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Locus of Control and Academic Achievement of First-Term Medical Students

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Locus of Control and Academic Achievement
of
First-Term Medical Students

by

Barbara J. Krupps Downing

A Dissertation Submitted to the Faculty of the Graduate
School of Loyola University Chicago in Partial Fulfillment
of the Requirements for the Degree of
Doctor of Philosophy

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VITA

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CHAPTER I

INTRODUCTION

Admissions policies at American medical colleges vary from state to state and from school to school. A common element of most all of the policies is a heavy dependence on two cognitive criteria, previous grade point averages (G.P.A.s) and Medical College Admission Test scores (MCATs) (Association of American Medical Colleges, 1986). This dependence evolved in part as a result of the dramatic increase in applications to medical schools during the 1960s and 1970s when the applicant pool increased from 182,800 between 1960-69 to 371,200 between 1970-79 (Johnson, 1983).

This increase was the result of a series of historical events which occurred after WWII. The increased birthrate or "baby boom" of the post-war years created an increased demand for health care at the same time it supplied a large pool of future applicants to medical schools. The development of the National Institute of Health (NIH) and the Health Research Construction Act of 1956 provided new funding to medical research and education allowing many states to acquire weak private medical schools and expand

their class sizes. Development of polio vaccines and new discoveries in the areas of cancer and DNA research brought medical research to the forefront as a career. When the Soviet Union launched Sputnik, the United States became concerned over the inadequacy of its scientific education and passed the National Defense Education Act in 1958 which provided funds for improved scientific education. This legislation provided the means for more students to prepare for careers in medicine (Johnson, 1983).

The Health Professions Educational Assistance Act of 1963 provided money for new schools and low-interest loans to students from diverse socio-economic backgrounds. The Medicare and Medicaid Acts of 1965 made health care available to more people thus increasing the demand for physicians and encouraging more students to apply to medical school. The women's movement and the civil rights movement encouraged greater numbers of applications from women and minorities to medical schools (Johnson, 1983).

In 1970, the Association of American Medical Colleges issued a report on the expansion of medical education that recommended the enrollment of 15,000 first-year students by 1976. The Vietnam War and educational draft deferments also had a big effect and have been credited with at least part of the meteoric rise in medical school applications between 1963 and 1973 (Johnson, 1983).

How best to choose the applicants with the greatest possibility of success became a high priority question during the 1950s. A national admissions conference took place in 1956 in which American medical colleges shared selection techniques (Association of American Medical Colleges, 1958). Most colleges reported a high dependence on grade point averages (GPAs) and Medical College Admission Tests (MCATs). Such cognitive criteria made it more efficient to handle the large number of applicants as medical schools began to use computers in their admissions process during the 1960s (Thompson, 1968). The MCAT which was developed in 1948 and was used to set minimum cut-off levels for screening applicants as well as to distinguish between higher ranking applicants (Johnson, 1983). These cognitive measures came into question when Johnson and Hutchins (1966) found that above a minimum cut-off there was very little relationship between test performance and successful graduation from medical school.

The task of choosing students who possess the academic ability to perform in the rigorous medical school curriculum and who have the other qualities necessary to successfully complete the program of study is difficult and costly by itself. When goals such as diversifying classes to represent the various ethnic groups in the population are incorporated into the admissions process, it becomes more difficult. The search for satisfactory admissions criteria

did not end with the admissions conference in 1956. Another conference was held at Buck Hill Falls, Pennsylvania in 1968 (Grant & Bennett, 1968) which emphasized the recruitment of minority students.

Methods for predicting completion and success in medical school are being even more sought after since the application trend has reversed during the last ten years. The number of applicants has plummeted 31% from 40,557 in 1977 to 28,123 in 1987. A variety of factors are cited to explain the decline in applicants. These factors include the soaring cost of medical education, increasing pragmatism on the part of many students who want to begin earning money quickly, publicity about the negative aspects of medicine including the high cost of malpractice insurance, the increasingly bureaucratic nature of the medical profession, and the perception by many students that a continuing overabundance of doctors exists (Mangan, 1988).

Problem Statement

The implications of this decline in interest for medical careers are many and varied for American medical colleges. Johnson (1983) believes that future medical school admissions will be characterized by at least three themes: more competition for students, increased attempts to reduce the cost of the admissions process, and continued

efforts to improve the assessment of personal qualities of applicants.

The Delphi study done by the AAMC in 1981 predicted that significant changes in the medical school admissions process may be necessary through the end of the century due to fewer applicants and more financial constraints. Delphi panelists believe it to be highly desirable for future medical students to be increasingly selected on the basis of noncognitive strengths. Those surveyed believe that a decline in the applicant pool will precipitate a reduction in the number of potential medical students with high grades and test scores. This belief seems to be supported by the report that MCAT scores for the 1988-89 entering class are slightly lower than in previous years (Medical College Admission Test, 1987).

The question is now becoming how to find qualified applicants who can succeed in medical school when an abundance of possible students with high MCAT scores and GPAs no longer exists. Medical schools currently consider not only grades and test scores but also such factors as character, interview impressions, career plans, and whether the applicant is from a minority/or disadvantaged background (Medical School Admission Requirements, 1986). Are there other variables than the ones currently in use that can be isolated to aid admissions committees in choosing students who will be successful in medical school? Are there

noncognitive variables that lead students with less than stellar cognitive scores to succeed?

This study looks at one such possible variable, locus of control. Locus of control represents the degree to which an individual perceives outcomes to be a result of one's behaviors. A student may believe that success is largely a function of luck or others' influence or timing. Such a student exhibits an external locus of control. In contrast, the student who believes that people make their own luck and that success is an outcome of choices which they make exhibits an internal locus of control.

Purpose

This purpose of this study is to determine if a relationship exists between locus of control and the academic success of first-year medical students at a major midwestern medical college. The study examines relationships between locus of control, previous academic achievement, ethnic background, age, sex, admissions scores, and medical school academic achievement.

Research Questions

This study seeks to answer the following specific research questions.

1. Is there a correlation between academic achievement in medical school and locus of control?
 - a. Is there a correlation between students who exhibit an internal locus of control and who achieve passing scores on first-term medical school exams?
 - b. Is there a correlation between students who exhibit an internal locus of control and who fail one or more first-term medical school exams?
 - c. Is there a correlation between students who exhibit an external locus of control and who achieve passing scores on first-term medical school exams?
 - d. Is there a correlation between students who exhibit an external locus of control and who fail one or more first-term medical school exams?

2. Does a relationship exist between selected demographic variables and locus of control?

3. Does a relationship exist between past academic achievement (as measured by MCAT scores and GPAs) and locus of control?

Conceptual Framework

The concept of locus of control has its foundation in social learning theory (Rotter, 1966). In this theory, a reinforcement acts to strengthen an expectancy that a certain behavior or event will be followed by that reinforcement in the future. Once an expectancy for such a behavior-reinforcement sequence is established, the failure of the reinforcement to occur will reduce or extinguish the expectancy. As a human being develops and acquires more experience, s/he differentiates between events which are causally related to preceding events and those which are not. When a reinforcement is seen as not contingent upon a subject's own behavior, its occurrence will not increase an expectancy as much as when it is seen as contingent. Conversely, its nonoccurrence will not reduce an expectancy so much as when it is seen as contingent. Accordingly, individuals differ in the degree to which they attribute reinforcements to their own actions based on their individual histories of reinforcement.

Rotter's social learning theory (1966) hypothesizes further that expectancies generalize from a specific

situation to a series of situations which are perceived as related or similar; therefore, a generalized expectancy for a class of related events has functional properties and makes up one of the significant variables in personality description. The more a person believes there is a causal relationship between a chosen behavior and its consequences, the more the individual's behavior will be affected by those beliefs. The belief that outcomes or consequences are controlled by one's own behavior characterizes a person who exhibits an internal locus of control. The belief that "chance" or "luck" or "others" control life's outcomes characterizes a person who exhibits an external locus of control. The medical student who believes that choices s/he makes (e.g. choosing to attend or to skip lectures, to read or ignore texts, develop a study schedule or study haphazardly) have a direct relationship to success or failure on quarterly exams is an internally controlled student. The student who believes that success or failure on exams is largely a result of circumstances beyond one's control (e.g. the professors are foreign-born and difficult to understand, the exams are poorly constructed, too much material is covered in one testing period) is an externally controlled student.

Significance of Study

This study investigates the relationship between locus of control and academic achievement. Little research of this nature has been conducted in the field of medical education. What research has been done (Gardner, 1982; Grover & Smith, 1981; Linn & Zeppa, 1984) has concentrated primarily on the relationship between anxiety and locus of control in medical students. These studies have done little to correlate locus of control and academic achievement with demographic data or with admission criteria.

The population sampled here offers a diversity in ethnic background and experience which is unusual in medical schools since the institution studied has as its policy the recruitment of students from culturally and financially deprived backgrounds. This study also investigates relationships between admission criteria and locus of control. This study adds a qualitative depth to the measure of locus of control via personal interviews with randomly selected students.

Hopefully, this type of data will contribute to the knowledge of the on-going admissions puzzle of who will have the highest probability of success in medical school. Due to the significantly high cost of educating a physician, both to the institution and to the individual student, academically unsuccessful medical students represent a

fiscal and ethical problem for medical education. Information regarding characteristics of academically successful students may also prove valuable for the initiation of student development programs within the student affairs area of medical education. Once students matriculate, little is done to help them develop the skills and outlook necessary to succeed. Evaluation of the student's academic progress takes place but personal development of the student does not. These areas are likely to take on even more significance as the applicant pool for medical schools declines. The number of applicants nationally for the 1987 class dropped 3,200 to 28,123 representing a 10.2 percent decline from 1986. This trend is expected to continue with a 10 percent decline predicted by the Association of American Medical Colleges for the 1988 entering class. Although many schools will reduce their class size in response to this decline, it is probable that schools may also accept students who have lower MCAT scores and lower GPAs than those of students accepted in previous years. Such a development will make other predictive criteria of success very valuable.

Assumptions

This study assumes that a student's locus of control remains stable over the period of time between the administration of the locus of control instrument in September and the administration of first quarter exams in December. This research also assumes that MCAT scores and GPAs represent a measure of the students' abilities to fulfill classroom requirements.

Limitations

It is not possible to determine the extent to which the participants in this study are representative of the entire medical school class. Only students who attended the orientation program and who chose to take the Nowicki-Strickland Scale (approximately 83%) were included in the sample.

The degree of honesty on the part of the respondents both on the written scale and during the personal interviews was also impossible to determine and poses an inherent limitation in any research.

A limitation of this study is the length of time over which the students' achievement is measured. The duration of one quarter was chosen because of the increasingly high failure rate which occurs at this institution during the first term. The shorter duration also allowed the

researcher to do in-depth interviews to determine the students' locus of control and perceived causation of grades while students were on campus and involved in the learning process.

Summary

This study is designed to investigate a major noncognitive factor which may correlate with students' achievement in medical school. The variable chosen for examination is locus of control. Examining non-cognitive variables is of interest due to the declining applicant pool for medical schools. As the applicant pool declines, the abundance of students with outstanding MCAT scores and GPAs decreases. Admission committees for medical schools can no longer pick from a group of students who have done so well in school that they are almost assured of continued success when they enter medical school. Increasingly, choices will need to be made from among students who present lower levels of achievement on traditional cognitive variables. This study examines locus of control to determine if a correlation exists between it and students' achievement during the first year of medical education. Such a correlation could lend new information to medical educators for use in developmental programs for students once they have matriculated.

CHAPTER II

REVIEW OF LITERATURE

One of the tasks of educators in selective courses of study such as medicine is to choose students who have the best possibility of success. Success in such settings is generally measured by the achievement of predetermined scores on tests such as term exams or national board exams. Achievement of such scores represents a social behavior. It follows then that educators are interested in understanding and predicting this social behavior. Why does one student achieve satisfactory grades on exams when another student of apparently equal academic abilities fails? To answer this question, a theoretical framework for the study of behavior is necessary. Social learning theory as proposed by Rotter (1954) and its resulting concept of locus of control (Rotter, 1966) provide such a framework for the study and possibly the prediction of student behavior. Social learning theory will be reviewed in the first section of this chapter. The second section of the chapter will review research on locus of control as it relates to academic achievement.

Social Learning Theory

Locus of control is a generalized expectancy on the part of an individual that an outcome will occur. It has its theoretical base in social learning theory as proposed by Rotter (1954) and is linked to the fact that major or basic modes of behaving are learned in social situations. Humans expect certain outcomes over others based on social situations which have occurred in past learning/life situations. Rotter developed this theory as a basis for predicting behavior and its principles can be applied to student performance. He proposed that the behavior of a human being is not to be understood in terms of a single learning situation, as is the case in most animal experimentation, but rather in terms of the changes which are affected through multiple, though comparable, learning experiences.

Three basic concepts, behavior potential, expectancy, and reinforcement value, are utilized in social learning theory (Rotter, 1954, p. 105). Behavior potential relates to the likelihood of any behavior occurring in any situation if a certain reinforcement or outcome is present. Rotter broadly defined behavior as any action of an organism that involves a response to a meaningful stimulus and that may be observed or measured directly or indirectly. The potentiality for the occurrence of any behavior may be

ultimately determined from its actual occurrence in any situation where other alternatives are present. The measure obtained is relative to other known alternatives. For example, a first year medical student has the option of reading and studying from very long and expensive textbooks or of reading the cooperative notes put out by a committee of classmates which cover all of the lecture material. The behavior potential could be measured for each alternative by recording the number of times a student chooses to study the texts as opposed to the number of times a student chooses to study the notes. In any situation, a behavior potential is characterized as being stronger or weaker than other behavior potentials.

The second concept of expectancy in social learning theory provides the basis for locus of control. Expectancy refers to the likelihood that a person attaches to a behavior that a certain outcome will occur (Rotter, 1954, p.107). It does not matter what value the reinforcement holds or what the actual probability of its occurrence is. Expectancy is only concerned with the degree to which the person believes that a certain behavior will elicit a certain outcome. A first year medical student, for example, may believe that studying the class material in depth, for understanding, will lead to a passing exam grade because that behavior led to passing grades as an undergraduate. Another student may believe that attending all lectures will

lead to desirable exam scores because such a behavior has led to such an outcome in the past. Another student may believe that the design of the test will have a great effect on the resulting score. Other constructs involving generalization, the number of past experiences, and the novelty of an occurrence are also variables that affect expectancy.

Locus of control is a generalized expectancy. It is the result of many learning experiences which grouped together cause individuals to believe that they have control over the outcomes in their lives or that they do not have control, and that outcomes are being largely determined by chance or luck. Expectancy is the variable most likely to change as a result of new experience. If a person behaves in a way that has always elicited a certain response such as a high exam score and then has a new experience in which the same behavior does not elicit the same outcome, the expectancy which is attached to the initial behavior shifts as a result of the new experience. The high school honors student who expects to do as well in college as in high school with the same amount of work is likely to experience a shift in expectancy when several exams result in failing grades.

Rotter's third concept in social learning theory is reinforcement value (1954, p. 107). It is the degree of preference which a person feels for one outcome or

reinforcement of a behavior over another one if the possibilities of their occurrences are equal. An example of this concept is that of a person who consistently chooses to be paid ten dollars for an hour of work as opposed to one dollar. The choice in this example is based on the reinforcement value in our society of ten dollars being significantly higher than that of one dollar.

Rotter (1954, chap. 6) expands on the specific concepts of behavior potential, expectancy, and reinforcement, to broader, more general concepts of need potential, need value, freedom of movement, and the psychological situation. It is with the latter concepts that the educator is usually concerned in personality measurement, evaluation, and student development and out of which the concept of locus of control evolves. The concepts are inter-related and often difficult to separate, but they aid the researcher in refining observations of behavior.

Need potential is defined as the average likelihood that a group of behaviors which are functionally related will occur. Such behaviors are related in that they lead to (or are directed toward) the accomplishment of the same (or similar) reinforcements. Concrete examples of such functionally related behaviors are buying books, attending classes, taking notes, and reading books. One of the possible reinforcements for such behaviors is the mastery of a body of knowledge. Passing exam scores is another

possible reinforcement. Another set of functionally related behaviors would include attending movies, going on week-end ski trips, and cutting classes to go on a picnic. A possible reinforcement for such behavior is the development of friendships or the creation of an intimate relationship.

Like need potential, need value is measured by determining the individual's preference among alternative outcomes. Need potential is a matter of selecting one group of behaviors leading to one set of outcomes over another group of behaviors leading to a different set of outcomes as in the case of the student who chooses to attend a picnic with friends instead of reading a text. The choice which the student makes determines the need value attached to the achievement of passing grades versus the establishment of interpersonal relationships.

Freedom of movement is defined by Rotter as the mean expectancy of obtaining a desired outcome as a result of a set of related behaviors. If a child throws a tantrum in order to gain the parent's attention and gains it, the freedom of movement for such behavior is high. If such behavior is ignored by the parent and the child does not gain attention, the freedom of movement is low for such behavior. Winning the parent's attention over and over by throwing a tantrum or by some other behavior creates a generalized expectancy that the outcome of gaining attention

can be controlled by the child. The child thus develops an internal locus of control.

The psychological situation is the perception which the individual has of his/her environment. This is termed the individual's meaningful environment. The interaction of the individual and that individual's meaningful environment is a core element of social learning theory. The accurate determination of an expectancy can only be achieved by learning how the individual characterizes the psychological situation. The manner in which a person perceives a given situation will determine which behavior is likely to have the highest expectancy of eliciting desired outcomes. A person interacting with another person who is perceived to be an enemy is likely to choose behaviors aimed at harm avoidance rather than behaviors directed toward love and affection. A student who perceives success in medical school to be a source of personal satisfaction will behave in a different manner than the student who views achievement as a burden imposed by family expectations. The latter student may be exhibiting an internal locus of control by failing an exam. In doing so, the student is demonstrating his/her control over outcomes. The student is exhibiting behavior which has the outcome of freeing him/her from a situation which was not of the student's choosing; therefore, an understanding of the student's meaningful

environment is essential to the prediction or explanation of behavior.

Social learning theory, in particular the concept of expectancy, provides the broad conceptual framework for understanding locus of control which will be discussed in more detail in the following section.

Locus of Control

It is commonly agreed that reinforcement, reward, and gratification are all motivators for achieving behavior (Rotter, 1966). The perception of the individual as to what qualifies as a reinforcement is of great importance in predicting behavior since one person's reward may not be the same as the next person's. Of equal importance to the study and prediction of behavior is a determination of the perception of control over such results. One of the determinants of this perception is the degree to which the individual believes that the outcomes follow from, or are contingent upon, personal behavior as opposed to the belief that outcomes of behavior are controlled by outside forces. Is there a perception of a causal relationship between personal actions and their results, or is there a perception that results follow personal actions but are not entirely contingent upon them? In the latter case, outcomes are typically perceived as the result of luck, chance, fate, or

are seen to be under the control of others. When an individual perceives events to be controlled by outside forces, Rotter (1966) labels this a belief in external control. When a person perceives events to be contingent upon personal behavior or characteristics, he labels this a belief in internal control. These are the concepts which form the basis of Rotter's locus of control construct.

Locus of control has its foundation in Rotter's (1954) earlier work on social learning theory with its concept of freedom of movement. Freedom of movement is a generalized expectancy of success resulting from one's ability to remember and reflect upon a lifetime of specific expectancy-behavior-outcome sequences (Lefcourt, 1982). Locus of control is defined as a generalized expectancy for internal as opposed to external control of outcomes. Like freedom of movement, it is an abstraction derived from a series of specific expectancy-behavior-outcome cycles. However, freedom of movement concerns the likelihood of success, while generalized expectancy of internal versus external control of outcomes involves a causal analysis of success and failure.

Locus of control and achievement-related behavior

Traditionally, success and failure in scholastic achievement were attributable to intelligence levels alone. In the 1950s, David McClelland and his colleagues (McClelland, Atkinson, Clark, & Lowell, 1953) conducted research on motivation for achievement which alerted educators to the importance of variables other than those assessed by intelligence tests for the prediction of achievement activity. Their studies linked achievement imagery in the fantasies of subjects with achievement motivation. They found that subjects who were introduced to achieving models tended to fantasize or image achievement situations and, in turn, exhibit a higher motivation for achievement.

In the 1960s, increased research on blacks and other minority groups began to reveal that various ethnic, racial and cultural groups differed considerably in their perceptions of social situations and institutions. The Coleman report (Coleman, Campbell, Hobson, McPartland, Mood, Weinfield & York, 1966) found that among nonwhite children, achievement was best predicted by a measure of the child's belief that academic outcomes were determined by the child's behavior. For some, schools were seen as a channel to opportunity, but to underprivileged minorities, schools were often seen as repressive, middle-class institutions in which

often seen as repressive, middle-class institutions in which they could exercise little control over agendas or outcomes.

The relationship between locus of control and achievement was further demonstrated by Crandall, Katkovsky, and Preston's (1962) research. Using the Intellectual Achievement Responsibility Questionnaire for children, Crandall et al. found that boys who attributed achievement responsibility to themselves demonstrated greater intensity in intellectual free-play pursuits and scored higher on intelligence achievement tests than boys who did not attribute achievement responsibilities to themselves. However, achievement responsibility was not significantly related to most criteria for girls. The researchers suggested as an explanation for this finding the possibility that boys and girls are differently rewarded by parents, teachers, and other persons for stating intellectual achievement expectations and standards. Boys may be criticized when their stated expectations and standards do not fit actual performance while other, more extraneous, factors may affect the praise and criticism meted out to girls. Intellectually proficient girls may be criticized for unfeminine boasting when stating high (though realistic) expectations and standards for themselves.

In a later study, Crandall, Katkovsky, and Crandall (1965) found achievement in boys as measured by report card grades to correlate with an internal sense of control in

grades 6, 8, 10, and 12, but found only an occasional correlation with standardized achievement tests. However, they did find a correlation between internal perceptions and achievement tests as well as report card grades in a ninth grade sample. These results were replicated by McGhee and Crandall (1968) who found that internals achieved better report card grades and scored higher on the Iowa Achievement test with some variability between the sexes.

Lessing (1969) studied large samples of eighth and eleventh grade students in Chicago schools using Strotbeck's Personal Control Scale (Strotbeck, 1958) and found that a sense of personal control was correlated with grade point averages even when IQ scores were held constant. Harrison (1968) found similar correlations and additionally found that these relationships cut across socioeconomic lines. Internally controlled students achieved academic success regardless of whether they were from economically advantaged or disadvantaged homes. Lessing (1969) found that a sense of control over events in one's life and a willingness to defer gratification tended to serve both as a cause and effect. Successful control of test outcomes, for example, tended to create an expectation of future control over outcomes.

The relationship between academic achievement and locus of control has been studied by a number of different researchers using numerous methods of measurement. Bar-Tal

and Bar-Zohar (1977) organized a tally sheet revealing the number of studies that have affirmed the relationship between achievement and internal locus of control. Among 36 investigations reviewed, only one study reported a negative relationship (Massari & Rosenblum, 1972) and four reported no significant relationships. The negative finding was obtained from female college students whose grades in a psychology course were associated with externality on Rotter's I-E scale (Rotter, 1966). Thirty-one investigators reported finding positive relationships between internal locus of control and achievement.

Messer (1972) found, in addition to the locus of control-achievement link that boys who assumed responsibility for success and girls who assumed responsibility for failure in a research setting were the most likely to have attained higher grades and achievement test scores. Messer's sex-linked results were also reflected in Duke and Nowicki's (1974) research. Using the Adult Nowicki-Strickland Internal-External (ANSIE) scale, they found that externality was associated with achievement for females, but internality was related to like achievement for males. Their research suggested that college-aged females were more likely than males to adopt an expressed external orientation to be congruent with the expected female cultural role of passivity. A female who expressed an internal locus of control orientation was felt to present

a social dilemma for females generally, and females in competitive situations with males, specifically. These difficulties resulted in what has been popularly termed "fear of success" in women. By succeeding and accepting responsibility for success, women become threatening to men, which may be perceived as lessening their chances for successful social interaction with the same men.

Gender differences also became apparent in studies conducted by Nowicki and Duke (1978) on university students in which competitive situations were arranged. They found that internally controlled females improved their task performance when competing with males, while externally controlled females seemed unwilling or unable to increase their achievement behaviors when asked to compete with male peers. These results indicate that externally controlled females find the demands of sex roles to inhibit assertive, achievement behavior. Lefcourt (1982) proposes that beliefs in internal control may be thought of as stereotypically masculine and that many females may respond to locus of control scales in accord with feminine role expectations. If such is the case, then unwillingness to compete with males could be a coordinating behavior and could be seen as damaging to potential achievement behavior in coeducational situations.

In recent years there has been a growing trend toward the use of interactionist models. The interactionist

perspective looks at the way in which the individual's behavior both affects and is affected by the environment. Investigators have begun to ask when and under what circumstances locus of control may prove to be a predictor of success. One of the first such studies to deal with achievement was conducted by Wright and DuCette (1976). They compared the predictive value of locus of control measures in open versus traditional classrooms. Using the Internal Achievement Responsibility questionnaire, students' internal locus of control was found to be a predictor of both high classroom grades and Scholastic Aptitude Test scores (SAT) in the open classroom where self-direction and participation were highly valued and encouraged. In traditional classrooms, the relationship was found to be negligible. A related study using 54 college students found that Rotter's Internal-External scale predicted performance and satisfaction. High discipline and low discipline situations were created to which the students were exposed equally. Students who were externally controlled performed best and enjoyed the high discipline more than they did the low discipline conditions. The students who were internally controlled did not vary as much with conditions but performed slightly better under the low discipline conditions (Parent, Forward, Canter, & Mohling, 1975).

University students were again the subjects of research conducted by Batlis and Waters (1973) and Batlis

(1978). Students were questioned regarding the degree of relationship that they perceived between getting an A on a course examination and twelve given outcomes both extrinsic (e.g., "Approval from friends") and intrinsic (e.g., "Having feelings of accomplishment"). Those who indicated that the grade was related to valued outcomes were designated as high in instrumentality. A correlation was found in both studies between instrumentality and performance among internals. This use of locus of control in conjunction with the concept of instrumentality indicates that assessments of internally controlled students may prove more predictive in expectancy-outcome situations than the assessment of externally controlled students.

Otten (1977) studied graduate students over a five year period and found that a combination of Rotter's I-E scale and an autobiography measure of locus of control allowed for some prediction of progress in graduate school. Internally controlled students were more likely to have completed their Ph.D.s in five years or to have dropped out of their programs than were externally controlled students. Internal students were thought to have internal goals which dictated that they either accomplish a degree within a specified time or "get out", while external students were thought to adopt the external standards of parents, administrators, etc., who might suggest that they stick it out even if they had to settle for a terminal master's

degree. Externally controlled students were more likely to have received a terminal M.A. degree or to still be working on the Ph.D. after five years. Six out of fifteen internally controlled doctoral students had received their Ph.D.s within five years, whereas none of the externally controlled students had completed.

Nord, Connelly, and Daignault (1974) found that locus of control when combined with aptitude measures for graduate business school students allowed for some prediction of grades. Their studies went on to partial out aptitude and the relationship between internal locus of control and high grades remained significant.

Prociuk and Breen (1975) reported being able to predict undergraduates' grade point averages making use of Levenson's three-factor locus of control scale (Levenson, 1973). In this study, subjects were divided into three groups: 1. true internals (those whose scores were the highest on internal factors), 2. defensive externals (those who attributed outcomes to powerful others primarily as a defense against possible failure), 3. true externals (those who attributed outcomes to chance). Prociuk and Breen (1975) found that true internals were the highest achievers of their sample and that defensive externals were more achieving than true externals.

Since the 1950s, researchers have been studying factors other than intelligence to explain academic

achievement. They have investigated the relationship between the sense of control (locus of control) which a student feels and level of academic achievement.

Differences in locus of control by gender, sex and academic levels were studied with many studies proving significant relationships between locus of control and achievement.

Locus of control and medical students

While locus of control has been investigated widely, only five studies were found in the professional literature involving locus of control and medical students. These studies investigated the relationships among locus of control, academic achievement, and stress-tolerance.

Kilpatrick, Dubin, & Marcotte (1974) conducted the first of these studies using Rotter's Internal-External Locus of Control Test (1966). They tested 277 medical students at a southern university to evaluate the interrelationships of personality characteristics, stress of medical education, and mood state. Mood states were determined by the administration of the Profile of Mood States Scale (McNair, Lorr, & Droppleman, 1971). They found that medical students with an internal locus of control consistently exhibited less mood disturbance than the externally oriented students. This was thought to be a result of a sense of control over environment and outcomes

acting to reduce anxiety by creating a sense that the student would be capable of handling whatever the situation demanded. Freshman medical students demonstrated increased mood disturbance after the first few months in medical school, but the junior year appeared to be the most stressful. It was expected that locus of control might change as a function of length of time in medical school since Kilpatrick, Miller and Williams (1972) found changes in locus of control in response to the stress of renal disease and hemodialysis. This was not the case, however, and locus of control did not appear to change suggesting that it is a relatively stable personality characteristic.

Grover and Tessier (1978) hypothesized that a group of medical students who exhibited the academic frustration syndrome would evidence extremes in locus of control as compared to a control group of medical students who were able to cope with academic frustration. The term academic frustration syndrome (AFS) was applied to students who exhibited a cyclic and self-perpetuating pattern of depression, of persistence in noneffective study methods, and who attributed their failure to circumstances beyond their control. Although the results were not statistically significant, the AFS students were found to have locus of control scores that tended to be more extreme either externally or internally than the overall medical school sample.

The researchers concluded that the student's level of facilitating and debilitating anxiety rather than their locus of control played an important role in determining whether a student would cope with academic frustration or enter the academic frustration syndrome cycle. The transition from college to medical school was thought to be traumatic for students who were at the top of their classes and needed to adjust to being a first year student again. The transition was also difficult because of the homogeneous group of high achievers who comprise medical school classes. They further concluded that the role of locus of control in the academic development and counseling of medical students remains unclear.

Grover and Smith (1981) also looked at academic anxiety and student mechanisms for coping with stress by examining relationships among prior achievement, academic anxiety, locus of control, and performance in the first year of medical school. External locus of control was found to correlate significantly with academic anxiety which was found to be significantly related to first-year performance. Anxiety, when combined with prior academic achievement, resulted in a significant increase in prediction.

Grover and Smith's (1981) research also revealed an unexpected occurrence. Locus of control for a majority of first year medical students shifted in a direction of greater externality. Low achievement students appeared less



likely to change their locus of control during the year while the highest achieving students demonstrated the greatest likelihood of change. It was surmised that as students became more aware of the copious amounts of material to be learned, their sense of control over the situation decreased and anxiety about the ability to achieve increased. As this anxiety increased, the need to externalize responsibility for inability to cover all of the material and for mediocre performance on exams caused the students to blame factors in the environment. The researchers found a hostility among the medical students which they interpreted as a protective mechanism utilized by students to guard their self-concepts. The standard pattern of teaching in large group lectures and of evaluation by means of standardized tests was also felt to contribute to the students' perception of external control.

The greatest shifts in locus of control both internally and externally occurred in the high achievement groups. Three or four students in the low achievement groups demonstrated very stable locus of control throughout the entire first year. Grover and Smith hypothesized that if students are willing to modify their locus of control to develop to the demands of the environment they may reduce stress and anxiety and thus achieve at a higher level. This conjecture seems somewhat extreme in light of Kilpatrick, Dubin, and Marcotte's (1974) research which found less mood

disturbance among internal students and found locus of control to be constant throughout the four years of medical school.

Gardner (1982) placed medical students in a "supported" group which wrote weekly essays for faculty members who read them and commented on them supportively. The essay group became less internal and more external while demonstrating less stress. They became more external as they came to depend on the feed-back from the faculty members via their essays, but the relationship which developed appeared to reduce stress levels. The non-essay group retained their internal control but reported more stress.

Perceived stress of junior medical students was measured by Linn and Zeppa (1984). Degree of stress and whether the stress was considered favorable or unfavorable were determined by students' ratings on a stress scale developed by the researchers. The scale was administered before and after the surgical clerkship. Using Rotter's (1966) locus of control scale it was determined that students likely to experience unfavorable stress were more external in control as compared with other students.

While these studies dealt primarily with stress as it relates to medical school achievement using locus of control as a related issue, a consistent theme throughout the findings was that the student with a general internal

orientation is more personally and academically effective than the student with an external orientation. Vargo and Black (1984) call for more investigation of locus of control and its correlates in medical students, both as a means of better understanding the concept of locus of control itself and as a way of gaining more specific knowledge with regard to the psychological functioning of medical students. They view locus of control research as a possible avenue to determining characteristics most conducive to satisfactory medical school performance and successful clinical practice.

Summary

Success in the first years of medical school is traditionally measured by achievement on standardized exams. Predicting such success is of value to educators in highly selective fields such as medicine because of the cost both in time and money to the student and to the institution. Locus of control has been explored as a possible indicator of achievement potential.

The concept of locus of control has been shown in numerous studies to be related to achievement in various age groups including college and university student populations. Locus of control has its theoretical foundations in social learning theory as proposed by Rotter (1966). Rotter developed this theory for use in predicting behavior such as

achievement. Locus of control is a generalized expectancy on the part of an individual that an outcome will occur. The individual's perception of control over outcomes determines locus of control. Research investigating the relationship between locus of control and achievement in medical students is sparse but indicates a connection between internality and achievement. A need for more research in this area exists. The present study is designed to build on this earlier research investigating locus of control and the academic achievement of medical students.

The chapter which follows describes the methodology utilized in this study.

CHAPTER III

RESEARCH METHODOLOGY

Population

The population for this study consisted of first-year medical students at an urban, midwestern research I university. Even though 200 student spaces were available for the Fall, 1987, entering class, only 183 students actually registered.

Sample

The sample selected to participate in this study consisted of 170 first-year medical students, or 93% of the 183 new students, who took part in a student orientation program presented by the College of Medicine. Students repeating the first year were not included. Out of the sample of 170 students, 151 students (or 89%) agreed to complete the Adult Nowicki-Strickland Internal-External Locus of Control Scale and take part in the study (see Appendix A). Of those students completing the Scale, 5 were later eliminated because they did not sit for exams at the end of the first quarter and no data were available for correlation; one was eliminated because he or she was

repeating the first year of school and did not meet the study's criteria of being a new student; and one was eliminated because he or she answered all of the Scale's questions with a "no" answer thus throwing the validity of the locus of control score into doubt. Thus, survey responses from 144 students (84.7%) were collected for the study.

Instrumentation

Locus of Control Scale

The Adult Nowicki-Strickland Internal-External Locus of Control Scale (Nowicki & Duke, 1974) was administered to all students taking part in the study (see Appendix B). This instrument was chosen over the more well-known Rotter Internal-External Locus of Control Scale (Rotter, 1966) because it corrected for the bias of social desirability of certain responses which had been found in the Rotter scale. It was also chosen because its ease of administration lent itself well to the limited amount of students' time and attention span available at the end of the orientation day when it was to be administered. The length of the instrument also made it possible to include it with research materials which were being administered by the Department of Psychiatry on the same day. It contains 40 questions which are answered by circling a "yes" or "no".

The Adult Nowicki-Strickland Internal-External (ANSIE) Locus of Control Scale's internal consistency is satisfactory. Nowicki and Duke (1976) report split-half reliabilities in the .60s for college (n=156) and community samples (n=33). They also reported test-retest reliability for college subjects to be .83 (n=48) over a six week period of time. Nowicki and Duke also investigated the relationship of the ANSIE scores to social desirability to determine discriminate validity. This relationship was considered to be important because of the criticism of the Rotter Internal-External Scale for its scores being significantly related to social desirability. Two samples of college students (n=48, n=68) were asked to complete the Marlowe-Crowne Social Desirability scale in addition to the ANSIE. The two scores were not related ($r=.10$, $df=47$; $r=.06$, $df=67$).

The construct validity of the ANSIE was found to be satisfactory by Nowicki and Duke (1974). Both the Rotter scale and the ANSIE were administered to two college samples and one community adult sample. In all three samples, the correlations between the two measures were significant ($r=.68$, $df=47$, $p .01$; $r=.48$, $df=37$, $p=.01$). These results support the contention that these two measures are assessing the same construct, but not in an identical manner (not with the relationship to social desirability which the Rotter scale exhibited).

student Interviews

Structured interviews with randomly selected students were conducted at the end of the first quarter of classes. The purpose of the interviews was to collect additional data to confirm locus of control findings for the selected students. Another purpose was to gain insight into the factors affecting the students and insight into their motives and attitudes about their academic experience. An interview form (see Appendix C) was developed by the researcher to record responses to four questions designed to determine the degree to which the student was externally controlled. The questions were as follows: 1.) How did your grades come out fall quarter? 2.) How do you feel about your grades? 3.) What did you think influenced your grades most? 4.) How have your career and educational choices been determined? How did you choose medicine and, or the University of Illinois? The questions dealt with the results of the students' first-term grades and with the ways in which their educational and career choices were made. The form provided space for recording responses to the questions. The interviews were taped.

Four pilot interviews were conducted with second-year students. The questions and form used for the pilot interviews varied slightly from the form which was eventually used for the first-year student interviews (see

Appendix D). It consisted of six questions and did not have the rating scale of from 1 to 10. The fourth question in which students were asked if they felt they could have changed the outcome of their grades in any way was eliminated. It became obvious during the pilot interviews that the response to this question was covered by question 3. Questions 5 and 6 were combined because the specific question about medical school choice and medicine as a career were subsets of the general question about career and educational choices.

Data Collection

Approvals were obtained during the summer of 1987 from the Institutional Review Board of Loyola University of Chicago to conduct research on human subjects and also from the University at which the research was conducted. The 40-item Adult Nowicki-Strickland Internal-External Locus of Control Scale was administered to 170 medical students during the new student orientation program on Wednesday, September 16, 1987. This orientation program was chosen because it offered the best opportunity for finding a large number of students in the same place at the same time. Administering the instrument during regular classes was ruled out because class attendance is not mandatory and is low except for days on which exams are scheduled. Exams are

only scheduled at the end of the quarter and the Vice-Dean of the College refused permission for any instrument to be administered close to exam time. As stated previously, 151 students (89%) chose to complete the instrument.

In December, 1987 the first-year medical students sat for quarterly exams in five subjects: biochemistry, physiology, gross anatomy I, tissue biology, and behavioral science. The exam results were not available until early February, 1988. At that time, a grade report for each student who completed the locus of control scale was obtained from the Dean of Students' Office. A tally of course failures was recorded for each student with "0" representing no failures and "5" representing failure in all subject areas.

Demographic data for each student were obtained from the admissions files of the College of Medicine. The data collected included age, sex, ethnicity, undergraduate GPA, science GPA, MCAT score, and membership in special admissions groups (Illinois Agricultural Association and Urban Health Program). A computer file was developed containing a record of each participant's demographic data, locus of control scores, and the results of course exams.

The locus of control scores ranged from 1 to 18 with a score of 7 representing the median. The students in the sample were divided into four groups determined by their locus of control score falling above or below the median and

having 0 exam failures or 1 or more exam failures. The students below the median and having 0 failures composed the Internal-Passing group. Students below the median with 1 or more failures composed the Internal-Failing group. Students above the median with 0 failures were placed in the External-Passing group and students above the median with 1 or more failures were placed in the External-Failing group.

A list of students in each of the 4 groups was generated by computer. The groups were numbered from 1 to 4 and the researcher was not aware of which specific groups were internal, external, passing, or failing. Phone calls were made to every fourth student in each group requesting volunteers for a personal interview of approximately 30 minutes. When a student was not available by phone, a call was made to the next fourth student. Of the 16 students who were contacted, all agreed to do the interview.

The interviews were conducted by the researcher during the months of February and March 1988 on weekdays for periods of time ranging from approximately 20 to 40 minutes. Interviews were conducted at the College of Medicine, but it was stressed that the information was not for use by the administration and would be used for research purposes only.

Data Analysis

Descriptive statistics were obtained on the following variables: age, sex, urban health program membership, MCAT scores, overall GPA, locus of control scores, and ethnic background.

A chi square was used to determine relationships between first-year medical students and their locus of control scores.

A Pearson product moment correlation was run on locus of control and age, locus of control and sex, locus of control and membership in the Urban Health Program (UHP), and locus of control and ethnic background.

A Pearson product moment correlation was also run on locus of control and undergraduate overall GPAs, undergraduate science GPAs, and Medical College Admissions Test (MCAT) scores.

The interview data were reported in case study format and locus of control scores were assigned by the interviewer using a scale of 1 to 10 with 1 representing strong internal influences and 10 representing strong external influences. The data were analyzed based on the amount of influence which outside factors appeared to have on the subject's life and career choices and on academic performance. The types of outside influences which the students cited as affecting

their life choices and academic outcomes were also categorized.

Summary

The sample consisted of 144 first-year medical students out of a population of 183 students. Locus of Control was determined through the administration of the Adult Nowicki-Strickland Internal-External Locus of Control Scale and through personal interviews with a random sample of students in the study.

Chi square and Pearson product moment correlations were employed to determine relationships between locus of control and academic achievement, locus of control and demographic variables, locus of control and past academic achievement. Sixteen interviews of randomly selected students were conducted to qualitatively determine their locus of control and learn what kind of outside factors may have influenced their academic achievement.

Both quantitative and qualitative research methods were employed in an effort to produce an in-depth evaluation of locus of control. Analysis of various demographic data was conducted to determine any correlations with locus of control and with academic achievement.

Included in the next chapter will be the results of the correlations run on locus of control and achievement,

locus of control and selected demographic variables, and locus of control and previous academic achievement. Reports of the personal interviews will also be included in the next chapter.

CHAPTER IV

PRESENTATION AND ANALYSIS OF THE DATA

This chapter reports, in four sections, the results of research conducted with first-year medical students to determine whether relationships exist between academic achievement and locus of control. The first section provides a profile of the sample studied. The second section presents academic achievement data represented by first quarter medical school exam results. The third section presents locus of control data. This section is divided into two subsections of which the first reports the descriptive results of the administration of the locus of control instrument and the second subsection reports the statistical analyses of the locus of control data. The fourth section of the chapter reports results of 16 individual interviews with selected students.

Profile

The sample for this study consisted of 144 first-year medical students out of a class of 183 first-time students at the urban site of a large midwestern medical school. The 144 in the sample represent 78.7% of all first-time students

at the urban site. The following characteristics of the sample are reported in Table 1.

Age

The age of the students in the sample ranged from 19 years to 35 years with a mean of 23.5 years. Although complete data for the urban campus site alone are not available, the sample appears to be representative of the entire first-year class, which consisted of 310 students on two campuses. The combined mean for the College of Medicine's two, first-year campuses was 24 years with a range of 19 years to 40 years of age.

Sex

Males comprised 67.4% (97) of the sample and females comprised 32.6% (47) of the sample. A breakdown by sex for the entire two campus, medical school class is not available, but the Dean for Student Services asserted that entering classes generally consist of one-third female to two-third male students.

TABLE 1

PROFILE OF MEDICAL STUDENTS SAMPLE

	Frequency	Percent	Cumulative Percent
Age Interval			
Under 20	1	.7	.7
20-23	106	73.6	74.3
24-26	17	11.8	86.1
27-30	12	8.3	94.4
31-35	8	5.6	100.0
Sex			
Male	97	67.4	67.4
Female	47	32.6	100.0
Urban Health Program (UHP) Participants			
No	111	77.1	77.1
Yes	33	22.9	100.0
Ethnic Background			
Caucasian	92	63.9	63.9
Asian/Pacific Islander	17	11.8	75.7
Black	18	12.5	88.2
Mexican American	13	9.0	97.2
Other Hispanic	4	2.8	100.0
Illinois Agricultural Association (IAA)			
Non-IAA	141	97.9	97.9
IAA	3	2.1	100.0

TABLE 1 (Continued)

	Frequency	Percent	Cumulative Percent
Medical College Admission Test (MCAT)			
Below 8.00	28	19.4	19.4
8.00- 9.99	47	32.6	52.0
10.00-11.99	58	40.3	92.3
12.00-13.50	11	7.7	100.0
Science Grade Point Average (SGPA) Undergraduate			
Below 3.01	1	.7	.7
3.01-4.00	27	18.9	19.6
4.01-5.00	116	80.4	100.0
Overall Grade Point Average (GPA) Undergraduate			
Below 3.01	3	2.1	2.1
3.01-4.00	34	23.6	25.7
4.01-5.00	107	74.3	100.0
Non-Urban Health Program (Majority) MCAT			
Below 8.00	2	1.8	1.8
8.00-9.99	40	36.1	37.9
10.00-11.99	58	52.2	90.2
12.00-13.50	11	9.9	100.0
Urban Health Program (Minority) MCAT			
Below 8.00	26	78.8	78.8
8.00-9.99	7	21.2	100.0
10.00-11.99	0	-	-
12.00-13.50	0	-	-

TABLE 1 (Continued)

	Frequency	Percent	Cumulative Percent
Non-Urban Health Program (Majority) SGPA			
Below 3.01	0	0	0
3.01-4.00	9	8.1	8.1
4.01-5.00	102	91.9	100.0
Urban Health Program (Minority) SGPA			
Below 3.01	1	3.0	3.0
3.01-4.00	18	54.6	57.6
4.01-5.00	14	42.6	100.0
Non-Urban Health Program (Majority) GPA			
Below 3.01	0	0	0
3.01-4.00	15	13.5	13.5
4.01-5.00	96	86.5	100.0
Urban Health Program (Minority) GPA			
Below 3.01	3	9.1	9.1
3.01-4.00	19	57.6	66.7
4.01-5.00	11	33.3	100.0

Urban Health Program

Thirty-three students, or 22.9% of the sample, participated in the Urban Health Program (UHP) which is made up of underrepresented minorities. The percentage of UHP students in the urban sample is representative of the entire class which consisted of 25% UHP students out of a total class of 310. Membership in the Urban Health Program is of particular interest because students who qualify for this program by virtue of belonging to a racial group which is underrepresented in the medical field are given extra admissions points in order to make them competitive with non-minority applicants. The result is that many of the UHP students enter medical school with lower MCAT scores and GPAs. Differences between the academic backgrounds of the UHP and non-UHP students are presented below.

Ethnicity

The ethnic breakdown of the respondents was 63.9% (92) White, 11.8% (17) Asian or Pacific Islander, 12.5% (18) Black, 9.0% (13) Mexican-American, 2.8% (4) Other Hispanic. These proportions are representative of the ethnic diversity within the entire two-campus class which were as follows: 61.7% White, 12% Asian or Pacific Islander, 11.5% Black, 7.8% Mexican American, 4.9% Other Hispanic, 1.7% Puerto Rican, and .3% Native American.

Illinois Agricultural Association (IAA)

The College studied accepts students each year who may fall below the expected GPA and, or MCAT score if they are recommended by a joint committee of the Illinois Physicians Association and the Illinois Agricultural Association. These recommendations are based on a commitment by the student to practice primary care medicine in a rural area of the state. Illinois Agricultural Association (IAA) students constituted only 2.1% (3) of the urban class and therefore membership in this group did not prove to be a discriminating variable. Only 6% of the entire medical school class participated in the IAA program. A larger percentage of IAA students was enrolled at the medical campus located in a rural setting thus reflecting their interest in rural medicine.

Medical College Admission Test (MCAT)

The College of Medicine utilizes an average of six subject scores from the Medical College Admission Test (MCAT) as one of the admission selection criteria. The six subject areas included in the MCAT are biology, chemistry, physics, science problems, reading, and quantitative skills. MCAT score averages ranged from 5.83 to 13.50 with a mean of 9.60 for the entire sample, 7.24 for the minority (UHP) students, and 10.31 for the majority students. These means

compared with a mean of 9.71 for the entire class, 7.18 for the total minority (UHP) student population, and 10.09 for all majority students.

Grade Point Averages

Undergraduate science grade point averages (SGPAs) ranged from 2.43 to 5.0 with a mean of 4.36 for the entire sample, a mean of 3.91 for the minority (UHP) students, and a mean of 4.50 for the majority students. The overall undergraduate grade point averages (GPAs) ranged from 2.84 to 5.00 with a mean of 4.27 for the entire sample, a mean of 3.69 for the minority (UHP) students, and 4.44 for majority students. The range for overall grade point averages for the entire, two-campus class was 3.33 to 5.00 with a mean of 4.29. The range for minority (UHP) students in the entire class was 3.33 to 4.74 with a mean of 3.88. The range for majority students was 3.60 to 5.00 with a mean of 4.33. Thus the ranges and mean grade point averages for the urban sample appear representative of the ranges and means for the entire, first-year medical school class.

Academic Achievement

In this study, academic achievement is measured by the number of passing and failing scores on first-quarter medical school exams. The first-quarter exams represent the first quantitative evaluation which students receive during their medical school program. Practice exams are available to students upon request, but no grades are recorded until the end of the first quarter. Therefore, these exams offer the first indication of the student's mastery of the medical curriculum. The exams are given in five subject areas reflecting the five courses which are part of the first quarter curriculum at the urban site. The subjects are: biochemistry, physiology, gross anatomy I, tissue biology, and behavioral science. All of the exams were passed by 52.1% (75) of the students in the sample. A total of 47.9% (69) of the students failed one or more of the exams. One exam was failed by 27.8% (40) of the students, two exams were failed by 9.7% (14) students, three exams were failed by 9.0% (13) students, and four exams were failed by 1.4% (2) students (see Table 2).

Within the ethnic groups the following percentages passed all of the exams: Asian Pacific-Islander 64.7% (11), Caucasian 63.0% (58), Other Hispanic 25.0% (1), Mexican 23.1% (3), and Black 11.1% (2). Of the majority students, 62.2% (69) passed all of the exams while 18.2% (6) of the

TABLE 2

ACADEMIC ACHIEVEMENT AS MEASURED BY FIRST TERM EXAM RESULTSFall Term -- 1987

<u>Exams Failed</u>	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Percent</u>
0	75	52.1	52.1
1	40	27.8	79.9
2	14	9.7	89.6
3	13	9.0	98.6
4	2	1.4	100.0

students considered to be minority (UHP) passed all first-term exams. The breakdown by gender was 51.5% (50) of males passing all exams and 53.2% (50) of females doing so (see Table 3).

Exam failure rates for the four years previous to this study are alarmingly high (see Table 4). In 1986, the percentage of students failing one or more quarter exams was 50%; in 1985, 41.5%; in 1984, 29.0%; and in 1983, 40.0%. This trend has raised concern over the admission process for students as well as concern for the experiences of the students once they enroll. Locus of control and its possible relationship to academic achievement are examined in the next sections.

TABLE 3

ALL EXAMS PASSED

<u>Ethnic Background</u>	<u>Percent</u>	<u>Number</u>
Caucasian	63.0	(58)
Asian/Pacific Islander	64.7	(11)
Black	11.1	(2)
Mexican American	23.1	(3)
Other Hispanic	25.0	(1)

Sex

Male	51.5	(50)
Female	53.2	(25)

Urban Health Participants (UHP)

Yes	18.2	(6)
No	62.2	(69)

TABLE 4

ACADEMIC ACHIEVEMENT FOR PREVIOUS YEARS
AS MEASURED BY FIRST TERM EXAM RESULTS

Exams Failed

<u>Years</u>	<u>0</u> (%)	<u>1</u> (%)	<u>2</u> (%)	<u>3</u> (%)	<u>4</u> (%)	<u>5</u> (%)	<u>Total</u> (%)
1986	50.0	20.0	10.0	9.0	9.5	1.5	50.0
1985	58.5	19.5	6.5	7.0	6.0	2.5	41.5
1984	71.0	12.5	6.0	5.5	3.5	1.5	29.0
1983	60.0	24.5	8.5	2.5	4.0	0.5	40.0

Locus of Control

Locus of Control: Descriptive Findings

The Adult Nowicki-Strickland Locus of Control Scale was administered to 144 students in the sample during the first week of medical school to determine whether they were internally or externally controlled. Locus of control scales ranged from 1 to 18 out of a possible range of from 1 to 40. The lower scores represented the more internal orientation on the part of the students studied. Internal orientation reflects the belief that outcomes in life are controlled by oneself while an external orientation reflects a belief that outcomes are controlled by outside influences or by chance or luck. The median score for the sample was 7 and the mean was 7.486. UHP student scores (n=33) ranged from 2 to 18 with a median score of 7 and a mean of 7.182. Majority (non-UHP) student scores (n=111) ranged from 1 to 17 with a median score of 7 and a mean of 7.577

Locus of Control: Tests of Significance

This study was guided by 3 research questions. In this section, the findings of statistical tests on the locus of control data generated by the research questions will be reported.

The first research question asked whether a correlation existed between academic achievement in medical school and locus of control.

Using the chi square test, it was determined that there was not a significant correlation between the first year medical students' academic achievement and their locus of control scores ($\chi^2=.90$, $p=.34$). The number of students who passed all exams and scored internal locus of control scores ($n=45$) was very close to the number who scored external scores and passed all exams ($n=30$). Similarly, the number of students who failed one or more exams and scored internal locus of control scores ($n=35$) was also very close to the number who failed one or more exams and scored external locus of control scores ($n=34$).

The second research question asked if a relationship exists between selected demographic variables and locus of control.

The Pearson product moment correlation test was used to ascertain whether any relationships existed between the variables of age, sex, and membership in the Urban Health Program. No significant relationships between age and locus of control ($r=.04$, $p=.3$), between sex and locus of control ($r=-.0078$, $p=.463$), and between membership in the Urban Health Program and locus of control ($r=-.047$, $p=.28$) were found.

Within the ethnic categories, only the Asian, Pacific Islander group showed a significant correlation with locus of control ($r=.13$, $p=.05$). The remaining ethnic categories were not significantly related to locus of control:

Caucasian ($r=-.04$, $p=.31$), Mexican ($r=-.002$, $p=.49$), Other Hispanics ($r=.08$, $p=.156$), and Black ($r=-.112$, $p=.09$).

The third research question asked if a relationship exists between past academic achievement (as measured by MCAT scores and GPA) and locus of control?

The Pearson product moment correlation test was used to ascertain that no relationship was present between MCAT scores and locus of control ($r=.019$, $p=.41$), GPA and locus of control ($r=.08$, $p=.15$), or science GPA and locus of control ($r=.05$, $p=.27$).

Interviews

Interview Structure

Sixteen first-year students from the sample were interviewed by the investigator. The sample was divided into four groups: internal-failing, external-failing, internal-passing, external-passing. The internal groups were composed of students who scored at the median of 7 or below on the Nowicki-Strickland Internal-External Locus of Control Scale. The external groups scored from 8-18 out of a possible score of 40. The passing groups passed all five

of their first quarter exams. The failing groups failed one or more exams at the end of the first quarter. They were asked four questions relating to their exam results and career and educational decisions (see Appendix C). The purpose of the questions was to determine if the students perceived their life choices and their exam results to be a result of their own actions or of outside influences. Four students from each of the four groups were interviewed. Requests for interviews were made to every fourth student within the groups until four were scheduled.

Group 1: Internal Locus/Failing Grades

The first student was a white male, approximately 22 years old, who attended the University of Wisconsin as an undergraduate. His responses indicated a very internal locus of control. He did not mention another person or circumstance until the final question which dealt with how he picked a medical school. He said he wanted to attend this school because his older brother is a third year student here and that the lower tuition was attractive because his younger sister is an undergraduate and the family is subsidizing three educations concurrently. He also responded by saying that he wanted to be in the city and he knew he could get a good education here. He failed 2 of the 5 exams for fall quarter and indicated a number of

times that the reason was that he did not study enough and did not realize the areas that he needed to emphasize. He did mention briefly that the quantity of information covered during the first term is so great that the amount may have affected his grades. Every other comment and response indicated that he saw his grades and his future to be entirely the result of his own actions. He stated very clearly that he could remedy the problem of failing grades by studying more effectively in the future and by averaging his failing grades with better grades in courses later in the year.

The second student interviewed in Group 1 was a black female, approximately 24 years old. She attended a college in New Orleans as an undergraduate because she wanted to go South and the college gave her scholarship money. Her mother is a teacher and her father is retired. She has one brother who is in the Air Force whom she characterizes as very bright but that school was not his "thing". As with the first student in this group, her responses indicated an internal locus of control. She failed 3 of the 5 courses for fall term and said that she was surprised because she believed that she had done better until she thought about the way that she had studied. She stated that she had not started to study one course until 3 weeks before the exam. She felt that being out of school for a while as well as spending time getting to know classmates may have influenced

her grades. She also said that other people's advice on how to study did not work for her, but when asked if she felt that this advice had influenced her grades a great deal she responded that other people's advice had never been that important to her. She stated that she has a plan of study now that she knows what to expect from the exams and that she will study her own way (only attending classes she felt were necessary) and is "sure that it is going to make a difference". While she mentioned some outside influences such as the big, intimidating book for one of the classes that she failed and her parents' desire for her to go into either law or medicine, she seemed overall to feel that she was in control of her life. When asked if she had always felt that she could do whatever she wanted to, she responded that she had and that the only issue was deciding what she wanted to do. Her responses definitely indicated a belief that the outcomes of her life depended solely on her own actions.

The third student in Group 1 was a white male, approximately 22 years old, who displayed an internal locus of control in his responses. He failed 3 out of 5 exams. He stated that he was embarrassed but not discouraged because he saw a "direct correlation" between how he studied and what he got. The only outside factors which he mentioned were the large amount of material which was covered the first quarter and the fact that he was used to

studying for understanding and essay-type exams. He appeared to be in complete control of all of his educational choices and their outcomes. He attended a private high school because that is where he wanted to go. He chose the University of Notre Dame because of the reputation and because he liked the way that the staff dealt with him at pre-college visits. He believed he wanted a medical career during his freshman year in college and later worked in a hospital which confirmed his interest. He failed courses because he chose to go to high school athletic events and spend time seeing old friends rather than studying. He chose to do a quarter's worth of work in five weeks at the end. It is clear that this student views the outcomes of his life as being a result of his own actions and is internally controlled.

The fourth student was a white male of approximately 21 years. He was the most "external" of Group 1. He cited a number of outside influences which affected his grades. A good deal of time was devoted to talking about the amount of material to be covered and he quoted the psychiatry professor who told the class that learning medicine was a lot like trying to drink water out of a fire hose. He also spoke of the professor in one course advising students that the test would be based on the text. He followed the advice and that was the one class which he failed (by one point). He said that people who studied the cooperative notes for

the class did much better and that the information given by the professor had led him in the wrong direction. He spoke of the transition from undergraduate to professional school and how that adjustment had affected his grades. His choice of an undergraduate major and of a medical school seemed to be very internal. He changed from a chemistry major (his father is a chemist) to psychology because he preferred it and wanted a more diverse background. He chose this medical school because he wanted to stay in the city and believed the school's reputation to be good. His confidence in his ability to rearrange his study schedule and positively affect next term's grades appears to be high.

Group 1 conclusion

This first group consisted of four students who scored internally on the Nowicki-Strickland Locus of Control Scale and who failed 1 or more quarter exams. With the exception of the last student, the vast majority of responses given during the interviews were internally directed. These students appeared to have made educational decisions very independently with only occasional references to financial or family constraints. They all viewed the outcome of their grades (both in the courses passed and those failed) to be a result of their own actions such as starting to study too late in the quarter, spending too much time at athletic

events, getting to know new people, etc. The exception to this was that all four students cited the quantity of information to be covered as having affected their study habits and their grades. None of the students exhibited any fear or lack of confidence in their ability to correct first quarter study problems and succeed on the next set of exams indicating that they felt that the outcome of their grades was solely dependent on their behavior and apparently not at the mercy of external factors.

Group 2: External Locus/Failing Grades

The first student in the second group was a black male, age 26. He was more mature than the average student by virtue of being a few years older and because he had already earned a masters degree and had been teaching science for five years in a New York City high school. He failed two of his five, first quarter exams, biochemistry by five points and tissue biology by only one point.

When asked how he felt about his exam results, he said that he felt that his grades weren't that bad. He felt that failing tissue biology by one point was frustrating because he had studied very hard and he kept thinking that if he had studied just one more hour, he might have passed the exam.

He felt that the greatest influences on his grades were the pace and the amount of the information covered. He

said that none of his educational experiences had prepared him for the intensity of the information presented in such a short time. He stated that he was pleased to learn that the material was not difficult. It was the pace at which the material was presented and the quantity which was presented which created problems for him. These responses indicated an external orientation to his grade outcomes. He did not perceive the outcomes to be affected by his own behavior but, rather by outside factors such as quantity and delivery of course material.

During the second term, he responded to his grade results by altering his study habits. He has become selective about which classes he attends. He is also concentrating on time management. During the first term, he attended classes from 8:30 to 3:30 and would cook, go to the gym, and talk to friends before studying. During the second term, he began skipping some classes to use the time to read last year's co-op notes and the texts, he cooks less, and goes to the library more. He feels that he is retaining more from reading than from classes which is contrary to what he expected. His past educational experiences taught him that students learn from experience - feeling, hearing, touching - but the time line in medical school necessitates that students only have time to read.

This student discussed the level of questions asked on the exams. When he had trouble with Biochemistry, he went

to the counseling center. He told them that he was a teacher and wanted to understand why he was having trouble with exam questions. They talked about levels of questions and he realized that he was not studying to the level of the questions being asked. He referred to Bloom's taxonomy to denote the level of the questions asked. He came to the conclusion that he was not using the study habits that he had taught his former students.

When asked if he felt more in control during the second term, he stated that he felt he was paced better. He said the first term was nerve-wracking. If he didn't understand something during the first week, he kept at it. Now he has learned to "let it go" and come back to it.

His educational choices were determined in grade school by the school district placing him in a special program from kindergarten through the rest of his public schooling in New York City. His parent's finances dictated his choice of colleges. He went to an inexpensive school for the first two years to sample classes and decide what he was interested in studying. He said that he looked at the people in various majors to determine if they were the kind of people whom he would want to be around in fifteen years. He found "straight" science majors to have "...absolutely no sensitivity at all", so he went into science education. Now he feels that he can find people in medical science with whom he can feel comfortable.

This student's choice process for selecting a medical school was a further indication of his external locus of control. He chose this medical school because even though he knew nothing of the school, the school seemed interested in him. The school corresponded with him in a timely manner and he learned that there was a lot of clinical experience to be had in the area. He was pleased that although the school was large, people still took time to talk to him when he visited. His choice process consisted of a series of reactions to outside stimulus.

He states that he "hopes he can make it" through medical school. He feels that it has all come at him so fast that he has had to sit down and evaluate what he is doing right and wrong and tell himself that he is not going to leave until "they" kick him out.

When asked if he seriously doubts whether he will get through medical school, he replies that he does, and that sometimes he wonders if he got through last quarter due to himself or due to luck which is a further indicator of an external orientation. He had spoken to second year students who said if students didn't "keep up", "they" would kick you right out, but he says that he has not seen that. He feels that "they" give you every chance, so he just hopes that everything will work out.

Many of this student's comments suggest an external locus of control. His continual reference to "they" having

control over him staying in medical school or not indicates a sense on the student's part that he is not in control of the situation. His career choices were also determined to some degree by the external environment which he believed to exist in each field such as the kind of people which he felt he would be associating with in the science field. However, this was mediated by his internal interest in science as a motivator for his life choices. He viewed his early educational opportunities as having been determined by outside forces since "they" (the New York school system) put him in special programs beginning in kindergarten. His continual referral to the amount of information to cover and the speed with which it was presented tied in with previous research. Grover and Smith (1981) found similar conditions affect medical student's locus of control as they realized the enormity of the material to be covered, they began to shift their locus of control in an external direction. Boyle and Coombs (1971) found that the freshmen women whom they studied made a quicker emotional adjustment to college when they recognized early the futility of trying to master all of the material presented.

The second student in Group 2 was a white female, age 21, who failed one of the five exams at the end of the first term. When asked how she felt about her test results, she stated that "they were actually better than she had expected" because she did not know how to approach the

studying, "panicked" at the end and wasn't prepared for the exams. She stated that her senior year in college had been very easy for her since she had been accepted early to medical school and felt that the pressure for grades was off of her. "Getting back into the swing" of studying after senior year was difficult for her.

When asked if she felt she could have changed the outcome of her grades, she replied that she was changing her study habits for second term. She stated that the material was not hard, but the volume was great. She also decided to attend fewer classes because she felt that they were a waste of her time and she felt her time was better used by going to the library and reading the co-op notes.

She was angry immediately after the exams and felt that her grades had been affected by the test construction. Many of the questions were taken from the material presented at the end of the quarter which many people did not have time to cover. She didn't feel that the questions represented what students were told they would. "They seemed to pick out stupid, picky details that didn't seem to be the meat of the material."

When asked about her educational choices, this student talked of having been tested in fourth grade for a gifted school and given the choice by her parents to attend or not. She chose to because she was impressed by the reputation of the school. She applied to only two colleges and chose the

better one academically. She did not want an ivy league school because she didn't want the "stigma" which she perceived to be involved with going to one. She chose the medical school she is attending for financial reasons. She felt that she was "steered" by teachers and parents in the direction of medicine as a career.

This student exhibited an external locus of control in several instances such as her belief that the test construction was responsible for her poor performance and her surprise that she had done as well as she did indicating that she did not feel that she could estimate her own command of the information presented. Her comment about being steered to medicine also indicated an external locus of control as did her belief that her change of schedule from senior year of college to first year of medical school impacted her grades.

The third student in Group 2 was a white male, approximately 35 years of age, who had been working in the music field for over ten years since he completed an undergraduate degree in music. He began playing the violin in second grade and continued. Music was a field which he enjoyed very much, but he felt that it was becoming increasingly difficult to make a living in the field with the increased use of synthesizers in place of live musicians. Another factor in his decision to change careers

was his mother's belief that he "had too much on the ball" to continue waiting for fifty dollar music jobs.

He took science courses while working as a musician in order to prepare for medical school and was accepted late in the summer from the waiting list of applicants. He had been accepted at another school but decided not to attend because of the school's high tuition, inconvenient location, and poor reputation.

When asked about his grades, he stated that they were disappointing. He didn't pass two of the five exams, but he did say that two of the exams could be averaged with later quarter exam scores to make a passing score for the year. He did not feel good about his grades and in one course he had very little understanding of what was being presented during the term or of what was expected of him indicating that he did not perceive himself to be in control but rather, felt controlled.

He said that he has ambivalent feelings about being in medical school but feels that if it doesn't work out, it won't have cost him a fortune to have attended this school. He is not sure that being in medical school will "work out" and that he came in feeling that he would not be able to "cut it". He felt like "walking out" once or twice a day during the first quarter. He believes that his attitude was bad during the first quarter and is hoping that he will be

able to improve it during the second quarter, but is not sure that such a change will necessarily impact his grades.

This student's comments gave many indications of an external locus of control. His statements concerning the outside forces, such as synthesizers and his mother, which influenced his career decisions indicated that his decision to enter medicine was not an internal one. His comments about wanting to walk out of medical school, combined with his assertion that he did not know what was going on throughout one class and his concern over his ability to "cut it" in medical school indicate that he did not feel a sense of control over his environment. He presented a picture of someone being acted upon both in his current situation and in his career decisions rather than someone who was internally controlled.

The fourth and final student in Group 2 is a white female approximately 22 years of age. She failed one of the five quarter exams, but only by one percentage point. This student was unable to determine her degree of success or failure on the exams after taking them. The exam on which she felt she had done the best was the one that she failed and the one which she felt the least comfortable about (Biochemistry) turned out to be her best score. When asked what she felt accounted for her lack of awareness of her success or failure, she stated that one has to "study to a certain extent but after that sometimes I think it turns out

to be some luck". She stated that some of the questions were "stupid" and that in talking to other students after the test, she determined that she had gotten one question right because she had misread it. She did not see a correlation between the amount of studying which she did and her exam results. She commented on the amount of material to be covered and the way the questions were chosen from among the material. The exams consisted of 1.5 questions per hour of lecture, but she studied many hours of lecture which did not appear on the exam. She did not feel that she could have affected the outcome of her grades since she had adhered to a study schedule throughout the term. She did say, as had other students, that she had reduced her attendance at classes during the second quarter in order to make better use of her time. She expressed concern over the fact that students are not allowed to see their exams to know how they had done in particular sections of the exams.

Her early educational choices were made by her parents' decision to live in the suburbs and place her in the geographically determined public school system. She chose a small liberal arts school over the large state university because she was "scared" of the bigness of the university and she felt that the liberal arts school had a good pre-med program which turned out many students who went on to medical school. She decided during the sixth or seventh grade that she wanted to be a doctor because she was

ill and was dissatisfied with her doctors. She told her parents that she wanted to be a "better doctor than all those doctors" she didn't like.

Her choice of a medical school was determined during "early decision" in August preceding her senior year because she was studying in the Orient during her senior year and wanted to do her medical school interview before leaving the country. She talked to students who were already attending this medical school. They seemed to like it and she applied early decision which meant that she was committed if accepted.

Many of the comments which this student made signified an external locus of control, especially the reference to her grades being largely a result of luck and the testing system. Her inability to accurately determine what her test results would be contributed to her sense that there was little connection between her efforts at studying and the outcome of her exam scores. Her career decisions were also influenced by outside factors. She was interested in the university, but the size deterred her. Her choice of a medical school was determined greatly by other people's perceptions of the school and whether or not they felt that they were receiving adequate clinical experience.

Group 2 conclusion

The second group consisted of four students who scored externally on the Nowicki-Strickland Locus of Control Scale and who failed one or more quarter exams. The students in this group indicated an external locus of control through many of their statements such as the first student who worried about whether or not "they" would let him stay in school. The second student indicated surprise over the outcome of her exam scores and believed that the test construction was the mitigating factor. Many of her career choices were determined by others' opinions such as medical students on whose opinions she relied heavily to choose a school and parents and teachers who "steered" her into medicine. The third student exhibited classic external traits such the weight which he placed on his mother's opinion that he had "too much on the ball" to remain a low-paid musician and his constant anxiety and ambivalent feelings about his suitability for medical school. The third student in this group stated that after a certain amount of studying, grades were largely influenced by luck. All of these students exhibited less of a sense of control over the outcome of their grades than did the students in the first group who had also failed one or more exams. They continually cited outside influences which affected their

career choices and their grade outcomes indicating an external locus of control.

Group 3: Internal Locus/Passing Grades

The first student in Group 3 was a white male, approximately 22 years of age. He stated that he was relieved at the outcome of his grades because he believed that he had failed 2 or 3 of them. He found the wording of the questions and the multiple choice format to be confusing since he had been used to essay exams as an undergraduate, but felt confident that he was adjusting to the system used at the University.

He stated that he felt the biggest effect on his test outcomes was the amount of time that he had spent studying indicating an internal locus of control. Early in his first term, he attended classes on a regular basis, but later determined that his time was better spent by reading for the hour that he would have been attending a lecture. He made this choice in part because of the difficulty which he experienced in understanding the accents of some of the professors.

This student attended grade school in Pennsylvania with some of his elementary years at public schools and some at Christian schools. This student's internal locus was evident in his decision to be a medical missionary at age 8.

He stated that he has reaffirmed that decision through the intervening years and chose this medical school because it lent itself to a missionary career offering him clinical experience with diverse ethnic and immigrant populations.

While this student cited some outside influences on his career decisions, such as a missionary whom he met at age 8 when he admits he was "very impressionable" and the outside factor of low tuition at the University medical school, his responses to the questions asked were largely internal ones and he exuded a self-determination both about his career choices and about his medical school experience.

The second student in Group 3 was an Asian/Pacific Islander female, approximately 21 years of age, who passed all of her exams. She stated that she was disappointed because she had hoped to achieve honors for the term, but stated that she still intended to work for honors for the year since they are computed on the average of course scores for the year. She admitted that she only studied to a level that would ensure that she would pass indicating that she felt that the outcomes were determined by her own behavior. She felt that she could have studied harder and believed that she had learned how to study more efficiently for the second term.

She did cite an outside influence which was a new boyfriend with whom she studied first term and she felt that her efficiency may have been lowered as a result. She has

reworked her study habits this term to study independently when she feels that she can benefit from it. She states that she feels "at peace" with the system she has worked out indicating that her evaluation of her progress is an internal one.

As with many of the preceding students, both internal and external, she has reduced her attendance at class as she determines that her time can be better spent studying and she depends largely on the co-operative notes from the preceding year's class for study material.

She chose medicine because she was interested in her science classes in high school, and ruled out a research career as a result of summer work experience in college. She stated that her parents wanted her to be a dentist and her brother a doctor, but they both exhibited an internal control by choosing the opposite fields.

When asked if she felt that she was in control during the first term, she stated that she did and that she felt the same way during the second term. Her responses reflected that sense of control, especially her comment about being "at peace" which relates to the research done by McNair, Lorr, & Droppleman (1974) who found that medical students with an internal locus of control consistently exhibited less mood disturbance than the externally oriented students.

The third student in Group 3 was a white male, approximately 24 years of age, who passed all of his exams. He stated that he did "really well" and would probably receive honors (top 5%) in all but one class by the end of the year when the scores are averaged. He stated that he felt "really good" and that he thought the exams were a lot more fair than he thought they would be -- that the "build-up" from the second year students was much more negative regarding the exams than he found to be the case. He believed that the majority of the questions were representative of the material covered in the courses.

His internal orientation was evident when asked what he felt influenced his grades most. He stated that it was probably his study time and habits and that he probably studied more efficiently than the others in his class. He attributed this to having been out of school for two years and learning to organize his time. He had been doing chemical research which was a self-motivating job with a great deal of independence and which required him to be very organized.

This student had an interest in becoming a doctor when he was in fifth grade. He considered other careers such as coaching since he was involved in sports and chemistry since he enjoyed his chemistry classes. He ruled out a career in chemistry during his work experience after college in the field of chemical research. He found it very frustrating

that he did not have control over the kind of research that was being funded and felt that he would have more autonomy in medicine which indicates an internal locus of control. In describing his decision making process, he did not mention any other people and his sense of control over his decisions and choices was evident. This student mentioned other people on two occasions. He said that he chose an Illinois undergraduate institution to stay close to family and friends and that he paid for his own schooling because he had two younger sisters who he felt would need his parents' support. The latter comment is another indication of internal control. Similarly, when he was presented with a financial problem, he adopted the attitude that he would take care of it himself.

This student was one of the highest scoring students interviewed and appeared to be one of the most internally controlled. This was exhibited in his independent analysis of the test construction to his identification of the sole influence on his test outcomes as being his own study skills and time invested. His educational and career choices were entirely internally motivated except for a passing reference to geographical proximity and family financial influences.

The fourth student in Group 3 was a white male approximately 22 years of age who passed all of his exams by what he described as a "good margin" with the exception of biochemistry which he passed by only a "slight margin".

He stated that he had some difficulty adapting to not doing as well in medical school as he had done in undergraduate school.

When asked about what affected his grades, he mentioned that they probably could have been higher if he would have studied "all the time" or lived closer to school, but he went on to say that he used the time that he commuted on the train to study. Another indication of internal locus of control was that he believed that he positively affected his grades by attending most of the classes. This was in sharp contrast to the vast majority of students interviewed who discontinued class attendance. An outside factor which this student mentioned briefly was the amount of material. This factor was commented on by many of the other students, both those with internal and external locus of control scores.

His educational choices were internally motivated also. He chose a Christian undergraduate college because he hopes to be a missionary and chose this state university because he did not want to have a lot of debt which would interfere with his career plans. He was very self-assured about his career plans and the direction which his life would take. This student presented yet another example of a high achieving, internally-motivated student who appeared to be very self-directed in his goals.

Group 3 conclusion

This group presented an interesting continuum of internally controlled students who achieved a range of grades from "passing" to "honors" on first term exams. The third student was the highest achieving with four of five exam scores in the top 5%. He indicated the least external influence on his grades and career decisions. The fourth student followed the third grades and in degree of internal control. The first and second students were similar both in their performance on exams and in the fact that they did occasionally mention outside influences on their achievement such as the second student's boyfriend and the first student's belief that the new testing system in medical school affected his outcomes. The three males appeared to be very definite about and internally oriented toward their future plans while the female student dealt more with the issue of being at "peace" and learning to function within a relationship than discussing career plans. She was also the only Asian Pacific-Islander as well as the only female in this group which may have some bearing on this different orientation.

Group 4: External Locus/Passing Grades

The first student in Group 4 was a white male, approximately 23 years of age, who passed all of his exams with a "fair margin of safety". He stated that he was surprised at the outcome of his exams indicating a sense that the outcomes were not within his control. The actual scores were "quite a surprise" to him since the ones he felt he did well in did not correlate with the actual outcomes. He also felt that he had failed one for sure and possibly another one. He attributed that to the possibility that some "bad" questions might have been thrown out. He felt that he had failed Biochemistry and found that he had done very well.

When asked to what he attributed his grades, he replied "it's a mystery". He initially responded that he saw "an anti-correlation" between how much he studied and how well he did on the exams. He later revised that comment and said that he had studied a lot for the biochemistry exam and even though he thought he had failed it, the outcome was different from his estimate. This student was not flippant at all, but genuinely felt that he had very little control over his grade outcomes.

Further indications of this student's external locus of control were his "real fear" that he would "screw up" since he saw so little correlation between how much he

studied and how he did on exams and his decision to go into medicine in part because it was what his parents wanted. He stated that he resisted it at first and then switched when his work in electrical engineering became dissatisfying. He found that in the biomedical field, he would have a hard time doing research without the supervision of an M.D.

When asked if he felt in control during the current term, he responded, "I'll let you know when I get my grades", indicating a sense that his success or failure was not within his control. He stated that he was frustrated with the medical school financial aid staff, the testing situation, and canceled classes. He told of a class which had a history of being canceled during the first term. After several weeks, no notice was posted to cancel the class so the students assumed that the class would be held as scheduled. They arrived at the class to find that no one was there. The students who made the effort to attend the class felt that their time had been wasted. These examples lead him to believe that he did not have control over his environment. When asked if he was happy with the school, he commented that it was like flying "econo class". It gets you there, but you are uncomfortable along the way.

This student's sense of surprise at his first term exam scores and his use of words such as "mystery" indicate an external locus of control. He did not feel that his actions had a direct correlation to his success or failure

in the testing situation and further felt that much of his environment was beyond his control from canceling of classes to control over the biomedical research which he had been doing prior to attending medical school.

The second student in Group 4 was Mexican-American, approximately 23 years of age, who passed all of his courses with what he termed "room for improvement". His external locus of control became evident when he stated that he was "shocked" at the outcome of his grades. He was sure that he had failed Biochemistry and could only conclude that "they" let you guess and that had probably helped him. He felt that he was not given enough time to complete the exam because there was "too much" material.

He did not feel a correlation existed between the amount of studying and the outcome of grades. He stated that the quality of study was more important than the quantity, but went on to say that he does not follow his own belief. Instead, he studies as much as possible so he won't feel "guilty". The concept of guilt for his behavior indicates a belief that there is an external authority who this student felt needed to be satisfied rather than following his own beliefs regarding the best approach to studying. He discussed his concern over feeling guilty if he did badly on something if he had chosen to go to a movie beforehand thus indicating a lack of trust for the validity of his own judgements.

He felt that living at home affected his grades a great deal, because his father prepares his meals and he gets a lot more sleep at home than he ever did in the residence hall as an undergraduate. He mentioned the external factor of friends influencing his grades since they explained information to him. He also commented that he attended classes because he didn't want to hurt the feelings of professors who spent a lot of time preparing for classes.

A big influence on his decision to enter medical school was his family. His brother, uncle and cousins were all doctors and he did not remember ever making a conscious decision to go to medical school. He chose this medical school because his brother had gone here and he used to come with him to study and he was used to it. He is happy with his decision because he likes the attitude of the other students. All of these comments indicate an external locus of control with few references to internally motivated decisions.

This student exemplifies an externally controlled student. He was surprised at the outcome of his grades, he attributed his grades to guessing and his external living environment rather than to his own control. He made educational choices based more on other people's career goals rather than his own and judged his decisions based on the type of people around him rather than on his internal impressions.

The third student in Group 3 is a black female, approximately 23 years of age, who passed all of her exams. She was brief in many of her responses and stated only that she was "satisfied" with her grades.

When asked what affected her grades most, she said hard work and the help of others. Upperclass students gave her "focus" as to what she should emphasize in her studies. She felt that extra study could have helped, but that on some tests, she was "guessing". She felt that luck played a part in her grades.

She was interested in medicine as a child, but had a bad experience with her high school counselor regarding college decisions. She stated that her counselor did not give her much information concerning the possibilities open to her and she finally picked her undergraduate institution because a friend was going there. She wanted to attend college to get a "better job", not because of any internal motivation. She chose her medical school because of contact which she had with students already enrolled. These students gave her guidance and the "focus" which she mentioned earlier as having a positive effect on her grades.

This student commented that she is currently attempting to decrease her dependency on older students. She also stated that she does not feel as "in control" this term as she did last term but hopes to improve that situation by spring term.

Although not an extreme example, this student exhibits traits of an external locus of control such as her dependency on other students for college choice as well as for assistance in medical school. She made the statement, "no one makes my decisions", but it was mediated by her dependency on her high school counselor to notify her of college choice options and her eventual dependence on a friend's college choice to lead the way.

The fourth student in Group 4 was a white female, approximately 22 years of age, who passed all of her exams, although her histology score was close to failing. When asked how she felt about her grades, she replied that she was "ecstatic" and "surprised". She did not have a sense that she had passed all of the exams.

She felt that she could have studied more and that she had just studied enough to get by. There are no exams given during the quarter, but she did take the Teaching Learning Exams (TLEs) which are practice exams offered at intervals throughout the term. She felt that these helped her study plan, but a lot of work "piled up" at the end of the term anyway.

She chose her undergraduate college because the other school to which she applied appeared to be "snobby". She chose her medical school because of low tuition, a close location to her home and because of its reputation. She is happy with her decision primarily because of the attitude of

the students. She feels that her fellow students are there because they are interested in learning medicine and find it a good place to do so. She is interested in a career in surgery, but feels that she may "compromise" on another field because of a desire to marry. She believes that surgery would be too time consuming for her family life.

This student exhibits an external locus of control in her decision-making process which revolves greatly around others. The "snobby" attitudes of the people at her second-choice college and the attitudes of the students at the medical school which she attends affected her choices and her level of satisfaction. Another indication of her external control was her reaction to the outcome of her grades. She did not feel in control of the outcome and treated the results as something which was done unto her rather than achieved by her. Another indication of her external locus of control was her thoughts on the field of medicine which she will pursue. Her choices are being dictated not by her interests as by the needs of a husband and family.

Group 4 conclusion

While all students in Group 4 exhibited an external locus of control, it appeared in varying degrees. The last two students expressed less of a sense of being controlled

by external variables than the first two did. All, however, expressed a sense of surprise at the outcome of their grades which indicated a sense on the students' parts that they were not in control of their destinies. They all stated that they felt they had failed at least one exam.

With the exception of the last student, all noted outside factors affecting their grades such as the deletion of "bad" questions in exam scoring, and the allowance that "they" let you guess on exam questions. The first student went so far as to describe his grade outcomes as a "mystery", while the third student named "luck" as a factor in her grades.

Interview Summary

The preceding sixteen students were interviewed to determine if they perceived their life choices and their exam results to be the result of their own choices or of outside influences. They were divided into four groups. The first group was comprised of students who had scored internally on the Nowicki-Strickland Locus of Control Scale and failed one or more first term medical school exams. The second group scored in the external range on the scale and failed one or more exams. The third group scored in the internal range of the Nowicki-Strickland scale and passed

all of the exams and the fourth group scored in the external range with passing scores on all exams.

The purpose of the interviews was to confirm the internal-external locus of control which the students exhibited through the administration of the Nowicki-Strickland Scale. The students who were in the internal groups, whether passing or failing, gave indications of an internal locus of control with statements concerning their reactions to their grades, their career choices, their beliefs concerning influences on their grades. The locus of control of the external groups was also confirmed by the interviews in both the passing and the failing groups. There were variations in each group and in several groups a spectrum of internal or external responses was evident, but the basic category which each students' scores indicated was confirmed by the interviews. A second purpose of the interviews was to learn what perceptions the students had of their teaching-learning environment and what factors, if any, did influence their academic achievement.

Chapter Summary

This chapter has reported the results of research conducted with first-year medical students to determine whether relationships exist between academic achievement and locus of control. A profile of the sample has shown the

sample to be representative of the entire medical school class in age, sex, Urban Health Program participation, and ethnicity. The sample's undergraduate grade point averages and MCAT scores were also representative of the entire first year class.

All five exams were passed by 52.1% of the class with 47.9% failing one or more exams continuing a trend toward high failure rates for the school. Locus of control scores ranged from 2 to 18 out of a possible 40.

No statistical correlation was found between students' locus of control and their academic achievement as measured by first term exam scores. For the demographic variables studied, a significant correlation was found between the Asian, Pacific Islander students and locus of control. No correlation was found between previous academic achievement (as measured by MCAT scores and GPA) and locus of control.

The individual interviews conducted with students from the sample indicated a more internal locus of control for the students who scored internally on the Nowicki-Strickland Scale and a more external locus of control for those who scored in the external range regardless of their academic achievement.

In the next chapter, these results will be discussed and conclusions will be drawn. Recommendations for further study and policy decisions will be made.

CHAPTER V

SUMMARY, DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

Following a summary of the research study, this chapter provides discussion of the qualitative and quantitative results reported in Chapter IV and presents recommendations for future research and medical school policy.

Summary

This research investigates the non-cognitive variable locus of control and its relationship to academic achievement in first-term medical students. A declining applicant pool for medical school admissions necessitates consideration of variables other than the traditional ones used to predict academic success. For several decades, medical schools have had an abundance of applicants who scored highly on the MCAT and who earned high GPAs in college (Association of American Medical Colleges, 1986). As the applicant pool declines, the number of applicants with high scores and grades also declines. Medical schools can no longer choose their matriculants from a pool of students who have done so well in school that they are almost assured of continued success in medical school

(Johnson, 1983). This study examines a personality variable, locus of control, to determine if a correlation exists between it and students' achievement during the first term of medical school. At the institution studied, approximately 50% of new medical students experience difficulty passing one or more first term exams. In recent years, the percentage has been on the increase, thus raising concern among faculty over factors that may be contributing to it.

Locus of control has its theoretical foundation in Rotter's (1966) social learning theory which was developed to predict behavior such as achievement. Locus of control relates to a generalized expectancy on the part of an individual that an outcome will occur. The individual's perception of their degree of control over outcomes determines their locus of control: internal or external. Research investigating the relationship between locus of control and achievement in medical students is sparse but indicates a relationship between internality and achievement (Grover & Smith, 1981; McNair, Lorr, & Droppleman, 1971)

The research sample consisted of 144 first-year medical students out of a population of 183 students. These students were administered the Adult Nowicki-Strickland Internal-External Locus of Control Scale (Nowicki & Duke, 1974). A stratified random sample of 16 students was also identified for interviews with the researcher. This sample

was stratified by locus of control scales (internal versus external) and by passage or failure of first term exams. The purpose of the qualitative focus of the study (the 16 interviews) was to confirm the internal or external rating received by these students on the Nowicki-Strickland Scale.

Statistical tests were used to determine if a significant relationship existed between locus of control and academic achievement as measured by first-term exam results. Statistical tests were also used to investigate relationships between locus of control and selected demographic variables as well as locus of control and previous academic achievement as measured by MCAT scores and GPAs.

No significant statistical correlation was found between students' locus of control and their academic achievement as measured by first-term exam results. For the demographic variables examined, a significant correlation was found between only Asian Pacific Islanders and locus of control. No significant correlation was found between previous academic achievement (as measured by MCAT scores and GPAs) and locus of control.

DISCUSSION

Representativeness of the Sample

The sample selected (n=144) appears to be representative of the entire medical school class in age with a mean of 23.5 years as compared to 24 years. The male (67.4%) and female (32.6%) composition of the sample is representative of the two-third-to-one-third gender make-up of the classes.

Approximately 23% of the sample participate in the Urban Health Program (UHP) by virtue of being an underrepresented minority. This representation is nearly equal to the 25% of UHP students in the class as a whole.

The ethnic background of the students was also representative of the entire class with 63.9% White as compared to 61.7%, 11.8% Asian Pacific Islander as compared to 12%, 9.0% Black as compared to a slightly higher 11.5%, 9.0% Mexican-American as compared to 7.8%, and 2.8% Other Hispanic as compared to 4.9%. While there are Puerto Rican (1.7%) and Native American (.3%) ethnic backgrounds represented in the first year class, none were in the sample studied.

Those students who were members of the Illinois Agricultural Association (IAA) program represented a smaller portion of the sample (2.1%) than of the class (6%), but the

numerical differences were small enough as to be statistically insignificant.

The similarity between the sample and the class as a whole is also evident for the MCAT mean which was 9.60 for the sample and 9.71 for the class. The mean grade point average for the sample was 4.27 (on a 5.00 scale) as compared to 4.29 for the entire class.

The percentage (47.9) of students in the Urban-site class who failed one or more exams at the end of the first term was anticipated since the school had been experiencing a high rate of failures in preceding years. The failure rate for the sample is representative of the urban-site first year class which experienced a 50% failure rate. The urban-site class cannot be compared with the down-state class because the latter is on a semester schedule while the former is on a quarter system. They also have a different curriculum.

The sample studied is thus demographically representative of the first-year medical school class at this University and the results of this research can be generalized to the larger class population.

Locus of Control Scores

The student scores for the Nowicki-Strickland Locus of Control Scale ranged from 1 to 18 out of a possible range of from 1 to 40. Lower scores indicate an internal locus of control while higher scores indicate an external locus of control. The sample of medical students studied exhibited overall a more internal locus of control with a mean of 7.47 as compared to a mean of 9.06 which Nowicki and Duke (1974) reported for a sample of white college students (n=154) and a mean of 10.96 which they reported for community subjects (n=33). Although the latter sample of community subjects was derived from a small sample (n=33) and the college sample was derived from an all white group, these mean locus of control scores indicate that this sample of medical students was more internally controlled than either an undergraduate population or a community population at large. This phenomena may be a result of the life experiences which the medical students have had. They have obtained admission into a highly selective academic program and are preparing for a career which will put them in a high socio-economic group. They see that their actions (ie. study, work, attention to detail, etc.) has impacted the outcomes in their lives. Many undergraduate students may not be as self-directed, and a community group probably includes people from a wide variety of background and life styles

many of whom may not perceive a connection between their behaviors and desired outcomes. It is possible that the research results reported here do not follow those reviewed by Bar-Tal and Bar-Zohar because the majority of the studies reviewed dealt with students at lower educational levels. Perhaps people who achieve in the earlier phases of education (elementary, secondary, and college) are those who have an internal locus of control and the elimination process on the way to medical education has left only those students who have an internal locus of control.

A chi square test determined that there was no significant correlation between the students' academic achievement (as measured by the first-term exam results) and their locus of control scores. This was surprising in light of a body of research reviewed by Bar-Tal and Bar-Zohar (1977) which found internal locus of control to be positively related to academic achievement in 31 of 36 studies. They reasoned that internals who believe that their successes and failures are the result of their own behavior will exhibit more initiative and persistence in achieving academic goals. Externals who blame forces outside of their control tend not to persist and thus fail. In support of this, Procuik and Breen (1977) theorized that people who rate as internals on the internal-external scales will seek more information in order to clarify the tasks which need to be accomplished and achieve higher goals.

Using a Pearson product moment correlation, it was determined that no relationship existed between gender and locus of control in this sample. A significant difference would have been expected since prior research has linked externality and achievement for females and internality to the achievement for males (Duke & Nowicki, 1974; Messer, 1972; Rotter, 1972). Duke and Nowicki's research suggests that college-aged females were more likely than males to adopt an expressed external orientation in order to be congruent with the expected female cultural role of passivity. A female who expressed an internal locus of control orientation was reported to present a social dilemma for females generally, and females in competitive situations with males, specifically.

The sample in this study may not be exhibiting the same correlation between gender, locus of control and achievement as the above mentioned studies because the role of women has changed since the studies cited were conducted. However, while one could assume that it is much more socially acceptable for women to control their own lives and careers in 1987 than in the early 1970s, Lefcourt (1982) proposed as late as 1982 that internal control may be thought to be stereotypically masculine and females may respond to locus of control scales in accord with female role expectations. The lack of significant correlation between gender and locus of control in the current study may

be accounted for in that women whose high level of formal education and achievement have gained them access to a medical school class, have learned to take greater control over their lives in spite of lingering societal expectations regarding women's traditional roles.

No significant correlation was found between membership in the Urban Health Program (Blacks, Mexican-Americans, American Indians, Mainland Puerto Ricans, and other Hispanics) and locus of control as would have been expected from previous research conducted. In unpublished research conducted by Graves (1961) a marked difference in locus of control was discovered between ethnic groups. Graves studied an isolated triethnic community in California consisting of Ute Indians, Spanish-Americans and Whites. He found that the Utes were the most external, followed by the Spanish-Americans and then by the Whites who were the most internal leading the researcher to conclude that the lower the socio-economic status, the less control which members of a group feel over outcomes in their lives. This conclusion coincides with the Coleman report (Coleman, et al., 1966) which found that achievement in school was related to children's belief that academic outcomes were determined by the child's behavior. For some children, schools were seen as a channel of opportunity. Underprivileged minorities often saw schools as repressive, middle-class institutions in which they could exercise little control over agendas and

outcomes and consequently achieved lower than their white counterparts. The assumption that differences in locus of control exist between ethnic groups is supported by further research which finds blacks to be more external on a variety of locus of control scales including the Nowicki-Strickland (Duke & Lewis, 1979; Zytoskee, Strickland, & Watson, 1971).

As in the relationship between sex and locus of control, minority standing and locus of control may not show a significant correlation as one would expect from the literature because of the specialized population which is being studied. It seems possible that students who have succeeded within the educational system as far as acceptance to medical school probably view themselves as being much more in control of their outcomes than the general population. These students, whether minority or not, most likely view education as a channel of opportunity to which the Coleman report refers.

Very little research has addressed the relationship between age and locus of control with the exception of the development of specific scales for adults versus children. No significant relationship was found in this sample which included ages ranging from 19 to 35 years. It was anticipated that older students would exhibit a more internal locus of control than younger students. It was believed that these older students would view outcomes as being within their control especially since they had decided

to alter their careers and lifestyles in a major way by returning to school at a non-traditional age. Such a decision indicates that they believe they control the direction and outcomes of their lives as opposed to believing that factors such as family obligation, age, and societal expectations restrict their opportunities and outcomes. Conversely, an argument can be made that returning to a student status after functioning as an adult member of society could cause older students to feel that control over their environment has been given up in the training and evaluation process.

The 19 to 35 age range is a wide one for a medical school program and would appear to offer interesting data regarding differences in locus of control from younger to older students. The appearance of data regarding older students is deceptive, however, since the mean age of the sample is 23.5 indicating that the bulk of the students in the sample are in the traditional age range of early twenties.

Of the ethnic groups represented in the sample (White, Black, Mexican-American, Other Hispanic, and Asian Pacific Islander) a significant relationship was found only between the Asian Pacific Islander group and locus of control. This outcome was surprising because of previous research cited above that indicated more external locus of control for minority groups such as Blacks and American Indians.

McGinnies, Nordholm, Ward, and Bhanthumnavin (1974) found that Japanese, along with Swedish subjects, were more external than subjects tested from Australia, New Zealand, and the United States. They concluded that the Swedish and Japanese cultures are more paternalistic and view conformity to group norms as more important than autonomy. With the exception of the Asian Pacific-Islander students, it is possible that the common level of academic experience and success which made it possible for the students in the sample to attain admission to medical school may be responsible for the leveling of the locus of control scores between ethnic groups. Students who attend medical school are apparently more internally controlled than other members of their ethnic group within the general population.

The commonality of the sample's level of educational attainment may also account for the absence of a relationship between locus of control and past academic achievement as defined by MCAT scores and GPAs. No statistically significant correlation was found between these variables as was expected since a relationship does appear to exist between achievement and locus of control (Bar-Tal & Bar-Zohar, 1977; Batlis & Waters, 1973; Nord, Connelly, & Daignault, 1974; Otten, 1977; Prociuk & Breen, 1975).

Qualitative Interviews

Individual interviews of 16 randomly selected students were conducted. Students who scored above the median score of 7 on the Nowicki-Strickland Scale were labeled "external" and those who scored 7 or below were labeled "internal". The students' responses reinforced their locus of control scores from the Nowicki-Strickland Scale regardless of the students' academic achievement as measured by first-term grades. While differences in responses did exist between internal and external locus of control students, the differences were not as marked as might be expected from a community sample.

The interviews were valuable for more than verification of the locus of control data. They also served to "flesh out" the students and impress upon the interviewer the diversity of racial and socio-economic background of the students being studied. The wide spectrum of career motivations was also evident in the interviews from the student who wanted to become a medical missionary to the student whose mother wanted him to make more money than he was making at sporadic music engagements.

One of the themes which ran through all of the interviews was the vast quantity of material covered in medical school and the consequent frustration for students who has been accustomed to learning class material in depth

as undergraduates. One interviewee quoted a professor who told his class that "learning medicine was like drinking water out of a fire hose". This phenomena was referred to by Boyle and Coombs (1971) who found that students who recognize early the futility of trying to master all of the material decrease inner conflicts and stress.

Another theme which became evident during the interviews was the lack of value which the interviewees placed on class attendance. Only two students who were interviewed felt that class attendance was helpful to them. Most indicated that after a trial-and-error period, they determined that their time was much better spent in independent study using the cooperative notes taken by students and distributed from the previous year. A number of interviewees complained that some of the foreign-born professors had a poor command of the English language which caused students to stay away from classes. One student complained of attempting to attend a class for weeks only to find it canceled each time, while another said he went because he felt sorry for the professor when so few people showed up for class. It seems quite possible that a relationship may exist between classroom experiences and the high failure rate each year at the end of first term. A number of students interviewed said that they experienced difficulty with their study routine until they learned to teach themselves through independent study. It can be

argued that a system which necessitates independent learning is an excellent preparation for the medical field which requires continual personal study on the part of physicians in practice and research to remain current in their fields.

The one Asian-Pacific Islander who was interviewed scored an internal locus of control of less than 7 on the Nowicki-Strickland Scale and the majority of her responses indicated an internal locus also. She also talked of her adjustment to medical school as being largely connected to her relationship with a new boyfriend met during the first term. The importance she placed on developing a relationship with a man coincides with the "fitting in" mentality as well as with the patriarchal emphasis found by McGinnies, Nordholm, Ward, and Bhanthumnavin (1974) in their research on locus of control with Japanese subjects (ie. a woman needs to be connected to a family with a man at its head). It is not known what this student's specific ethnic background is, however, and the point needs to be made that the Asian Pacific-Islander category takes in a wide variety of cultural backgrounds and traditions.

Limitations

A limitation to this study is the self-reporting nature of the Nowicki-Strickland Locus of Control Scale. The students' responses to the Scale's questions may have

varied from what was actually believed or acted upon in everyday life. Responses may have been affected by what the student perceived to be a socially acceptable response especially since the instruments were signed.

A limitation to this study was also the relatively short length of time over which the academic achievement was measured. A longitudinal study over the entire first year or perhaps one using program completion may have provided differing data on success-failure rates.

CONCLUSIONS

The results of this study suggest that no statistically significant relationship exists between locus of control and academic achievement (first-term exam results), between locus of control and traditional predictors of academic success (MCAT and GPA), and between locus of control and age, sex, or Urban Health membership (minority status). The only significant correlation was found with the variable of ethnicity. Of the ethnic variables studied, White, Mexican-American, Other Hispanic, Black and Asian Pacific Islander, only the Asian Pacific Islander students exhibited a significantly more external locus of control score than the other groups.

As a result of these data, it does not appear that locus of control is a variable which would be of benefit in

the selection of medical students. The range into which the sample's locus of control scores fell may be the most salient result found in this study. Since the adult groups (Nowicki & Duke, 1974) studied in developing the Nowicki-Strickland Scale had higher locus of control mean scores than this sample, it suggests that medical students, by virtue of their level of achievement, may be such a homogeneous internal group to begin with that comparisons on the locus of control variable may be impossible. The homogeneity was also reflected in the personal interviews. While a range of differences between students' responses regarding who controlled their life choices and their current outcomes in medical school existed, none of the students' responses indicated an extreme lack of control over the outcomes in their lives.

The group studied is ethnically diverse and diverse in terms of age but very homogeneous in level and type of educational experience. This homogeneity may be responsible for the internal orientation which the group exhibits and the resulting lack of relationship between locus of control and any of the variables studied.

RECOMMENDATIONS

The significant relationship which was found between locus of control and the Asian Pacific Islander group of students is a finding which should be pursued further since many students in this ethnic group apply and are accepted each year to medical schools and other institutions of higher learning. They represented 11.8% of the sample with 64.7% passing all first term exams as compared to 52.1% of the sample. It would be of interest to determine if the results of their locus of control scores are a true representation of their sense of control over outcomes or if a cultural interpretation is at play which influences their scores as was found by McGinnies & Ward (1974) with Japanese subjects whose culture is paternalistic and does not value autonomy.

It is recommended that the locus of control instrument be administered to all applicants to a medical school to determine if a difference exists between those who are accepted and those who are not.

A longitudinal study investigating locus of control and achievement could be beneficial. The relationship between locus of control and academic achievement could be studied using end of year grades or perhaps medical program completion.

From the information gained through the interviews, it is recommended that the medical school investigate further the student perceptions of the classroom environment and the teaching-learning experience. Additionally, any longitudinal study should include extent of classroom attendance as a variable in examining factors affecting academic performance.

Finally, it is recommended that the exploration of non-cognitive variables such as personality characteristics measured by the Myers-Briggs Type Indicator or the Minnesota Multiphasic Personality Inventory continue. These variables may provide additional pieces to the admissions puzzle since all students accepted based on cognitive criteria do not succeed and because, as stated previously, the number of students who have high GPA and MCAT scores is declining (Medical College Admission Test, 1987).

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APPENDIX A

For efficiency, the following instrument is being administered along with the preceding materials. It constitutes a separate study and will immediately be detached. The data will be dealt with independently and confidentiality will be maintained.

CONSENT FORM

The following questionnaire is being administered as part of a research project designed to investigate motivational factors in medical students' achievement. The project will tract first quarter grades and a small sample of students may be requested to participate in interviews later in the academic year. The interviews will be on a voluntary basis. All information will be used for research purposes only and will not affect an individual's academic standing in any way.

I consent to be part of this study.

Name

Age

Date

APPENDIX B

Please circle whichever answer best describes the way you feel. There are no right or wrong answers. Don't take too much time answering any one question, but do try to answer them all.

- | | | |
|---|-----|----|
| 1. Do you believe that most problems will solve themselves if you just don't fool with them? | YES | NO |
| 2. Do you believe that you can stop yourself from catching a cold? | YES | NO |
| 3. Are some people just born lucky? | YES | NO |
| 4. Most of the time do you feel that getting good grades means a great deal to you? | YES | NO |
| 5. Are you often blamed for things that just aren't your fault? | YES | NO |
| 6. Do you believe that if somebody studies hard enough he or she can pass any subject? | YES | NO |
| 7. Do you feel that most of the time it doesn't pay to try hard because things never turn out right anyway? | YES | NO |
| 8. Do you feel that if things start out well in the morning that it's going to be a good day no matter what you do? | YES | NO |
| 9. Do you feel that most of the time parents listen to what their children have to say? | YES | NO |
| 10. Do you believe that wishing can make good things happen? | YES | NO |
| 11. When you get punished does it usually seem its for no good reason at all? | YES | NO |
| 12. Most of the time do you find it hard to change a friend's (mind) opinion? | YES | NO |
| 13. Do you think that cheering more than luck helps a team to win? | YES | NO |
| 14. Did you feel that it was nearly impossible to change your parent's mind about anything? | YES | NO |
| 15. Do you believe that parents should allow children to make most of their own decisions? | YES | NO |
| 16. Do you feel that when you do something wrong there's very little you can do to make it right? | YES | NO |
| 17. Do you believe that most people are just born good at sports? | YES | NO |
| 18. Are most of the other people your age stronger than you are? | YES | NO |
| 19. Do you feel that one of the best ways to handle most problems is just not to think about them? | YES | NO |

- | | | | |
|-----|---|-----|----|
| 20. | Do you feel that you have a lot of choice in deciding who your friends are? | YES | NO |
| 21. | If you find a four leaf clover do you believe that it might bring you good luck? | YES | NO |
| 22. | Did you often feel that whether you did your homework has much to do with what kind of grades you got? | YES | NO |
| 23. | Do you feel that when a person your age decides to hit you there's little you can do to stop him or her? | YES | NO |
| 24. | Have you ever had a good luck charm? | YES | NO |
| 25. | Do you believe that whether or not people like you depends on how you act? | YES | NO |
| 26. | Did your parents usually help if you asked them to? | YES | NO |
| 27. | Have you felt that when people were angry with you it was usually for no reason at all? | YES | NO |
| 28. | Most of the time, do you feel that you can change what might happen tomorrow by what you do today? | YES | NO |
| 29. | Do you believe that when bad things are going to happen they just are going to happen no matter what you try to do to stop them? | YES | NO |
| 30. | Do you think that people can get their own way if they just keep trying? | YES | NO |
| 31. | Most of the time do you find it useless to try to get your own way at home? | YES | NO |
| 32. | Do you feel that when good things happen they happen because of hard work? | YES | NO |
| 33. | Do you feel that when somebody your age wants to be your enemy there's little you can do to change matters? | YES | NO |
| 34. | Do you feel that it's easy to get friends to do what you want them to? | YES | NO |
| 35. | Do you usually feel that you have little to say about what you get to eat at home? | YES | NO |
| 36. | Do you feel that when someone doesn't like you there's little you can do about it? | YES | NO |
| 37. | Did you usually feel that it was almost useless to try in school because most other children were just plain smarter than you were? | YES | NO |
| 38. | Are you the kind of person who believes that planning ahead makes things turn out better? | YES | NO |
| 39. | Most of the time, do you feel that you have little to say about what your family decides to do? | YES | NO |
| 40. | Do you think it's better to be smart than to be lucky? | YES | NO |

APPENDIX C

Name:

Group:

Date:

INTERVIEW QUESTIONS

1. How did your grades come out Fall quarter?
2. How do you feel about your grades?
3. What do you think influenced your grades most?
4. How have your career and educational choices been determined? (How did you choose medicine and , or the University of Illinois?)

APPENDIX D

INTERVIEW QUESTIONS

1. How did your grades come out Fall quarter?
2. How do you feel about them.
3. What do you think influenced your grades most?
4. Could you have change the outcome of your grades in any way?
5. How have your career and educational choices been determined?
6. How did you decide to get into medicine?

APPROVAL SHEET

The dissertation submitted and approved by Barbara J. Krupps Downing has been read and approved by the following committee:

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

The dissertation is therefore accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy.

April 16, 1990
Date

Terry E. Williams
Director's Signature