of Research Questions

The research questions posed in Chapter One and the research statements that address those questions are summarized as follows:

1. What is the relationship between stress appraisal, coping strategies, and academic achievement?

The relationship is that differing categories of stress appraisal and coping strategies produce different associations to academic achievement. Research statement number one addressed the relationship between stress appraisal and academic achievement. Research statement number two addressed the relationship between coping strategies and academic achievement. Research statement number one was rejected as the data analysis revealed a statistically significant difference between the Stress Questionnaire subscales. The results failed to allow a rejection of research statement number two. While different coping subscales did show different mean scores for academic achievement, these scores were not found to be statistically significant.

2. Do community college students reveal a cognitively oriented, changing, process-centered experience of stress and coping strategies?

Data analyses show that community college students experience changes in both stress appraisal and coping strategies during the unfolding of a stressful event. Research statements number three and four addressed the question of student stress and coping experience. Both of these research statements were rejected as statistically significant differences were found between the subscales of the respective instruments and between the time interval presentations of the measurements.

3. Are community college students of different academic levels stressed differently and do they exhibit different coping strategies at three different stages of stress presentation during an academic semester?

Results of the data analysis show that transfer and developmental students experience differences in stress appraisal but not in coping strategies. Research statements number five and number six addressed differences between levels of academic preparedness. The study rejected research statement number five but failed to reject research statement number six. Developmental students reported experiencing more challenge and benefit emotions than their transfer counterparts, but only one of nine statistical procedures for coping strategies revealed significance and then only at one presentation.

4. Are community college students of different age groups stressed differently and do they exhibit different coping strategies at three different stages of stress presentation during an academic semester?

Results showed statistically significant differences between the two age groups for coping strategies, but not for stress appraisal. Research statements number seven and eight addressed the question of student age. The study failed to reject research statement number seven concerning differences in stress appraisal, but did reject research statement number eight concerning differences in coping strategies. Ten of the twelve T-test procedures conducted on stress appraisal failed to show significant differences between the groups. Analysis of research statement number eight showed that older students were more problem focused and more social support focused at T_0 and T_1, while younger students were more emotion focused.

5. Are male and female community college students stressed differently and do they exhibit different coping strategies at three different stages of stress presentation during an academic semester?

Results of the data analysis reveals that males and females are stressed differently and that they exhibit different coping strategies. Research statements number nine and ten addressed the question of gender differences in stress and coping. The study rejected both of these research statements. Concerning stress appraisal, females exhibited more threat and harm emotions, while males exhibited more challenge emotions. Throughout the study,

females expressed a higher reliance on Social Support Coping than did their male counterparts.

Chapter Five

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS FOR FUTURE RESEARCH

This chapter is divided into three major sections. The first section provides a summary of the purpose, research methods, data analyses, and findings. In the second section, conclusions and discussions based on the results of the research are presented. The third section offers recommendations suggested for future research.

SUMMARY

In an effort to synthesize the numerous data analyses presented in this study, the following summary encapsulates the major design, methods, and findings in generalized form.

Purpose

The purpose of this study was to examine how stress appraisal and coping strategies change during a stress situation and how they relate to academic achievement among community college students. The study is significant because it examined factors seldom included in an investigation of the experience of community college students and it examined factors seldom included in investigations of the contributing elements to academic achievement. As community colleges continue opening doors

of higher education to an expanding range and diversity of students, factors such as stress appraisal and coping strategies become increasingly significant in the understanding of academic achievement.

Population

The population for the study was community college students enrolled in the Virginia Community College System during the fall semester of 1988. The study sample consisted of 385 students enrolled in one of twenty-five mathematics courses at six different community college locations. Distribution of the sample in terms of the variables studied were as follows: Gender = 31.7% male and 68.3% female; Age = 73.2% traditional and 26.8% nontraditional; Level of Academic Preparedness = 48.9% Developmental and 51.1% Transfer.

Research Design

The research design of this study follows a framework of parameters established by Folkman and Lazarus (1985). The design centers on the stress point of a student's first major mathematics test of the semester. After a baseline of stress appraisal and coping strategies are recorded during the first week of the semester, instruments are administered two days prior to the test and again when test grades are returned. Academic achievement measurements are obtained

from each students' numerical course grade collected at the end of the semester.

Research Statements

The study tested ten research statements with each having three different time frames to be examined. Research statements one and two examined stress appraisal and coping strategies in relation to academic achievement. Research statements three and four assessed the process oriented theory of stress appraisal and coping strategies forwarded by Folkman and Lazarus (1985). Research statements five through ten examined how the variables of Age, Gender, and Level of Academic Preparedness are functions of stress appraisal and coping strategies.

Instruments

Two instruments were used for the collection of data in this study. A Stress Questionnaire, originally designed by Folkman and Lazarus (1985), delineated fifteen items scored on a Likert-type scale into four distinct subscales of stress appraisal. The Ways of Coping Check List produced three distinct coping strategy subscales from a list of forty statements. Each instrument allowed subjects to choose responses similar to their experiences during the semester.

Analysis of Data

Analysis procedures included the calculation of descriptive statistics, chi-square, T-test, regression and ANOVA procedures. SAS programs for statistical analysis were used with statistically significant differences determined at the $p < .05$ alpha level.

Findings

Results of the statistical analysis provide the following findings concerning the research statements of the study:

1. Research Statement One: There are no differences among four categories of stress appraisal in relation to academic achievement for community college students.

The study rejected research statement number one. Outcome Harm Emotions was shown to have a higher association to academic achievement than did the other stress subscales. There was a difference between the subscales, however, the Stress Questionnaire showed a low association to academic achievement.

2. Research Statement Two: There are no differences among three categories of coping strategies in relation to academic achievement for community college students.

The study failed to reject research statement number two. No statistically significant differences were found between the subscale groups at the T_1 presentation of the Ways of Coping Check List. Additionally, scores on the

three coping subscales showed no significant differences in association to academic achievement.

3. Research Statement Three: There are no differences in stress appraisal for community college students at three presentations of a Stress Questionnaire.

The study rejected research statement number three. Analysis of the data revealed increases in challenge and benefit emotions up to the interval prior to the first major test. Also, an increase in threat emotions and a decrease in harm emotions occurred between T_1 and T_2.

4. Research Statement Four: There are no differences in coping strategies for community college students at three presentations of a Ways of Coping Check List.

The study rejected research statement number four. Statistically significant differences were found between T_1 and T_2 for all three of the Ways of Coping Check List subscales. Each of the coping strategies decreased in mean score after students received test grades.

5. Research Statement Five: There are no differences between transfer students and developmental students in stress appraisal.

The study rejected research statement number five. Rejection of the research statement was allowed as significant differences were found in Anticipatory Challenge Emotions and in Outcome Benefit Emotions. Developmental

students reported experiencing each of these emotions to a greater extent.

6. Research Statement Six: There are no differences between transfer students and developmental students in coping strategies.

The study failed to reject research statement number six. Of the nine statistical procedures conducted on this hypothesis, only one showed any significant difference and then, only at the T_0 presentation.

7. Research Statement Seven: There are no differences between traditional age college students (25 or under) and nontraditional age college students (over 25) in stress appraisal.

The study failed to reject research statement number seven. While Anticipatory Threat Emotion differences were found to exist at T_0 and T_1 between the two age groups, comparisons in the ten other T-test procedures were not statistically significant and did not support rejection of the research statement.

8. Research Statement Eight: There are no differences between traditional age college students (25 or under) and nontraditional age college students (over 25) in coping strategies.

The study rejected research statement number eight. Significant differences were found in all three of the coping subscales. Nontraditional age students were found to use more Problem Focused and Social Support Coping

strategies before test time, while traditional age students reported using more Emotion Focused Coping at every interval studied during the semester.

9. Research Statement Nine: There are no differences between male and female community college students in stress appraisal.

The study rejected research statement number nine. Significant differences were found between males and females in stress appraisal in three different subscales. Females revealed more Anticipatory Threat Emotions during the first portion of the semester and more Outcome Harm Emotion after having received their test grades. Males indicated experiencing more Anticipatory Challenge Emotions both before taking the test and again after test grades were returned.

10. Research Statement Ten: There are no differences between male and female community college students in coping strategies.

The study rejected research statement number ten. At each interval of the semester studied, females expressed a higher reliance on Social Support Coping than did their male counterparts. The consistent use of a Social Support Coping strategy as shown in the statistical analysis appears to be a gender related factor. The Social Support Coping difference between genders is statistically significant at T_0, T_1, and again at T_2.

CONCLUSIONS

The conclusions found in this study have the express purpose of contributing to understanding how a student's experience in a typically stressful situation produces coping behaviors to address the situation. A purpose of this type reflects a common desire among educators to increase the value and significance of education. In his book, Higher Learning, D. C. Bok (1986) addresses the educators need to assess instruction.

> At present, universities have no adequate way of measuring the effects of undergraduate education or assessing the methods of instruction they employ. This is a serious defect. No human endeavor can progress, except by chance, without some way of evaluating its performance. Only with assessment of this kind can faculties proceed by an intelligent process of trial and error to improve their educational programs. (p. 66)

Progress by means other than chance to improve educational programs best describes the purpose to which the conclusions in this study are directed.

Information obtained through the administration of a Stress Questionnaire, a Ways of Coping Check List, and student grades in a college mathematics course led to the major conclusion that different students are stressed in

different ways, use different coping strategies, and find their academic achievement to be associated, in varying degrees, to a changing, cognitively-oriented, process-centered experience of stress.

Five specific purposes of this study were listed in Chapter One. Each of these purposes have been addressed and completed. These purposes may now be reviewed in light of the data presented.

1. To investigate the cognitive-transactional theory of stress developed by Lazarus (1966) and Lazarus and Folkman (1984).

Investigation showed that community college students do undergo a cognitive-transactional experience of stress. During the progression of a mathematics course, students reported a perceptive awareness of an unfolding, potentially stressful event and a response to the transactional nature of the behaviors required to address their cognitive appraisal of the situation. Students appraised the stress potential and revealed adjustments in coping strategies as they moved from the relative comfort of the first week of classes toward a focus on their first major test and finally, to receiving their individual test grades.

The overall results of the extensive analyses performed in this study support the contentions of Lazarus and Folkman that stress is a cognitive-transactional process in which coping may be viewed as a mediator of stress and emotion. Changes in the reliance upon a particular coping strategy as

time and the focal point of stress passes corresponded with changes in stress appraisal during the same period.

2. To examine the relationship between stress appraisal, coping strategies, and academic achievement.

This particular purpose was included in the study to provide the opportunity of exploring nonintellective correlates of academic achievement. Clearly, the goal of such a designed purpose was prediction. The ability to predict academic achievement with nontraditional and nonintellective factors is certainly not novel with this study. Like the preponderance of literature preceding this study, nonintellective factors in this research showed very little predictive value for academic achievement. Different stress appraisals provided different associations to academic achievement, but different coping strategies did not. However, the explained variance in all cases was minimal. The conclusion offered by this study is parallel to most other similar research: The nonintellective factors of stress appraisal and coping strategy produce a very low association to academic achievement and appear to account for only small portions of impact upon academic achievement.

3. To compare stress and coping strategies among community college students under age 25 with community college students aged 25 and over.

Student age has increasingly become important in community colleges. As student demographics and patterns of

attendance attest, nontraditional students comprise a large portion of community college enrollments. Including an age variable in this study contributes to the educational literature concerning the varied needs and learning styles of a varied student populations.

The findings of this study show that student age is a factor of coping strategies but not of stress appraisal. While no differences were found between younger and older students in how they appraised stress, they did exhibit different coping strategies. Older students used more Problem Focused and Social Support Coping than their younger counterparts. Having a functional access to both of these coping strategies seem to be a combination of the resources older students are more likely to possess. Increased maturity and an expanded, or maybe more instrumental, social network allows older, nontraditional students a resource not available to younger students.

4. To compare stress and coping strategies among male and female community college students.

The inclusion of gender as a variable in this study continues a long history of exploring this topic as an explanation for different educational attainments. The data analysis provided a conclusion that males and females do view stress situations differently and do use different coping strategies to address their perceived stressful situations.

The data appears to show an interactive relationship between stress appraisal and coping strategy. Individual coping strategy appears likely to coincide with stress appraisals. Females reported experiencing more threat and harm emotions, and coupled those stress appraisals with a reliance on Social Support Coping strategies. Males, on the other hand, reported more challenge emotions and less Social Support Coping. Caution must be taken in drawing conclusions in the area of gender. A number of other possible dynamics are likely to contribute to the differences. Females may simply be more adept at Social Support Coping and find strategies in that category not found by males. Also, cultural influences may be responsible for the attribution of differing coping strategies for female in a college mathematics course. Whatever the underlying factors producing the gender differences, this study contributes the information that males and females view and approach the stress of a college mathematics course very differently.

5. To compare stress and coping strategies among community college students of two different levels of academic preparedness.

Community colleges are well known for the diversity of academic ability found in their enrollments. Like diverse student age, levels of academic preparedness are likely to be more predominant at community colleges than at other

institutions of higher education. Contributing to the understanding of the unique needs of students with varied levels of academic preparation is a purpose with functional implications for education. Unfortunately, the findings in this study do not clearly delineate information regarding this particular variable.

Students enrolled in developmental classes reported more challenge and benefit emotions, but show no difference from their transfer counterparts in coping strategies. The conclusion reached here is that developmental students, being less academically prepared, are likely to view their enrollment in a mathematics course as challenging (or difficult) because of their skill deficiency in the topic area. Likewise, developmental students are likely to view successful completion of the course as being more beneficial to them than would transfer students who may tend to see themselves as possessing the basic skills necessary for course completion.

Recommendations

This study was limited to community college students enrolled in mathematics courses at six different locations across the state of Virginia. Because of the relatively small size of the sample and the one semester time limit of the study, it is recommended that additional research be

conducted to further the understanding of a cognitive-transactional theory of stress. The findings of this limited study have added knowledge or have been informative to two areas of investigation. First, the study supports the theoretical perspectives of stress proposed by Folkman and Lazarus (1985) and secondly, the study reveals stress appraisal and coping strategy differences among subgroups of the community college population. However, this study was limited to community college students enrolled in mathematics courses at six different locations across the state of Virginia. Because of the relatively small size of the sample and the one semester time limit of the study, it is recommended that additional research be conducted to further an understanding of both a cognitive-transactional theory of stress and the learning dynamics inherentin diverse student populations. With these comments in mind, the following recommendations are made:

1. The present study was conducted with students enrolled in mathematics classes only. This selection was considered to be the groups most likely to experience a similar stress situation at several different schools. The assumption made was simply that a mathematics test would provide a focal point around which the dynamics of stress, coping and academic achievement could be addressed. It is recommended that future research be designed to include a

wider range of students and with academic encounters other than mathematics courses.

2. The instruments used in the present study ask students to mark their subjective emotional experience on a Likert-type scale and to select subjective coping strategies from a list of forty such items. Subjectivity of a self-report measure is the first obvious problem with such a design. Secondly, scales of emotional response and lists of potential reactions are limited in their ability to accurately define the isolation of an particular emotional experience. It is recommended that future research include additional methods of data collection to facilitate a broader understanding of student experience and to more fully isolate specific responses. Qualitative interviews and controlled experimental conditions would be two such designs that would offer broader and more complete understanding of student learning dynamics.

3. The present study used variables of student age, gender, and level of academic preparedness to distinguish between groups of community college students. While these distinctions provide information concerning different stress and coping experiences, they are limited by their broadness. It is recommended that future research combine certain variables, such as age and level of academic preparedness,

to determine the interaction of the two and how that interaction may be a function of academic achievement. It is also recommended that other variables such as socioeconomic class, educational level of parents, and locus of control be considered as possible nonintellective factors of academic achievement.

4. Ascertaining the factors contributing to academic achievement has long been a pursuit of educational researchers. The present study was conducted, in part, to explore the relationship of stress and coping to academic achievement. An inherent problem in such an undertaking is the isolation of a particular subscale item with a particular test or course grade. Confounding variables are assumed to exist, but the level of their influence is elusive and difficult to measure at best. It is recommended that future research be conducted with the design of stress and coping subscales. The phrasing, wording, order of presentation, or relevance of item may likely distort how accurately the subscale predicts an association with academic achievement.

5. The findings of the present study reveal several characteristics for different groups of students. For example, it was concluded that females exhibit a higher reliance on Social Support Coping than do their male

counterparts. Such findings could be greatly enhanced by an investigation of how increased Problem Focused Coping skills might impact upon academic achievement for females. It is recommended that future research be conducted to determine if the development of individual skills in stress appraisal or coping strategies lead to improved academic achievement.

6. The present research, like the bulk of what has gone before it, will have difficulty finding its way into applied education. Addressing the practical value of educational research and the gap that exists between investigators and decision makers, D. C. Bok (1986) asserts:

> Investigators have . . . probed such interesting topics as the impact on learning of small classes and the effects of computer-assisted instruction and other new methods of teaching. The critical point, however, is that such inquiries rarely come about at the behest of curriculum committees or academic deans. The investigators are typically psychologists or professors of education who work for their own professional purposes; they rarely have close contact with campus officials who might profit from their studies. Without a connection between investigators and decision makers, such research lacks prestige, and much of it has no practical value for those who actually

> help to shape educational policies. Again and again, surveys and tests measure attitudes and changes that are of no great interest to faculty members. Most of the studies examine public school classes, and even those which focus on colleges are often of limited usefulness because they look at institutions too different from one's own for their results to have and practical utility. (pp. 66-67)

While basic research is certainly valued in its own right, educational researchers have a responsibility and obligation to the professional dimension of their academic degrees. It is recommended that future research in areas similar to that of the present study be designed with an awareness of the need for applicable information in institutions of education.

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APPENDICES

APPENDIX A

STUDENT PROFILE QUESTIONNAIRE

STUDENT PROFILE QUESTIONNAIRE

The purpose of this questionnaire and study is to obtain information about student experience in a college course. The information collected will be used for research purposes only. All individual responses will be held in the strictest confidence. Thank you sincerely for your cooperation.

SS# _____-_____-_____ DATE: _____

COURSE NAME AND NUMBER: _____

NAME OF COLLEGE: _____

NAME OF PROFESSOR: _____

Please answer the following questions by placing a mark (x) by the answer most appropriate for you.

1. Gender: _____Male _____Female

2. Age: _____under 18 _____18-25 _____26-40 _____over 40

3. Racial / Ethnic Background
   - _____ Afro-American (Black)
   - _____ Euro-American (White)
   - _____ Mexican-American (Hispanic)
   - _____ Native-American (Indian)
   - _____ Oriental-American (Japanese, Chinese)
   - _____ Other

4. How many hours per week are you employed?

_____ 0	_____ 11 - 20	_____ 31 - 40
_____ 1 - 10	_____ 21 - 30	_____ 41 and over

5. How many hours per week are you enrolled in school?

_____ 1 - 3	_____ 7 - 9	_____ 13 - 15
_____ 4 - 6	_____ 10 - 12	_____ over 15

6. Is this your first semester (or course) ever taken in college?
   _____ Yes _____ No

One additional bit of information is vitally important to this study. The necessary data is held on your college file and by the professor of the class listed at the top of this form. This information is accessible only with your permission. Specifically, would you allow us, <u>in complete confidence</u>, to obtain your test scores, class grade, and cumulative GPA (grade point average) at the end of the current semester? <u>Please mark (x) yes below and sign your name.</u> THANK YOU.

_____ YES Signed _____

APPENDIX B

STRESS QUESTIONNAIRE

SS# _____-_____-_____ DATE: _____

COURSE NAME AND NUMBER: _____

NAME OF COLLEGE: _____

NAME OF PROFESSOR: _____

This is a scale to assess how you are feeling right now. For each item please circle the number which best represents your current feelings. Only one number may be circled for each item. Do not dwell on any single item.

Right Now I Feel

	Not at All			Somewhat		Extremely	
Worried	1	2	3	4	5	6	7
Hopeful	1	2	3	4	5	6	7
Angry	1	2	3	4	5	6	7
Sad	1	2	3	4	5	6	7
Confident	1	2	3	4	5	6	7
Exhilarated	1	2	3	4	5	6	7
Fearful	1	2	3	4	5	6	7
Disappointed	1	2	3	4	5	6	7
Eager	1	2	3	4	5	6	7
Pleased	1	2	3	4	5	6	7
Anxious	1	2	3	4	5	6	7
Happy	1	2	3	4	5	6	7
Guilty	1	2	3	4	5	6	7
Relieved	1	2	3	4	5	6	7
Disgusted	1	2	3	4	5	6	7

APPENDIX C

STUDENT INSTRUCTIONS
FIRST PRESENTATION OF INSTRUMENTS

WE WOULD LIKE YOU TO THINK ABOUT A CURRENT OR VERY RECENT STRESSFUL EVENT WHICH PERTAINS TO ACADEMICS AND YOUR LIFE AS A STUDENT. THIS STRESSFUL EVENT MIGHT BE SOMETHING LIKE ENROLLING IN A DIFFICULT COURSE, GOING TO COLLEGE FOR THE FIRST TIME, OR BEGINNING AN ACADEMIC TERM THAT IS IMPORTANT TO YOU.

AFTER YOU HAVE RECALLED THE STRESSFUL EVENT, PLEASE FILL OUT THE FOLLOWING QUESTIONNAIRE WITH REGARD TO HOW YOU DEALT WITH THAT EVENT.

APPENDIX D

SECOND PRESENTATION OF INSTRUMENTS

WE WOULD LIKE YOU TO THINK ABOUT A CURRENT OR VERY RECENT STRESSFUL EVENT WHICH PERTAINS TO ACADEMICS AND YOUR LIFE AS A STUDENT. THIS STRESSFUL EVENT MIGHT BE SOMETHING SUCH AS PREPARING FOR THE IMPORTANT EXAM YOU ARE SOON TO TAKE IN THIS COURSE.

AFTER YOU HAVE RECALLED THE STRESSFUL EVENT, PLEASE FILL OUT THE FOLLOWING QUESTIONNAIRE WITH REGARD TO HOW YOU DEALT WITH THAT EVENT.

APPENDIX E

THIRD PRESENTATION OF INSTRUMENTS

WE WOULD LIKE YOU TO THINK ABOUT A CURRENT OR VERY RECENT STRESSFUL EVENT WHICH PERTAINS TO ACADEMICS AND YOUR LIFE AS A STUDENT. THIS STRESSFUL EVENT MIGHT BE SOMETHING SUCH AS HAVING RECENTLY TAKEN AN IMPORTANT EXAM IN THIS COURSE. AFTER YOU HAVE RECALLED THE STRESSFUL EVENT, PLEASE FILL OUT THE FOLLOWING QUESTIONNAIRE WITH REGARD TO HOW YOU DEALT WITH THAT EVENT.

APPENDIX F

WAYS OF COPING CHECK LIST

SS# _____-_____-_____ DATE: _____

COURSE NAME AND NUMBER: _____

NAME OF COLLEGE: _____

NAME OF PROFESSOR: _____

DIRECTIONS: PLACE A MARK (X) BESIDE EACH OF THESE STATEMENTS THAT ARE DESCRIPTIVE OR CHARACTERISTIC OF HOW YOU DEALT WITH A CURRENT OR VERY RECENT STRESSFUL EVENT.

___ 1. Bargained or compromised to get something positive from the situation.

___ 2. Talked to someone to find out about the situation.

___ 3. Blamed myself.

___ 4. Hoped a miracle would happen.

___ 5. Went on as if nothing happened.

___ 6. Concentrated on something good that could come out of the whole thing.

___ 7. Accepted sympathy and understanding from someone.

___ 8. Criticized or lectured myself.

___ 9. Wished I was a stronger person - more optimistic and forceful.

___10. Felt bad that I could not avoid the problem.

___11. Tried not to burn my bridges behind me, but left things somewhat open.

___12. Got professional help and did what they recommended.

___13. Realized I brought the problem on myself.

___14. Wished I could change what had happened.

___15. Kept my feelings to myself.

___16. Changed or grew as a person in a good way.

___17. Talked to someone who could do something about the problem.

___18. Imagined a better time or place than the one I was in.

___19. Slept more than usual.

___20. Made a plan of action and followed it.

___21. Asked someone I respected for advice and followed it.

___22. Had fantasies or wishes about how things might turn out.

___23. Got mad at the people who caused the problem.

___24. Accepted the next best thing to what I wanted.

___25. Came out of the experience better than I went into it.

___26. Talked to someone about how I was feeling.

___27. Talked about fantastic or unreal things (like perfect revenge or finding a million dollars) that made me feel better.

___28. Tried to forget the whole thing.

___29. Tried not to act too hastily or follow my own hunch.

___30. Stood my ground and fought for what I wanted.

___31. Wished the situation would go away or somehow be finished.

___32. Tried to make myself feel better by eating, drinking, smoking, or taking medication.

___33. Just took things one step at a time.

___34. Avoided being with people in general.

___35. I knew what had to be done, so I doubled my efforts and tried harder to make things work.

___36. Kept others from knowing how bad things were.

___37. Came up with a couple different solutions to the problem.

___38. Refused to believe it had happened.

___39. Accepted my strong feelings, but didn't let them interfere with other things too much.

___40. Changed something about myself so I could deal with the situation better.

APPENDIX G

EXPECTANCY AND CONFIDENCE SCALES

SS# _____-_____-_____ DATE: _____

COURSE NAME AND NUMBER: _____

NAME OF COLLEGE: _____

NAME OF PROFESSOR: _____

Please complete the following statements:

1. What percentage of the problems on this test do you expect to get correct? (circle one percentage)

40% 50% 60% 70% 80% 90% 100%

2. The confidence I have in making the previous statement is:

(circle one number)

Extremely Low			Moderate			Extremely High
1	2	3	4	5	6	7

APPENDIX H

DIFFICULTY SCALE

SS# _____-_____-_____ DATE: _____

COURSE NAME AND NUMBER: _____

NAME OF SCHOOL: _____

NAME OF PROFESSOR: _____

How difficult was this test? Circle one number.

Not Difficult at all		Somewhat Difficult			Extremely Difficult	
1	2	3	4	5	6	7

APPENDIX I

INSTRUCTOR'S SCHEDULE OF DATA COLLECTION

DATA COLLECTION SCHEDULE

T_0 - First week of classes

Administer
A. Student profile questionnaire
B. Stress Questionnaire
C. Instruction page (WCCL)
D. Ways of Coping Check List

T_1 - Last class day prior to first major exam

Administer
A. Stress Questionnaire
B. Instruction page (WCCL)
C. Ways of Coping Check List

Exam day

Administer
A. Pretest (expectancy and confidence)
B. Posttest (level of difficulty)

T_2 - Class day that exam grades are returned

Administer
A. Stress Questionnaire
B. Instruction page (WCCL)
C. Ways of Coping Check List

End of Term

Provide list of percentage scores from first exam and percentage score of course by social security number.

VITA

William Terry Whisnant was born on June 18, 1948 in Valdese, North Carolina. He completed his elementary and secondary education in the Burke County Public Schools System and graduated from Drexel High School in 1966. After graduation, he enrolled in the School of Graphic Arts at Chowan College, Murfreesboro, North Carolina and received a Certificate in Newspaper Composition in 1967. While employed with Knight Publishing Company in Charlotte, he was drafted into the Armed Services.

Between March, 1968 and April, 1969, he served as a photographic specialists with the Sixth Psychological Warfare Unit in South Vietnam. Upon his return home, he enrolled in Western Piedmont Community College in Morganton, North Carolina and received his Associate Degree in Liberal Arts in the Spring of 1971. Transferring his credits to West Georgia College in Carrollton, Georgia, he enrolled in the Humanistic Psychology Program. He received a Bachelor of Arts Degree in the Spring of 1974 and a Masters of Arts in Psychology in the Fall of 1975.

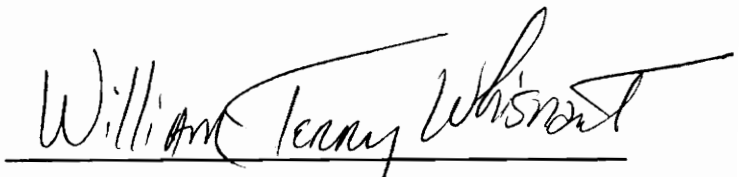
In 1976, he accepted a faculty position in Psychology and Behavioral Sciences at Southside Virginia Community College in Alberta, Virginia. During his tenure at Southside Virginia Community College, he conducted

additional graduate study at Virginia Commonwealth University resulting in a minor in the field of Sociology.

In the Fall of 1986, he undertook a two year sabbatical leave from Southside Virginia Community College to pursue doctoral study at Virginia Polytechnic Institute and State University, Blacksburg, Virginia. During his sabbatical leave, he performed a research assistantship in instructional leadership with the Community College Program in the Administrative and Educational Services Division of the Virginia Polytechnic Institute and State University School of Education.

In addition to teaching at Southside Virginia Community College, he is founder and President of Horizon Seminars. This private enterprise is a conference presentation and workshop organization specializing in motivational and self-improvement seminars. Horizon Seminars has conducted over two hundred such events for business, industry, as well as both private and public service organizations.

Terry is a voting member of the Virginia Community College Association, a member of the American Association of Community and Junior Colleges.



William Terry Whisnant

STRESS APPRAISAL AND COPING STRATEGIES AS A FUNCTION OF ACADEMIC ACHIEVEMENT AMONG COMMUNITY COLLEGE STUDENTS

by

W. Terry Whisnant

(ABSTRACT)

Educators long ago recognized that a variety of factors contribute to academic success. High school grades, college entrance scores, personal motivation, and self esteem are among the traditional indicators or factors commonly identified with academic success. As community colleges open the doors of higher education to ever expanding segments of the population, the need for knowledge of the myriad factors contributing to academic success increases. The purpose of this study was to address a portion of that need via the examination of stress appraisal and coping strategies among community college students.

The framework for the research in this study follows a process-centered theory of stress and coping developed by Folkman and Lazarus (1985). Specifically, this study was an exploration of how stress and coping strategies change over time and what relationship that change may have to academic achievement.

Data for the study was collected from Virginia community college students currently enrolled in math classes. Students in these classes completed three stress and coping instruments centered around the focal point of their first major math test. Course grades served as a measure of academic achievement for comparison to stress and coping scores. Comparisons were also made among the student variables of age, gender, and level of academic preparedness.