



Locus of control and propensity for risk taking as related to achievement in higher education
by Margie Cassell

A thesis submitted in partial fulfillment of the requirements for the degree of Doctor of Education
Montana State University
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Abstract:

The purpose of the study was to explore the constructs of locus of control (LOC) and risk-taking propensity and to examine the relevance of these constructs to achievement in higher education. Four hundred ninety-nine students were examined on two instruments, the Rotter Focus of Control Scale and the Choice Dilemma Questionnaire (risk taking) during randomly selected courses at Eastern Montana College in Billings, Montana. Achievement was measured by GPA which was acquired from student academic records. Correlational methods and comparative analyses were utilized to test the hypotheses.

It was concluded that there was no significant multiple relationship between achievement and locus of control, risk-taking propensity, year in school, age, and family-of-origin income level. It was determined that there was a significant difference between males and females in locus of control. There were also significant differences in the means of married, single, divorced and widowed students in LOC scores.

Contrary to much of the available literature, there were no statistically significant differences in GPAs of individuals with an internal or external LOC. Females scored significantly higher on achievement than males, contrary to traditional beliefs. Males and females do not show a significant difference in risktaking propensity.

Additional research is recommended on the relationship between LOC and achievement with the relatively new Academic Locus of Control Scale (Trice, Ogden, Stevens & Booth, 1982), particularly in regard to women. Also highly recommended is additional research into academic risk taking.

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IN HIGHER EDUCATION

by

Margie Cassell

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ABSTRACT

The purpose of the study was to explore the constructs of locus of control (LOC) and risk-taking propensity and to examine the relevance of these constructs to achievement in higher education. Four hundred ninety-nine students were examined on two instruments, the Rotter Locus of Control Scale and the Choice Dilemma Questionnaire (risk taking) during randomly selected courses at Eastern Montana College in Billings, Montana. Achievement was measured by GPA which was acquired from student academic records. Correlational methods and comparative analyses were utilized to test the hypotheses.

It was concluded that there was no significant multiple relationship between achievement and locus of control, risk-taking propensity, year in school, age, and family-of-origin income level. It was determined that there was a significant difference between males and females in locus of control. There were also significant differences in the means of married, single, divorced and widowed students in LOC scores.

Contrary to much of the available literature, there were no statistically significant differences in GPAs of individuals with an internal or external LOC. Females scored significantly higher on achievement than males, contrary to traditional beliefs. Males and females do not show a significant difference in risk-taking propensity.

Additional research is recommended on the relationship between LOC and achievement with the relatively new Academic Locus of Control Scale (Trice, Ogden, Stevens & Booth, 1982), particularly in regard to women. Also highly recommended is additional research into academic risk taking.

CHAPTER 1

INTRODUCTION

In reviewing the literature on achievement, it was found that there were well over 16,000 research reports catalogued dealing with achievement. The great majority of these were concerned with intellectual variables. A similar interest in non-intellectual variables in achievement has come to the forefront in relatively recent years. Prior to the research of David McClelland and his colleagues, scholastic failure was usually attributed to a low level of intelligence. Success, on the other hand, was attributed to a high level of intelligence. The work of McClelland and his associates encouraged an interest in research into motivation of achievement. This research alerted psychologists and educators to the importance of variables, other than those related to intelligence, for the prediction of achievement (McClelland, Atkinson, Clark, & Lowell, 1953).

In *Missions of the College Curriculum* (1979), the authors pointed out that 1960 marked the beginning of a new era in education. From 1870 to 1960, the emphasis in higher education was on the production of new knowledge and new technology. The emphasis in higher education was on the increase in the gross national product and in individual personal incomes. Curriculum was oriented, at this time, to "knowledge for use" rather than culture. Beginning in 1960,

administrators and educators in institutions of higher education began to respond to a new consumerism and this consumer sovereignty resulted in significant changes in curriculum, such as more time allowed for electives, more courses presented in the arts, more courses for nonmajors, and more courses designed for personal growth. Colleges and universities responded to the expressed needs in their communities for "life-long learning." Students were beginning to be better organized and demanded direct input into curricular policy and admission standards (Carnegie Foundation, 1979).

During the decade of the 1960s, pressure continued to build from minority groups, who were under-represented in most colleges and universities. They complained that the standard criteria for admission to college were biased in favor of white traditional students. Educators were forced to consider that scholastic achievement tests and high school grade point averages, good predictors of academic success for non-minorities, may not accurately predict success for minorities. During this period, many educational institutions introduced flexible admission policies for minorities (Astin, 1982).

Research into non-intellectual variables of achievement began to expand significantly as educators recognized their importance and significance for both traditional as well as non-traditional students (Goodstein, Crites, and Heilbrun, 1963).

The Coleman report contained extensive information about the status of the educational systems and the effectiveness or ineffectiveness of education particularly

in regard to minority group members. Coleman and associates were concerned with the tremendous impact of cultural disadvantage and family background differences on achievement. They reported that differences in family background accounted for significant variation in achievement. They also found that attitudinal variables such as students' interest in school, self-concept and locus of control accounted for more of the variance in achievement than family background variables and school variables. (Coleman, Campbell, Hobson, McPharland, Mood, Weinfeld, & York, 1966)

As noted above, educators have presented much research evidence supporting the fact that many non-intellectual factors contribute to problems with achievement (Coleman et al., 1966). It is the belief of this investigator that there is a need for research which focuses on non-intellectual psychological issues that affect achievement. This paper will focus on two non-intellectual variables, i.e., locus of control and the propensity for risk-taking as each relates to achievement in higher education. It is expected that a greater understanding of variables which contribute to the success or lack of success in an academic setting will be helpful in plotting new approaches to student advising and education.

Locus of Control

Locus of control, which refers to the degree to which individuals believe that they can control their environment, is a concept which has triggered enormous interest in educators and psychologists since it was initially proposed in 1954. A

sense of personal control appears to be profoundly important to most individuals (Lefcourt, 1982).

In 1971, B. F. Skinner wrote a book, *Beyond Freedom and Dignity*, which quickly became a best seller and became a primary topic of conversation among therapists. Skinner suggested that man must relinquish his belief in freedom and self-determination. He felt that man must accept the fact that he is controlled by forces external to himself. He believed that such acceptance would cause mankind to become more responsive to those forces which control them. Thus the world would be a more orderly environment. He suggested that the determination of behavior must shift from autonomous man to the environment, most certainly to save the environment and the evolution of the species. He speculated that, by accepting that we are controlled by external factors, most men would become altruistic and pleasant with each other (Skinner, 1971).

Skinner stated that the "literature of freedom" has branded all control as wrong and has misrepresented many advantages to be gained from a socially controlled environment. Therefore, people are unprepared for the next step, which is not to free men from control but to analyze and change the kinds of control to which they are exposed (Skinner, 1971).

These ideas alarmed many psychologists who believed that vagaries in personal experiences produce creative individuals. Many psychologists believe that it is essential to have freedom to become self-actualized (Lefcourt, 1982).

While Skinner felt that the chance elements of childhood produce psychotic and deviant individuals, many psychologists, such as Carl Rogers, believed that a world without freedom would have the effect of squelching creative individuals. Rogers felt that the salvation of the world, with its fragile environment, was the process of creativity which would lead to scientific development and adaptations to the environment. He felt strongly that psychological freedom is essential to foster creativity (Rogers, 1961).

In 1962, Rogers debated with Skinner at a conference. The transcripts of that meeting were not published until 1989. Rogers stated very strongly at this conference that, "to the extent that a behavioristic point of view in psychology is leading us toward a disregard of the person, toward treating persons primarily as manipulable objects, toward control of the person by shaping his behavior without his participant choice, or toward minimizing the significance of the subjective--to that extent I question it very deeply." He continued to state in the strongest of terms that behaviorism would take man down a pathway with destructive consequences (Kirschenbaum & Henderson, 1989).

Lefcourt agreed with Rogers. He suggested that the very surrender of the belief in free will is a source of increased prosocial violence. He said that man can only perceive himself as the master of his own fate if he can become comfortable with himself in the world. He cautioned, however, that the encouragement of individuality and privacy may also encourage more loneliness and discontent among the less privileged resulting in more antisocial criminality. Man must, he said,

become more competent in helping these least privileged individuals in order to avoid losing our personal freedom (Lefcourt, 1982).

Coleman and associates attempted to examine the degree to which children feel in control of their environment. They found that black Americans and other minority group members show a much lower sense of control of their environment than do whites. Particularly in metropolitan areas, about twice the proportion of blacks than whites give responses indicative of feelings of low control. This is also true of other minority group members, most significantly among the Puerto Ricans, and least so of Oriental Americans (Coleman et al., 1966).

The construct of locus of control may be conceptualized as a continuum ranging from internal to external control. An internal locus of control refers to the expectancy that an individual is in control or instrumental in obtaining rewards from his/her environment. An external locus of control refers to the expectancy that rewards or failures are determined by chance, luck, fate, etc. (Massari & Rosenblum, 1972).

There is a logical assumption that internal locus of control may be related to achievement in higher education. This expectation stems from the assumption that if a person believes his successes and failures are the result of his own behaviors, he is more likely to exhibit more initiative and persistence in the classroom, thus acquiring knowledge and greater problem solving skills.

Numerous investigators have attempted to verify this assumption. The studies do not always provide consistent results, but there is an obvious trend in the

literature with indications that the perception of locus of control is related to academic achievement, particularly for children. The relationship is not nearly so clear or so consistent for adults, including college students.

It is particularly in the area of sex differences that additional research seems to be important. In the relationship between locus of control and achievement for women, the research is conflicting. For example, Nowicki and Walker (1973) and Duke and Nowicki (1974) found that externality, rather than internality, was associated with achievement for females, defined by grade point averages, but internality was associated with achievement in males. The literature poses interesting related assumptions about the fear of success among females, i.e., that there has not been a significant change in the feelings many women continue to have that it is not feminine to demonstrate success (Chandler, Shama, & Wolf, 1982; Olson, 1988).

Gordon (1977) found that with male children locus of control was related to grade point average but not to achievement test scores. The reverse was true of females, that the locus of control was related to achievement test scores, but not to grade point average. It may be possible that grade point average is a more conflict-ridden index of achievement activity than is an achievement test.

In the research on locus of control and achievement, there has been a trend toward using interactionist models. Researchers want to know when and under what conditions locus of control may offer predictions of academic success (Wright & DuCette, 1976).

Risk Taking

Risk is defined in the Oxford English Dictionary as: "to expose to the chance of injury or loss." References to a concept of risk date back to the seventeenth century. In order to qualify as risk-taking, it is necessary for there to be a potential loss (or injury). Second, there must be a chance of loss. A certain loss is not considered a risk. Also, "to expose" means that action may be taken that can increase or decrease the chance of loss. Risk, therefore, suggests the availability of a choice (MacCrimmon, Wehrung, & Stanbury, 1986)

The concept of risk taking may be applicable to most human action whenever the consequences are uncertain. Risk taking may be viewed as a selection of one alternative among many in which the choice of one alternative may leave an individual in a decidedly worse position than if he/she had selected otherwise or decided not to decide (Carney, 1971).

Mathematicians have long been interested in risk-taking. The interest demonstrated by psychologists in risk taking issues has been relatively recent. Even so, there seems to be limited research in the field.

There are two terms that are significant to the field and will be referred to occasionally in Chapter 2: expected value and expected utility.

Expected value may be defined as the average net gain or loss of each possible outcome. This is a mathematical concept.

Expected utility is a psychological concept and means the subjective value of any experience, object, quality. For example, if one needed to make an emergency phone call and needed a quarter to make the call, but only had a dollar bill, one would be willing to pay one dollar for a quarter. In this case, one has more utility for a quarter than for a dollar.

Obviously, most people do not gamble or risk according to a mathematical formula because humans have their subjective ideas of probabilities. Most people who gamble realize that the expected value in most gambling situations is very low. Many continue to gamble, however, and this is the point at which the social scientists become interested, for such individuals seem to gamble for less than logical reasons (Carney, 1971).

On the surface it would appear that the distinction between luck and merit seems clear. Luck may be a fortuitous event and is seen as uncontrollable. When skill is involved, there may be a causal link between behavior and outcome.

Psychologically, the distinction between chance and skill may be blurred for many people. These people respond to chance events as if they are subject to control (Langer, 1983).

Feather (1969) demonstrated that if a person expects to be successful, and is, then he/she begins to attribute the success to his/her ability. However, if that person fails, then the failure may readily be attributed to bad luck.

It may be that the need for mastery, or skill, motivates individuals to perceive all events as potentially controllable. Ellen Langer, in 1983, presented a

model which she called the "illusion of control." This model suggested that the more a situation is perceived by the individual as requiring skills, the more the individual will develop a perception of an illusory control in regard to it. Different factors contribute to this illusion of control, such as familiarity with the task, personal involvement, a positive sequence of results, etc.

Some interesting research by Kogan and Wallach in 1964 suggested that people are more likely to be moderately risky when they feel that skill is involved. When just chance is involved, individuals become much more risky or much more conservative (Kogan & Wallach, 1964).

In the early 1960s, there was considerable research into individual differences in risk-taking as related to achievement motivation. J. W. Atkinson in 1958 and 1964 explored the relationship between achievement motivation and preference for risk (Atkinson, 1964). Atkinson stated that individual differences in the strength of achievement-related motives influence behavior in situations which are competitive. His theoretical model involves six variables: the subjective probability (expectancy) of success (P_s), the subjective probability of failure (P_f), the incentive value of success (I_s), the incentive value of avoiding failure ($-I_f$), the achievement motive (M_s), and the motive to avoid failure (M_f). The subjective probabilities refer to expectancies aroused in situations concerning the probability of outcomes or consequences of certain acts or behaviors. Positive incentives refer to possible rewards and goals, and negative incentives refer to possible

punishments. Motives may be described as dispositions to approach classes of possible incentives or, of course, to avoid classes of negative incentives.

Atkinson suggested that the attractiveness of success may be positively related to the difficulty of the task. Also, the unattractiveness of failure may be negatively related to difficulty, holding the type of activity constant. He suggested that the degree of difficulty can be inferred from the subjective probability of success (P_s). When an individual finds a task difficult, his subjective probability of success (P_s) is very low. When an individual finds a task easy, his subjective probability of success (P_s) is very high. Thus one can make assumptions about the incentive values of success or failure. Assume that the incentive value of success (I_s) is a positive linear function of difficulty. The value $(1-P_s)$ can represent I_s , the incentive value of success. When P_s is high, as with an easy task, I_s is low. When P_s is low, as with a difficult task, I_s is high. One can say that the negative incentive value of failure (I_f) can be taken as $(-P_s)$. Obviously, when P_s is high, as with a very easy task, the sense of humiliation accompanying failure is great, for example, $(-.90)$. Conversely, when P_s is low, with a very difficult task, there may be little humiliation in failing, for example, $(-.10)$. In other words, the negative incentive value of failure is a negative linear function of difficulty.

The above variables may be combined multiplicatively:

$$\text{Resultant Motivation} = (M_s \times P_s \times I_s) + (M_f \times P_f \times -1).$$

Atkinson demonstrated with experiments that predictions may be made from this model concerning the effects of individual differences in the strength of

achievement motive and motive to avoid failure, on both level of performance and risk-taking (Atkinson, 1957).

Atkinson believed that whether the motive to achieve or the motive to avoid failure is stronger, a person's performance level should be the greatest when there is uncertainty about the outcome or the result. He stated that individuals in whom the achievement motive is stronger than the motive to avoid failure would prefer intermediate risk, while those for whom the motive to avoid failure is stronger than the motive to achieve success would prefer either very easy and safe tasks or extremely difficult tasks. He believed that an individual with a strong motivation to avoid failure will prefer to succeed with the safe task than risk failure with a very speculative task. In other words, a very difficult task will explain failure and thus the individual can avoid humiliation.

Charlotte Gilson in 1968 conducted research for the Office of Naval Research on individual differences in risk taking. She demonstrated that high-achievers preferred intermediate risks. The low-achievers' risk preferences were strongly affected by the risk-taking situation. When tested individually, they preferred small risks. When tested in groups they preferred large risks. The high-achievers, however, individually preferred larger or greater risks and as a group preferred smaller risks than the low-achievers. The effect of reward on the risk-taking behaviors of subjects was not clear, but it appeared that when a reward was offered for success, the low-achievers did not take quite as extreme risks as they did when no reward was offered. Gilson offered only partial support for

Atkinson's theory. In Gilson's study there was no evidence that the low-achievers avoided the humiliation of failure by choosing the other extreme as Atkinson had suggested. She admitted, however, that the conditions under which testing took place had differed from the conditions in Atkinson's study. She felt that the differences may have been partly attributed to the effect of grouping and the effect of reward.

Relatively few studies have been conducted about the relationship of risk taking to locus of control. In several studies, individuals with internal and external locus of control have been observed responding to gambling tasks. The results have been conflicting. This research will be reviewed in Chapter 2.

Purpose of the Study

The purpose of the study is to explore the constructs of locus of control and risk-taking propensity and to examine the relevance of these constructs to achievement in higher education.

General Questions to be Answered

1. Is there a significant multiple relationship between achievement, locus of control, risk-taking propensity, year in school, age, and family-of-origin income level?
2. Is there a statistically significant interaction between gender and ethnicity on locus of control?

- (a) Is there a statistically significant difference between means of male and female participants?
 - (b) Is there a statistically significant difference in means of five ethnic groups?
3. Is there a statistically significant interaction between risk-taking propensity and marital status on locus of control?
- (a) Is there a statistically significant difference in means for high or low risk-taking propensity?
 - (b) Is there a statistically significant difference in means for marital status?
4. Is there a statistically significant interaction between gender and ethnicity on achievement in higher education as measured by grade point average (GPA).
- (a) Is there a statistically significant difference between means of male and female participants?
 - (b) Is there a statistically significant difference in means of the five ethnic groups?
5. Is there a statistically significant interaction between marital status and choice of helping services (Y or N) on achievement in higher education as measured by GPA.
- (a) Is there a statistically significant difference between means of choice of helping services (Y or N)?

- (b) Is there a statistically significant difference between means for marital status?
6. Is there a statistically significant interaction between locus of control and choice of helping services (Y or N) on achievement in higher education as measured by GPA?
- (a) Is there a statistically significant difference between means of internal and external locus of control?
 - (b) Is there a statistically significant difference between means of choice of helping services (Y or N)?
7. Is there a statistically significant difference between mean scores of students who choose the helping services as a major course of study and students who choose other majors in terms of propensity for risk-taking?
8. Is there a statistically significant difference between males and females in propensity for risk?
9. Is there a statistically significant difference among mean GPA scores of the three categories of propensity for risk.

General Procedures

The investigator completed a request to do research on human subjects at Eastern Montana College. It was reviewed by the Human Subjects Research Committee of the institution. Dr. John Dodd was the faculty sponsor at Eastern Montana College. Once approved, the following procedures were implemented.

Seven hundred students were selected from different courses randomly selected in various departments at Eastern Montana College. Departments utilized included Psychology, Institute for Habilitative Services (includes Special Education), Education, Science, Sociology, Mathematics, and Business.

Students were asked to complete the Rotter Locus of Control test and the Choice Dilemmas Questionnaire. These students also completed a consent form giving consent to participate in the study, a GPA release form to grant permission to obtain GPAs from the registrar's office, and a survey for demographic information.

This study is passive-observational in nature. Hypothesis 1 required correlational methods and multiple regression was utilized (multiple correlation coefficient squared, R^2). The remaining hypotheses required comparative analysis. Factorial analysis of variance was the statistical method utilized to analyze the independent and interactive effects of two or more independent variables on the dependent variable. The t-test for differences in means was utilized in several hypotheses.

The Statistical Package for the Social Sciences (SPSS) was utilized in the computer center at Eastern Montana College to compute the statistical procedures.

Limitations

The study may have had several limitations. The data for this study were gathered in one particular year and are therefore limited to those circumstances. There were factors for which no control was attempted, such as the physical facilities and the time of day during which tests were administered.

The findings of this study were limited by the reliability and validity of the Rotter I-E scale and the Choice Dilemmas Questionnaire.

Definition of Terms

Academic achievement: Educational outcomes as demonstrated by the cumulative GPA.

Class standing: Freshman: 0 - 29 hrs; Sophomore: 30 - 59 hrs; Junior: 60 - 89 hrs; Senior: 90 and up.

Graduate status: Graduated from a four-year college and accepted as a graduate student.

Expected value: Average net gain or loss of each possible outcome.

Expected utility: The subjective value.

External locus of control: A belief that reinforcements are controlled by external forces such as luck, chance, fate, or powerful others.

Family-of-origin income level: The income level of family of origination (usually parents).

Freedom of movement: The mean expectancy of obtaining positive satisfactions as a consequence of related behaviors which are directed toward the accomplishment of reinforcements.

GPA: Cumulative grade point average. It is computed by dividing the total cumulative grade points earned by the total credits attempted for courses taken. Grade points are calculated by multiplying the number of credits by the numeric value of the grade in each course. Then the sum of the grade points are divided by the total credits attempted (Montana State University registrar).

Helping services curriculum: Generally regarded as psychology, social work, counseling (school or rehabilitation).

Illusion of control: The more a situation is perceived by an individual to require skill, the more an individual will develop a perception of an illusory control to it.

Internal locus of control: An individual's belief that reinforcements are contingent upon his/her ability and effort, rather than fate or chance.

Locus of control: The generalized expectancy for internal or external control of reinforcements.

Motive: A strong affective association, characterized by an anticipatory goal reaction and based on past association of certain cues with pleasure or pain (McClelland, 1955).

Minorities: People described as American Indian, Alaskan natives, Asians, black, and Hispanics.

Reinforcement: Positive or negative outcome in response to behavior, usually offered to encourage or discourage repetition of behaviors.

Risk taking: To expose to the chance of risk or loss.

Self-actualized: The process of achieving one's greatest potential.

Social learning theory: A school of psychology, the basis of which suggests that a reinforcement acts to strengthen an expectation that a particular behavior will be followed by that reinforcement (Rotter, 1966).

Subjective probabilities: Personal estimates of probability not based on fact.

CHAPTER 2

REVIEW OF THE LITERATURE

Introduction

The prediction of academic success in institutions of higher learning has been a perpetual problem for educators and psychologists. It is clear that tests of aptitude or intelligence have long been seen as good predictors of academic success, at least for the traditional student. However, Goodstein and Heilbrun (1962) reported that such aptitude measures account for less than half of the variance in academic performance.

Goodstein and Heilbrun (1962) noted that interest in non-intellectual factors, especially personality variables, was developing in the educational community in the early sixties. They suggested that these non-intellectual variables may be an additional relevant source of variance in the prediction of academic achievement. They used the Edwards Personal Preference Schedule on 357 undergraduates, with the variance attributable to a brief test of scholastic ability partialled out. They concluded that personality factors are significantly related to academic achievement when the influence of ability or intelligence is statistically removed. They cautioned that the nature of the relationships depended upon the

general ability level of the group being studied. They expressed concern with other studies in which levels of ability are ignored as a variable, which causes the true relationships between personality factors and achievement to be concealed. In their research, endurance is significantly ($r = .48$) related to achievement in the middle ability male subgroup. In the high ability subgroup, however, endurance is insignificantly negatively correlated with achievement. Abasement, while negatively correlated with achievement in the low ability female subgroup, is positively (minimally) correlated in the middle and high ability female subgroups. Goodstein and Heilbrun concluded that the success in college of relatively bright and dull males may be more determined by intellectual factors than with average ability males where intellectual factors are less predictive of success and where personality factors are the more important determiners of actual academic success and failure.

One year later Goodstein and Heilbrun continued research in this vital area. They designed a study to determine if nonintellectual variables operate to either facilitate or interfere with efficient use of academic ability. They concluded that college achievement, measured by GPA, consists of several general variance components: intellectual (35%), non-intellectual (15%), unknown (40%), and error and other (10%). They stated that almost one-half of the total variance cannot be predicted from intellectual and non-intellectual variables, or by errors in measurement. Goodstein and Heilbrun concluded that personality factors do appear to make a significant contribution to the prediction of academic achievement, beyond that which can be attributed to aptitude. They added,

however, that no consistent pattern of personality factors may clearly be associated with academic success. They stated that the Minnesota Multiphasic Inventory (MMPI), which they used in this configural and within-levels method of analysis, may not have been the appropriate instrument to use. They pointed out, again, that the Edwards Personal Preference Schedule is a better predictor of academic achievement in the middle range of ability (Goodstein & Heilbrun, 1963).

Hoyt and Norman (1954) and Drake (1962), however, both used the MMPI in their research of personality variables relating to achievement and concluded that maladjustment does significantly affect college achievement, producing both under- and over-achievement.

John Holland, in 1959, designed a study to demonstrate the usefulness of the California Psychological Inventory (CPI) and the Scholastic Aptitude Test (SAT), both separately and in combination, as predictors of scholastic achievement in high ability students. He found that the CPI and SAT are useful in predicting freshman grades in a high ability group of high school seniors. He stated that multiple regression equations for the CPI and SAT in combination cross-validate, and result in multiple R s two to three times as great as zero-order r 's for the SAT alone. He found that the CPI may generally be more effective than the SAT in the prediction of achievement, at least with this high functioning population (Holland, 1959).

In 1960, Fishman and Pasanella reviewed admission selection studies. In regard to non-intellectual variables, they reported that, in 26 studies, the correlation between psychological variables and intellectual criteria, on the average, was .22

(range of .01 to .62). Study-habits tests correlated between .26 and .66 with freshman grades in college. They also reported that correlations with college grades and biographical information ranged from .01 to .63 (Fishman & Pasanella, 1960).

In 1965, Bloom and associates conducted an extensive survey of the literature and concluded that in the majority of studies concerning the relationship between home background and academic performance, this relationship resulted in significant correlations (.30 to .50) (Bloom, Davis & Hess, 1965).

In 1989, Kanoy and Latta designed a study in which they used the traditional predictors of college performance, that is, SAT scores and high school GPA, along with cognitive and psychological variables, i.e., cognitive complexity, locus of control, academic self concept and effort, to predict the GPA of college women in their freshman year. They believed that their study revealed important information for college administrators involved with admission policies, at least in regard to women. They pointed out that not one traditional predictor of successful academic performance predicted the GPA of the lower-achieving students. For the higher-achieving students, the high school GPA and the SAT significantly predicted success and predicted 56% of the variance in GPA. In the lower-achieving group, two psychological variables, the internal locus of control and amount of effort applied accounted for 46% of the variance in GPA (Kanoy & Latta, 1989).

Gender Differences in Achievement

Mickelson (1989) reports that female underachievement is a myth. He reports that women are certainly matching men in academic achievement, and in many areas are surpassing men. More girls than boys graduate from high school and more women than men graduate with a baccalaureate degree. Specialization continues to differ: there are more women in the social sciences and humanities and, consistent with tradition, men may excel in mathematics and the sciences. This seems to be slowly changing too.

Duckwall, Arnold, and Hayes in 1990 found no significant gender differences in learning styles and success. Robertson (1991), however, found that women experience more slowing in academic progress than men, probably as a function of more diverse role demands experienced by women than men. Again, non-intellectual variables may be more of an issue in the prediction of academic success than intellectual variables, at least in regard to women.

The remainder of this chapter deals with locus of control and propensity for risk taking as they relate to achievement.

Locus of Control

Rotter, in 1954, initially introduced the concept of locus of control. This concept is based upon social learning theory. In social learning theory, a reinforcement acts to strengthen an expectation that a particular behavior will be

followed by that reinforcement. If the expected reinforcement does not follow, the expectation will subsequently be reduced. Obviously, when a reinforcement does not appear to be contingent upon an individual's behavior, the expectancy that the reinforcement will follow upon completion of the behavior will be reduced.

Individuals may differ in the degree to which they attribute reinforcements to their activities, considering the variances of experiences (Rotter, 1954).

Rotter suggested that individuals, once they recognized the causal relationship of behavior and reinforcement, begin to generalize from this belief so that it may affect a variety of behavioral choices in many different but similar situations. Generalized expectancies will assist in the determination of behavioral choices along with the value of potential reinforcements. Characteristic differences in behavior will result from these generalized expectancies in situations which may culturally be categorized as chance versus skill determined (Rotter, 1966).

Rotter offered a general formula which easily explains his theory: $NP = f(FM \& NV)$. Need potential (NP) is a function of the expectancy that these behaviors will lead to these reinforcements (freedom of movement) and, or plus, the strength or value of these reinforcements (need value). An understanding of the freedom of movement concept is essential in understanding the development of the locus of control construct in social learning theory (Rotter, 1954; Lefcourt, 1982).

Rotter defined freedom of movement as "the mean expectancy of obtaining positive satisfactions as a result of a set of related behaviors directed toward the

accomplishment of a group of functionally related reinforcements." If a person has a high expectancy of failure or an aversive experience as a result of his behavior, his freedom of movement is low. Conversely, if he has a high expectancy of success as a result of his behavior, his freedom of movement is high (Rotter, 1954).

Essentially, freedom of movement is a generalized expectancy of success which results from one's ability to remember a lifetime of specific expectancy-behavior-outcome sequences (Lefcourt, 1982).

Perceived control may be defined as a generalized expectancy for internal as opposed to external control of reinforcements. Freedom of movement concerns the likelihood of success; however, the generalized expectancy of internal versus external control of reinforcement involves an analysis of success and failure in terms of causation (Rotter, 1954).

It is important to note that it is the interpretation of the cause of success and failure that is pertinent to the generalized expectancy of internal versus external control. It is one's belief about how rewards are determined that provide a contribution along with freedom of movement and need value to the prediction of goal-directed activity (Rotter, 1954).

Locus of Control and Cognitive Functioning

Information Assimilation

Lefcourt suggested that locus of control may be a correlate of the kinds of cognitive activity that facilitate the perception of and maintenance of personal causation. He felt that individuals with an internal locus of control would be open to self-examination and nondefensive and would readily assimilate information about themselves. He believed that individuals described as internal would be more cautious and calculating about their choices and personal involvements than external individuals. He stated that self-direction in internals should entail more active cognitive processing of information in regard to the attainment of valued goals (Lefcourt, 1982).

In 1962, Seeman and Evans conducted the first study which linked locus of control and cognitive activity. Using a 12-item "alienation" scale, derived from Rotter's I-E scale, they attempted to predict the knowledge that tuberculosis patients had about their own disease processes. They used a 20-item knowledge test and a staff survey in which staff were asked to estimate their patient's knowledge about tuberculosis to determine that their prediction that high alienation and poor learning are associated. Alienation, in this instance, is described as a sense of powerlessness. Internals were rated as significantly more knowledgeable than externals (Seeman & Evans, 1962).

The research suggested that internals avail themselves of information, even with negative implications, because they believe that they may be able to act in their own behalf. Externals may more readily accept their state of dependency on their care-givers and thus have less need for information. In addition, the unalienated group (internals) were happier with highly controlled wards. The externals appeared to prefer the less controlled wards. The researchers suggested that the internals may see the relationship between an orderly and controlled hospital setting and the intended outcome of successful treatment (Seeman & Evans, 1962).

In 1963, Seeman conducted research in a reformatory in which he demonstrated that the learning of information relevant to correctional matters is dependent upon the inmates' degree of alienation. He again demonstrated that the inmates' expectancies for control governed their subsequent attention to, and retention of, information (Seeman, 1963).

Phares, in 1968, conducted research to determine if internals are more effective in the utilization of information. In terms of retention of information, there appeared to be little difference between internals and externals in the equivalent amount of information retained. However, it was found that there was a significant difference in the correctness of items recalled. Phares concluded that internals may better utilize information. Phares pointed out that the results of his study further indicated that an internal orientation results in behaviors which permit individuals to cope with reality effectively (Phares, 1968).

Davis and Phares (1967) also produced findings that internals, to a greater extent than externals, engage in behaviors which will yield more information. They stated that internals have more knowledge which is important for later outcomes, remember more of this information and actively seek information that will be useful in the future.

Pines and Julian (1972) conducted similar research. They explored the hypothesis that internals and externals are oriented differently in a performance situation. They suggested that internals would be more responsive to task or informational demands and externals would be more responsive to social or experimenter demands. As predicted, internals were more concerned by the task difficulty manipulation, while externals were more concerned by the social evaluation and experimenter demands. They suggested that although internals and externals may be equally concerned about performance outcomes, they apparently adopt different performance strategies dependent upon where they believe the locus of control does exist.

Lefcourt (1982) suggested that internals may have better assimilation and use of information than externals and therefore may be more apt to recognize the pertinence of information. They may be more certain of their purposes and values than are externals.

This is supported by the research of John Paul McKinney, who found that subjects with internal locus of control scored higher on both value clarity and value relevance than externals (McKinney, 1975).

In 1989, Hollenbeck, Williams, and Klein found, in related research, that the commitment to difficult goals is negatively related to externality. This is consistent with Lefcourt's position that internals are more certain of their purposes and values than are externals (Lefcourt, 1982).

Attention and Decision Making

Another aspect of cognitive functioning which is relevant to achievement is the ability to attend and concentrate. Extremely limited research has been conducted in this area.

In research conducted in 1986, the Intellectual Achievement Responsibility Scale, one of the first tests of internal-external locus of control, was used to determine that externals demonstrated decreased persistence to attend in the face of challenge. Using an attentional task, called the Span of Apprehension, both groups, internals and externals, demonstrated equivalent attentional functioning on the initial assessment. However, subsequent assessments indicated a variable diffused attention in externals, while internals demonstrated a trend toward improved focused attention in assessments (Soraci, Leggett, Dweck, & Valk, 1986).

One study by Rotter and Mulry (1965) demonstrated that internals better attend to and take longer to make a decision on a task that is defined as skill controlled rather than chance controlled.

Julian and Katz reported the results of their research which replicated, to some degree, the study by Rotter and Mulry. They found that as the difficulty of

decision making increased, internals needed more time to make decisions.

Externals, on the other hand, did not vary as much. They acted as if there were no differences between simple and difficult choices (Julian & Katz, 1968).

Lefcourt, Lewis, and Silverman prepared another design to further test these concepts. In their research, the investigators used the Level of Aspiration Board and attempted to alter the subjects' expectancies in regard to the skill or chance nature of the required tasks. The investigators found that internals did accept the investigator's instructions with less resistance than externals. The internals appeared to be biased toward accepting the directions referring to skill and rejected the directions referring to chance. Internals, perceiving the tasks as skill determined, spent more time in decision making and demonstrated greater ability to attend and concentrate than did internals who believed tasks to be chance determined. Again the reverse tended to be true of externals (Lefcourt, Lewis, & Silverman, 1968).

Also concerned with decision making, Wheeler and Davis (1979) conducted research which demonstrated that students with an internal locus of control showed greater difficulty arriving at decisions when those decisions had serious consequences for someone else than did externals.

In 1973, several investigators conducted research pertaining to time utilization (in decision making). They reasoned that internals may use specific test-taking strategies that result in obtaining higher achievement scores than externals may achieve. They believed that their research would demonstrate that

internals would spend less time on easy items and more time on difficult items, as opposed to externals who may not differentiate between item difficulty in their time utilization. Results did support this hypothesis (Gonzali, Cleary, Walster, & Gonzali, 1973).

Lefcourt summarized the research. He reported that internals' attentiveness, concern, and interest varied in response to the types of situations with which they were confronted. Internals were much more deliberate if the decision was important than were externals. It was found that externals may not draw such sharp distinctions about presented tasks. When instructions did seem to affect the externals, it was the chance-determined tasks that captured greater attention and deliberation (Lefcourt, 1982).

Perceptual Sensitivity

Perceptual sensitivity is another area of interest in regard to the internal-external construct. Wolk and DuCette in 1974 concluded in two investigations that internals were more perceptually sensitive as they were shown to obtain higher levels of incidental learning. Such learning was interpreted as the product of a more attentive and organizing cognitive system. Most interesting was their finding that when researchers clearly instructed the subjects in the need to attend for particular important items, externals, like internals, showed a positive relationship between intentional and incidental learning. Internals showed no changes after clarifying information was offered. It appeared, reported the

investigators, that the external did not make full use of his/her "attentional system" until stimuli were made prominent. For the internal, however, such explication appeared to be redundant (Wolk & Ducette, 1974). Other investigators found that internals benefited from "self-discovered" feedback (intrinsic reinforcement) during tasks, but not externals. Externals, on the other hand, improved when the experimenter offered verbal feedback (extrinsic reinforcement) during the task. When extrinsic reinforcement was offered, the performance of externals was superior to that of internals (Baron & Ganz, 1972).

Lefcourt (1967) conducted research on cue explication. He assumed that externals suffer from the inability to recognize cues that might help them be successful in task performance and that they are more suggestible and conforming than internals. In his research he demonstrated that externals could behave like internals if the experimenter explicitly explained the meaning of the tasks. The internals, again, did not change their behavior with cue explication.

This research has specific implications for educational settings. This will be discussed in Chapter 5.

Measures of Locus of Control

There are a number of different locus of control (LOC) scales presently in use. For adults, the Internal-External Rotter's scale (Rotter, 1966) may be the most widely used today. The James Scale of Internal-External Control, the

Nowicki-Strickland Personal Reaction Survey, and the Levenson's Internal Scale, have also been used for adults (Bar-Tal & Bar-Zohar, 1977).

In regard to children, Bailer's Locus of Control Scale, the Intellectual Achievement Responsibility Questionnaire, and the Nowicki-Strickland Internal-External Control Scale have been extensively used. In addition, a number of other scales, Gruen, Korte, Stephens, the Children Locus of Control Scale of Cromwell, and the Children's Picture Test of Internal-External Control, have also been used with children (Bar-Tal & Bar-Zohar, 1977).

A new locus of control scale was developed in 1985, called the Academic Locus of Control (ALC) Scale. While the use of this scale appears to be very limited, it may warrant further usage. Three studies have been recorded using this scale. In these studies, significant correlations between ALC scores and variables such as class participation, study time and homework were found (Trice, Ogden, Stevens, & Booth, 1987).

Achievement in Children

The first investigations of locus of control were conducted on children using the Intellectual Achievement Responsibility Questionnaire (IAR). This was conducted in 1962 by Crandall, Katkovsky, and Preston. They evaluated the relationships between early-grade-school children's achievement motivations and attitudes and their performances in intellectual achievement situations. They found that the IAR was strongly related to time spent in intellectual free-play activities

among the boys. For girls this was not the case. In regard to performance on intelligence and achievement tests, similar patterns were obtained, i.e. that the IAR was significantly related to these tests for boys, but totally unrelated for girls. However, the importance that children placed on intellectual competence was predictive for the girls' but not the boys' intellectual achievement free-play behaviors. The boys expectations of intellectual successes were positively related to their intellectual achievement efforts, but the expectations of the girls were not significantly related to their intellectual efforts (Crandall, Katkovsky & Preston, 1962).

Nowicki and Roundtree in 1971 assessed whether school achievement, popularity, involvement in extracurricular activities, and intelligence are related to locus of control (LOC) in a secondary school-age population. They utilized the Nowicki-Strickland scale of generalized expectancy of locus of control. They found that locus of control was related to achievement for males, but not for females. They found that extracurricular activities were positively related to LOC in females. Popularity was not related to LOC and neither was intelligence. In fact, intelligence tended to be higher for external males (Nowicki & Roundtree, 1971).

Nowicki and Strickland, in presenting their new LOC scale for children, reported that LOC scores were related to achievement in males. Of the females, only 5th and 7th grade girls' scores related to achievement. Scores were not related to social desirability or intelligence test scores (Nowicki & Strickland, 1973).

In 1977, Donald Gordon reported on his research with children. He found that an internal LOC orientation was significantly related to greater academic achievement and high self-esteem. Males LOC scores were related to grade point averages and not achievement test scores, while the reverse held true for females (Gordon, 1977):

In an interesting comparison of Hungarian and American children, it was found that they did not differ significantly in locus of control orientation, nor did they differ in their relationship of achievement to LOC. The only inconsistency was that LOC orientation was a more powerful predictor of academic performance of the Hungarian females than for the American females. The authors speculated that this may involve a social desirability factor. It may be that academic achievement is sufficiently valued in Hungary that there may be no need for girls to be "embarrassed" about achievement (Rupp & Nowicki, 1978).

Of all the other studies reviewed by this investigator in regard to LOC in children as related to achievement, the findings were consistent, i.e, that locus of control is positively and significantly related to achievement, particularly in boys. The findings are inconsistent in girls. In one study, however, it was found that there was an absence of a significant relationship between LOC and measures of scholastic achievement (Milgram, 1971).

Achievement in College-Age Subjects

Generally the reviews concerning the prediction of academic achievement in college students from the LOC scales have been much more confusing and indefinite than with children.

Massari and Rosenblum (1972) found a negative relationship between internal perception and academic achievement in college students. They found that internality was positively related to a trusting attitude and not related to intelligence.

In other studies, such as Eisenman and Platt (1968), Gonzali et al. (1973), and Prociuk and Breen (1973), no significant relationships were found between LOC and achievement. Likewise, Hjelle in 1970 found no difference between internals and externals in a comparison of their cumulative grade point averages.

Others, however, have reported significantly positive relationships between LOC and achievement in a college setting. For example, Allen, Giat, and Cherney (1974) found a positive correlation between success on a test and internal LOC. Also, Boor (1973) found that for males, success in a psychology course correlated with internal LOC, although the correlation was somewhat lowered when IQ was partialled out. There was no significant correlation for females, however. Foster and Gade (1973) found that internals had higher GPAs than externals. Nord, Connelly, and Daignault (1974) also found a significant correlation between internal-external scores and GPA. Prociuk and Breen (1974) in their second

experiment, changed from the Rotter Scale to the Levenson Scale, and found that LOC correlated with GPA for males and females.

In a recent study, Moody and Gifford (1987) demonstrated that there was no significant relationship between an internal locus of control and achievement in chemistry. External males scored higher in achievement than did internal males. The interaction for females was not significant. However, the results indicated that internal females scored higher than external females.

Gender Differences

It has already been mentioned numerous times in this review that there are significant sex-linked differences in the internal-external locus of control research, particularly in the research on children. Again, the research is quite conflicting in regard to adult females and locus of control.

In 1973, Nowicki and Walker designed an experiment with 78 third graders to examine whether social desirability was a significant mediator of locus of control-achievement relationships. They suggested that the lack of consistent findings in previous studies concerning the relationship between achievement and locus of control for females may be the result of the failure of researchers to obtain "pure" groups of internal and external females. They suggested that the tendency of females may be to answer questionnaires in a socially desirable manner instead of responding according to their actual personal behaviors. This has apparently "confounded" the achievement and locus of control relationship in research attempts.

Nowicki and Walker (1973) found that the internal females scoring low in social desirability attained achievement scores higher than any other group. The researchers speculated that this group may indeed feel in control of their environment, but also may resist the pressures of society to depend solely on males. Likewise, the researchers continued, the true external female may achieve less because she does not feel in control of her environment. She may fit well into the role that society expects of a woman.

Some researchers have suggested that the underachievement of women may be a function of sex differences in attribution patterns (Parsons, Ruble, Hodges, & Small, 1976). Various studies, however, comparing the causal attributions of females and males, have not always been consistent. Luginbuhl, Crowe, and Kahan (1975) found no sex differences in attribution patterns.

Ric Brown conducted a study on achievement-oriented women graduate students. He wanted to determine if their traditional or non-traditional sex role orientation was related to their attributional style. He found that women who were more non-traditional with a need for individualistic achievement and independence were more likely to have internal LOC. More traditional college women viewed their reinforcements as external and coming from family and other social forces (Brown, 1983).

Cheryl Olson, in 1988, conducted research on female college students to determine if "feminine modesty" continues to prevent women from attributing credit to themselves for ability, rather than luck. The results suggested that women are

inhibited from making self-promoting attributions in an achievement situation which involves face-to-face interaction.

Chandler, Shama, and Wolf designed a study using five cross-national samples to determine gender differences in attributional causality. They believed that different societies at varying stages of developing may endorse different social models. They utilized the Multidimensional-Multiattributional Causality Scale (MMCS), created by Lefcourt, VonBaeyer, Ware and Cox, which reportedly was created to differentiate achievement and affiliation contexts and were balanced across success and failure situations. Chandler and associates obtained data from India, Japan, South Africa, United States, and Yugoslavia. The subjects consisted of 684 university students. In the results, there were significant differences between males and females across all five countries for achievement attributions to task and for the internal/external dimension. The differences for attributions to ability, effort, and luck were not significant. Although there were some significant differences between the genders in individual countries, as was true in India, there were many more similarities than differences. Females in this study were significantly more internal than males. Gender differences were stronger, in this study, in the affiliation than the achievement domain (Chandler, Shama & Wolf, 1982).

Gail Crombie conducted research in which there were two independent variables, achievement level and sex-role orientation. Both achievement levels and sex-role orientation were divided into two levels, high and low achievement and

androgynous and stereotypic feminine. In addition, the study included five dependent variables: Subjects' ratings of causal attributions for ability, effort, task difficulty, luck, and mood. These were measured for academic success and for perceived success on an assigned task. In their results, the androgynous and stereotypic females high in achievement did not differ significantly from each other on GPA or IQ. The results were the same with the androgynous and stereotypic females low in achievement. Women who were androgynous and high in achievement attributed their academic success more to ability than did the other groups. Androgynous was defined as women who described themselves as high on both masculine and feminine traits. The stereotypic women high in achievement were more likely to disguise their ability and to be overly modest. Overall, they found that the usage of ability (attribution) does not appear to be related to higher achievement performance in women. Crombie felt that this finding was particularly interesting as many researchers have suggested that females' underachievement may be partially due to the fact that they do not utilize ability as a principal attribution, but utilize effort (Crombie, 1983).

An interesting summary of women and achievement motivation is offered by a primatologist, Dr. G. Mitchell. Mitchell stated that men could be aroused to increase their need for achievement by offering them specific instructions. Women cannot be so aroused. Mitchell also reported that men classified as high in achievement select tasks of moderate difficulty and are willing to work longer at them. Apparently such men work well in academic settings (Mitchell, 1981).

Mitchell reported that women have a stronger need for affiliation than do men; however, they show no real difference in need for achievement. They appear to excel in social situations more than do men (Mitchell, 1981).

Mitchell reported that the long-standing suggestion that women fear success because it is "unfeminine" failed to change during the 1970s. She stated that this is because of the conflict women experience in feeling torn between job and family. Of considerable interest is the fact that men were showing more fear of success in the 1970s than in the 1950s. Among blacks, fear of success was higher in men than in women. It appears that now both men and women believe that success can have negative consequences (Mitchell, 1974).

Locus of Control and Age

In evaluating children with both the Rotter scale and Nowicki's scale, both measures indicate that locus of control becomes more internal with age (Rotter, 1966; Nowicki & Strickland, 1973). This appeals to common sense, that children will feel less helpless as they mature.

Penk (1969) supported this relationship between age and LOC. He found chronological age to be positively correlated with internality. Bailer, conducting research on mentally retarded and normal children in 1961, also found a correlation with mental age. He found that, when he partialled out mental age, the correlation between chronological age and LOC was considerably lowered. Conversely, mental age and LOC had a strong correlation when chronological age was partialled out.

He concluded that retarded children do not differ from normal children in the development of the ability to conceptualize success and failure. Of course, this ability matures somewhat more slowly in the retardate (Bailer, 1961)

In a later study, Duke, Shaheen, and Nowicki suggested that LOC would be curvilinear over the course of a lifetime. They hypothesized that the elderly would feel the loss of control as they aged. They concluded after their study, however, that the resident geriatric population studied were no more external than adults or college-aged individuals (Duke, Shaheen, & Nowicki, 1974).

Weisz and Stipek (1982), in an extensive review of 33 studies, using 12 different measures of LOC, found absolutely no consistency in results. Many studies reported increases in internality with age, but just as many reported no changes. Very few reported a decline in internality with age.

Race and Locus of Control

Several references have already been made to research suggesting that blacks may be more external in their orientation. Since Rotter's (1966) initial report on the matter, research has consistently stated that blacks may be more external. Coleman et al. (1966) and Lefcourt (1982) have suggested that it is because of the limited opportunities that blacks face in the educational systems and work place that cause them to feel such helplessness and impotency and that those feeling states cause them to score as externally oriented. Inconsistencies in the research continue today.

DeCharms and Carpenter (1968) conducted research on black children in grades 2, 6, and 7 and found that locus of control predicted spelling and math achievement in females only. Buck and Austin (1971) and Jorgensen (1976) found positive relationships between internality and achievement in black high school students.

In 1971, Norman Milgram conducted a study of black and white children in a Catholic school setting. Using the Bailer Locus of Control Scale, Milgram found that there were age-related progressions in internal LOC, but there were no significant relationships between sex, race, or academic achievement to LOC. The author acknowledged that black children in a private Catholic school may not be similar to black children in a public school.

In recent research by Johnson and Napier (1987), the influence of locus of control and American College Testing (ACT) in predicting grade point average was investigated with college freshmen at a predominantly black campus. Locus of control scores were not significantly related to GPA, while ACT scores were significantly related to GPA.

In regard to Hispanics, Garza and Ames (1974) reported that Mexican-American college students were significantly less external than Anglo-Americans on the Rotter scale. Their findings appear to contradict the stereotype that Mexican-Americans are fatalistic and controlled by external forces. They suggested that the culture of the Mexican-Americans may actually contribute to a greater perception of internal control because Mexican-Americans are usually

polite and respectful towards others, even when they do not so feel, and this suggests a great deal of internal control.

Bender and Ruiz (1974) designed a study to investigate race and class differential determinants of underachievement among Mexican-American and Anglo-American students in the 11th grade. They found that there were no differences on LOC based on ethnicity. They did find, however, a positive relationship between internal LOC and GPA. They also found that socioeconomic status was the critical variable regarding academic achievement, rather than ethnicity.

Cole, Rodriguez, and Cole (1978) designed a study to find the extent to which the stereotype that Mexican or Chicano students are fatalistic was accurate. They received data from the United States, Mexico, Ireland, and West Germany. Results showed the Mexican university students to be more internally oriented than students from each of the other nations. Another study, in which they compared Anglo and Chicano students in California, showed that the internal scores for Chicanos were nearly identical to those obtained from Anglo students. The only students (Mexican) who showed to be external were those expressing no desire to attend college. They concluded that Mexicans and Chicanos do not fit that stereotype.

There have been extremely few studies conducted on American Indians regarding their success attributions. In one study, Tyler and Holsinger (1975) administered the Nowicki-Strickland Locus of Control Scale to Indian and white

children in the fourth, seventh, ninth, and eleventh grades. They hypothesized that Indian youths would be more external than whites. This supposition comes from a general awareness of the special powerlessness that exists among the Indian population. They found, however, that internality increased with age. While in the lower grades, Indian males and females were significantly more external than whites. By the eleventh grade, there were no significant differences between Indian and white students.

In a study conducted by a graduate (Masters) student at Eastern Montana College in Billings, Montana, Sandra Foley (1983) compared Indian and white students on locus of control. She found no significant differences.

Most interesting is the research on Chinese adolescents conducted in 1987 by Chiu. The Intellectual Achievement Responsibility Questionnaire was administered to 194 U.S. adolescents and a translated version of the IAR was administered to the same number of Chinese adolescents in Taiwan. Results demonstrated that U.S. adolescents were more internal in the attribution of success, but more external in the attribution of failure. The reverse was true for the Chinese. The investigator speculated that the Chinese have less need to blame others for their failures and are more likely to share the credit with significant others when something "good" happens.

Socioeconomic Status and Locus of Control

Several studies report a relationship between internal-external locus of control and socioeconomic status (SES), with the exception of studies regarding college-aged populations. In younger populations, high SES is associated with internality and low SES with externality. In several studies low SES Negroes were the most externally oriented group (Battle & Rotter, 1963; Gore & Rotter, 1963; Rotter, 1966).

Nowicki and Strickland (1973), in their early work on the Nowicki-Strickland Locus of Control scale, found that in grades 3-10 scores were generally negatively correlated with socioeconomic level. The few significant correlations were in the male group.

In 1963, Richard Franklin at Purdue University, investigated the relationship of I-E scores to various developmental, attitudinal, and behavioral variables, and to determine some of the internal characteristics of the I-E scale (Rotter). In the research design, he related I-E scores to grade in school, mother's education, socioeconomic class, religious orthodoxy, future educational and vocational plans, grades, study attitudes. In the results, achieving more internal scores related positively with being in a higher grade, a "better" student, from a higher socioeconomic group, ambitious, more definite about vocational plans, and more religious, and having a mother with more education.

Tobias Gonzales (1983) summarized the research relating SES to locus of control. He stated that the research indicated that SES does not play a significant

role in the relationship between LOC and achievement. Studies with low-income college students indicated no significant relationship, he reported, between internal LOC and achievement.

Propensity for Risk Taking

Individuals conduct their risk-taking behaviors on the basis of subjective estimates of probability rather than objective probabilities of events. Psychologists are interested in studying individuals' behaviors in social settings that can influence individuals to take greater or lesser risks pursuing a desirable outcome (Carney, 1971).

As Cohen suggested in 1964, life may be an uninterrupted sequence of choices. From birth to death we are faced with choices which are forced upon us like, for example, the choice of burial or cremation upon death. There are situations, however, in which people declare a decided preference between alternatives when, in fact, there is really no difference in advantage. Cohen presented a number of interesting experiments regarding the subjective estimates of probabilities. He found that when the chance of success is relatively small or seemingly out of reach, most people look on the bright side, seeing it brighter than it is, ignoring the dark side. He concluded that when a task seems difficult, individuals tend to overestimate the performance to be achieved, and they underestimate the performance to be achieved when a task seems easy to them. In like manner, Cohen also found that when English football players were asked to

estimate the probabilities that they would shoot a goal from various distances, it was found that they overestimated their abilities to make the long shots, but they tended to underestimate their abilities to make the short shots. Griffith (1949) and McGlothlin (1965) likewise found, in observing horse racing, that people overbet on the longshots and underbet the favorites.

The Illusion of Control

Observations of gambling casinos will reveal many individuals who are behaving as if they can control chance, such as individuals who blow on the dice, throw the dice hard or soft, etc. Central to this concept, reported Langer in 1983, is the need to achieve competence. Complete mastery may include the ability to "beat the odds." As Atkinson (1957) suggested, when an outcome is difficult to control, or when the subjective probability of success is low, the performance level should be the greatest and the sense of mastery should be the greatest. It stands to reason, then, that the greatest sense of mastery would be possible if one could control chance events.

People continually strive to be competent in an effort to control their environments. DeCharms and Carpenter (1968) discussed man's need to be a causal agent in his own affairs. Lefcourt (1982) discussed the debilitating helplessness in individuals who feel trapped in environments which they cannot control.

In an effort to avoid feelings of helplessness, many people behave as if they can influence purely chance events. This observation has been acknowledged for years by psychologists. Kelly (1963) reported that people develop belief systems in order to predict and control the course of events, thus relieving the pain of anxiety.

Langer stated that when an antecedent event is obvious and identifiable, causality of a subsequent event is attributed to it. Individuals have such a need to see causality that even when no antecedent event exists, it is supplied. Langer reported that this is the "just world" phenomenon. This is defined as a belief that good things happen to good people who do good things and bad things only happen to people who do bad things. This belief that people get what they deserve allows individuals to reduce their anxiety over concern and worry about the possibility that aversive events may occur by chance (Langer, 1983).

Lerner and Simmons (1966) demonstrated that individuals believe that people (victims) receive what they deserve. Under the guise of another experiment, 72 undergraduate female subjects observed a peer who was participating in a paired-associate learning task. When the peer (victim) made usual errors, she appeared to receive severe and painful shocks. Later, in describing the suffering victim, subjects rejected and devalued her when they believed that they would continue to see her suffer in a following session and when they perceived themselves as powerless to alter the fate of the victim. The experimenters suggested that this lent support for the hypothesis that rejection and devaluation of suffering victims are primarily based on man's need to believe in a just world.

As Langer stated in 1983, people often fail to discriminate between controllable and uncontrollable events. They act as if they have control over chance events. Langer suggested that when conditions exist in a chance event which allows participants to behave as if they are participating in a skill event, the "illusion of control" develops. Certain behaviors which appear to be relevant to skill confound the participants, causing them to believe that their skills will influence the outcomes of the chance events. These behaviors may include making choices, thinking about the tasks and developing possible strategies, the process of exerting effort while engaged in performing the task, or competitive activities. Familiarity, also, may contribute to confound the participants. Of course, when this illusion is in place, there exists a greater possibility of risk taking. This illusion may dissipate when failure introduces reality into the situation.

Several investigators attempted to replicate Langer's research with varying results. Ladouceur, Mayrand, Dussault, Letarte and Tremblay, in 1984, were unable to create an illusion of control in a situation of chance. In 1986, Letarte, Ladouceur, and Mayrand conducted a similar investigation, adding informal interviews to gather information about subjective beliefs. They found that most subjects reported some degree of primary or secondary illusory control during the game. They also found that frequent wins induced more personal control than infrequent wins.

Rothbaum, Weisz, and Snyder (1982) developed an interesting position in regard to these issues. They acknowledged that there is extensive evidence that

people strongly value and are reluctant to relinquish control. They noted that locus of control theorists believe that various "inward" behaviors of passivity, withdrawal, and submissiveness are signs of relinquished perceived control. This inward behavior is frequently accompanied by causal attributions to limited ability, chance, etc., suggesting uncontrollability. The authors of this paper proposed, however, that these attributions and related behaviors may reflect a type of perceived control that is often overlooked. They explained that people attempt to gain control, not only by bringing the environment into line with their wishes, which they referred to as primary control, but also by bringing themselves into line with the environment, which they referred to as secondary control. They discussed four manifestations of secondary control:

- (a) Attributions to limited ability may serve to enhance predictive control and to protect against disappointment.
- (b) Attributions to chance may reflect illusory control. These individuals may exhibit passivity and withdrawal in skill situations, reserving energy for situations that allow them to capitalize on "being lucky."
- (c) Attributions to powerful others permit vicarious control when the individual identifies with people he/she regards as powerful.
- (d) All of the above may foster interpretive control in which an individual seeks to understand and derive meaning from uncontrollable events in order to accept them.

The authors felt that, when perceived control is recognized in all forms, the inward behaviors referred to above can be seen as efforts to sustain rather than relinquish the perception of control. (Rothbaum et al., 1982).

Chance Versus Skill

John Cohen (1960) conducted research on chance and skill issues. He found that in youth of 12 to 14 years, two sources of uncertainty in the same situation did yield larger estimates of success than would be expected on the basis of estimates made in two situations each with its own source of uncertainty. This relative overestimation of success when the uncertainties are fused in a single situation is much more pronounced when the uncertainties relate to chance than when they relate to skill. Uncertainties about chance events, although entirely beyond control, seem to impact optimism less than uncertainties about skill events in this young population. This appears to change in young undergraduates who do not experience this same optimism, and their estimates are the same whether based on uncertainties in one or in two situations.

This paradoxical observation in young adolescents, that estimates of success are greater when there are two uncertainties than when there is one uncertainty, was further explained by Cohen. He stated that for this optimism to occur, the second uncertainty must carry a larger psychological probability than the one carried by the first; the larger the second probability as compared with the first, the greater is the paradoxical effect. Cohen stated that when uncertainties from two

sources relate to chance, estimates of success are made by averaging the two separate estimates. When the uncertainties relate to skill, rather than chance, the estimates of success are made in a multiplicative process (this is not a conscious process, however) (Cohen, 1960).

Kogan and Wallach (1964) conducted a study in which they asked college students to bet on the outcome of separate chance and skill tasks which were dice and shuffleboard. The students selected pairs of bets that combined probability levels and monetary rewards. This study was designed to produce zero expected value bets. The subjects were allowed to keep money when they were successful. In this study, skill oriented subjects did not reveal greater risk-taking tendencies than did the chance oriented group. Chance oriented subjects took the most extreme risks, both high and low, under chance conditions.

Meyers (1976) using horseshoes and a card sorting activity as skill and chance tasks, respectively, designed a study to determine whether differences existed within subjects on skill and chance risk-taking behavior. He found that children took greater risks in the chance oriented situations, particularly inner city white girls.

Thomas (1978) conducted research that supported the above studies. He found that children (4th grade) took more risks in chance situations than in skill situations.

Risk Taking and Achievement

McClelland and associates (1953) conducted research on the relationship of achievement to risk taking. He studied two groups of boys and girls, one consisting of 26 children in kindergarten, the other of 32 in third grade. He found that with both groups of subjects, individuals with high achievement tended to take moderate risks while subjects with low achievement tended to take either very safe or very speculative risks. He speculated that, at the safe end of the continuum, high achievers may take somewhat longer risks than the low achievers, either because their confidence in their own ability is such that the subjective probability of success is increased over what it actually is or because their higher achievement drive would not be sufficiently rewarded by such a safe success, or both. However, at the more speculative end of the continuum, high achievers may reject some of the more extreme risks either because failure is more painful to them or because they may be able to take little personal credit for success if it is in fact a "lucky" enterprise. McClelland also speculated that stable individual differences in achievement have been formed by the age of five.

Atkinson (1957) and Atkinson and Feather (1966) reported that individuals who have a high fear of failure generally do not take moderate risks. Instead, they may take very high risks so that they do not have to feel personally responsible for failure, or they may take such low risks that success is virtually certain. This was reflected in their research with high school students. Individuals who had a high need for achievement expressed vocational interests appropriate to their abilities.

However, those students who had a high fear of failure expressed vocational interest in occupations that were either much too difficult or much too easy.

Clifford, Lan, Chou, and Qi (1989) conducted two field observation studies with American and Chinese students, aged 8 to 11. This was an effort to examine developmental and cultural patterns in academic risk taking, determined by student selection of academic achievement tasks varying in difficulty. They found that sex differences in academic risk taking and failure tolerance were minimal. They also found that failure tolerance decreases with grade. Academic risk taking is low, they reported, relative to the (theoretically) optimum risk level of .50. This suggests that academic performance is valued more than academic challenge. They found that academic risk taking tends to be higher under variable, rather than fixed, payoff conditions. The value of failure tolerance as a predictor of academic risk taking may be greater with unfamiliar, rather than familiar, tasks.

Clifford and associates (1989) concluded with three hypotheses to explain their field observations of academic risk taking: (1) Variable payoff hypothesis: Variable payoff provides an incentive for increased use of the information-maximization principle and thus elicits increased academic risk taking. (2) Accuracy-difficulty judgment hypothesis: The validity of response-accuracy and task-difficulty judgments is inversely related to academic risk taking. (Task-difficulty judgment is assumed to increase with development and differ with content). (3) External constraint hypothesis: Academic risk taking is a negative function of external constraints (defined as externally imposed ability evaluations).

The above authors agreed with current theory and research which suggest that moderate risk taking is essential to human motivation and propose that the study of academic risk taking should have received greater attention than it has received. They also suggested that there is a need to identify factors that will enhance the value of academic challenge and reduce the value which students place on high levels of absolute success. The authors expressed concern that, as long as educators assign tasks rather than provide risk taking opportunities and reward high levels of success rather than evidence that students are selecting challenging tasks, low academic risk taking is likely to be evidenced. Also, they stated, as long as educators provide fixed rather than variable payoff, and use salient external constraints (teacher administered rewards and punishments), low academic risk taking is likely to continue.

Margaret Clifford and Fen-Chang Chou in 1991 conducted a study in Taiwan. They stated that both variable payoffs and a game context will increase academic risk taking, but the payoff factor accounts for the majority of the risk-taking variance. However, in spite of combining variable payoff and game context, academic risk taking continued to be substantially below the optimum 50% success level.

Clifford and Chou (1991) felt that this avoidance of moderate risk may best be explained by the reinforcement practices prevalent in today's schools. They stated that moderate academic risk taking will occur if teachers modify both the nature and focus of reinforcement practices. Evidence of performance

improvement, the opportunity to use well-established knowledge and skills, and the freedom to develop skills must be substituted for task-irrelevant rewards such as money, treats, etc. It is essential to replace the emphasis on perfection with a focus on moderate risk taking and tolerance for failure. Teachers should provide, they report, for the selection of challenging tasks and the setting of higher goals. Self-monitoring is also an essential skill to teach.

Clifford and associates (1989) expressed concern about the frequent argument from educators that a tendency toward learned helplessness might best be minimized by ensuring greater mastery may, in fact, prohibit optimum motivation. Mastery levels of 80% or above, they stated, often stand in opposition to moderate risk taking. They argued that, in the context of motivation theory, risk taking is more critical than is mastery.

In a similar vein, Maehr and Stallings in 1972 conducted two studies in which the effects of internal and external evaluation on performance and motivation were examined. They found that subjects showed a continuing interest in difficult tasks if they worked on them under internal conditions. However, the continued interest in difficult tasks was reduced by the external evaluative conditions. Subjects being externally evaluated appeared to prefer easy tasks to difficult tasks. This was particularly noted in high need achievement boys.

Margaret Clifford, in 1988, conducted an academic risk taking study with fourth, fifth, and sixth grade students. She required subjects to select 6 of 35 to 40 multiple choice items in three content areas. Each set of items was arranged in

order of increasing difficulty, a trend which was easily understood. Subjects were instructed to select items they thought they would enjoy working. These subjects were told that the activity was not a test. Clifford found that the sixth graders chose items as much as 1 and 1/2 years below their mean achievement level, suggesting very conservative risk taking. Further, academic risk taking appeared to decline with grade level. She also found that academic risk taking was significantly correlated with a self-report measure of school failure tolerance. School failure tolerance also decreased significantly with grade.

Susan Harter, in 1978, conducted a study which examined the gratification which children derive from cognitive mastery on problem-solving tasks as a function of task difficulty. The subjects were fifth and sixth grade students. They were given a series of anagrams varying in difficulty. As reflected both in smiling and rated enjoyment, greater pleasure was manifested on the correct, compared to the incorrect items. There was a positive linear relationship between smiling and difficulty level. Repetition, however, of correctly solved anagrams produced an obvious decline in enjoyment. The author interpreted the results to suggest that the maximum gratification was derived from the active solution of challenging problems. Apparently easily-solved problems provided relatively little pleasure.

Risk Taking and Sex Differences

Paul Slovic in 1966 conducted an investigation on 735 boys and 312 girls between the ages of 6 and 16. The subjects participated in a decision-making game

which was designed to assess their risk-taking propensity. He found a sex difference that surfaced between the ninth and eleventh year of age and in the direction of the predicted stereotype: the boys were bolder than girls.

In 1982, Ginsburg and Miller conducted research in a descriptive, naturalistic study to determine the sex differences in risk taking. They observed 480 three to eleven year old children at four different risk-taking locations at a zoo. They found that girls were just as likely as boys to enter the zoo. It was discovered, however, that at all four of the risk-taking situations, significantly more boys than girls engaged in risk-taking behaviors. Older boys and girls were more likely to take risks than the younger children.

Thomas (1978), in doctoral research, found that no significant differences in risk-taking propensity were found between boys and girls under chance conditions. However, a significant difference was found under skill conditions. Apparently, boys preferred a more conservative risk.

Meyers (1975), in his doctoral program, investigated whether sex differences in risk-taking behavior existed in children. No sex differences were found.

In the college student population, Wallach and Kogan (1959), found that at varying levels of decision certainty, women were found to be more conservative than men when unsure of their decisions and more extreme than men when sure of their decisions. The authors speculated that women learn conservatism through fear of punishment in subjectively ambiguous situations. When, however, a situation may be perceived as highly certain, a "counterphobic release of boldness"

seems to occur. In the area of content, women were more conservative than men in the areas of risks of income loss, death, and football defeat. However, women were bolder than men concerning risks in the areas of marriage and art (perhaps areas in which boldness furthers a woman's fulfillment and expression).

In another rare study of college students in relation to risk taking and sex differences, Gary Wyatt (1988) prepared a study in which undergraduate students were required to make decisions with uncertain outcomes in hypothetical economic, achievement and social situations. These students, under conditions of uncertainty, treated potential costs as more salient than potential rewards. Males appeared to avoid threatening outcomes more than females.

Risk Taking and Socioeconomic Status

Little has been written about socioeconomic status and risk-taking propensity. Gary Wyatt (1988) found that undergraduate students from lower income families were more concerned about potential costs than potential rewards.

Risk Taking and Age

Wallach and Kogan, in 1961, conducted a study in which they examined age differences in judgment and decision making. They found that, for both men and women, highly significant and similar age differences were obtained when judgments were "very sure" in the expected direction of greater extremity for young subjects than for old. There appeared to be a greater unwillingness to risk as age increased, even though subjects were very certain of their judgment. Judgment

extremity under moderate confidence, however, increased from young adulthood to old age in the case of females. Older women were more extreme than older men under high confidence (similar to younger men and women). While younger men were more extreme than younger women under moderate and low confidence, no sex differences were obtained for the older subjects.

Risk Taking and Locus of Control

Liverant and Scodel, in 1960, hypothesized that behavior in a situation involving decision making under conditions of risk is influenced by a dimension of internal-external control. They found that the internals chose significantly more intermediate and significantly fewer low probability bets than the externals. Significantly more internals than externals never selected an extreme high or low probability bet. They also found that the amount of money wagered on safe as against risky bets was significantly greater for internals, and there was a tendency for internals to be less variable in choice of alternatives.

T. H. McInish, in 1981, explored investors' personality characteristics (I-E Locus of Control) and risk-taking. Findings indicated that investors were significantly more internal than college students. Contrary to previous studies, evidence was found that externals chose riskier portfolios than did internals.

Summary

Research demonstrates that an internal locus of control contributes to superior cognitive functioning in the areas of information assimilation and the ability to attend and concentrate. It also appears that internals are more perceptually sensitive than are externals. It may be that externals require much more "cue explication" than do internals in an educational setting.

The relationship of LOC to achievement is positively significant in children, particularly males. The findings are inconsistent with female children.

The research on the relationship of LOC to achievement in college students is very inconsistent and additional research is recommended. Again, it is in the area of gender differences that inconsistency abounds.

There is a dearth of information and research on academic risk taking even though current theory and research suggest that moderate risk taking is essential to human motivation. College students value academic performance more than academic challenge and this is considered very problematic. Some researchers suggest that an emphasis on mastery may prohibit motivation and may stand in opposition to moderate risk taking.

CHAPTER 3

PROCEDURES

Introduction

The problem considered in this study was to examine the relationship between locus of control and propensity for risk-taking and achievement in higher education. Achievement was measured by cumulative grade point average. This chapter includes nine major headings: (1) Introduction, (2) Population Description and Sampling Procedure, (3) Setting of the Study, (4) Description of Measurement Instruments, (5) Description of Variables, (6) Data Collection, (7) Statistical Hypotheses, (8) Analysis of Data, and (9) Precautions Taken for Accuracy.

Population Description and Sampling Procedure

The sample included 499 students at Eastern Montana College, freshman through graduate status, from the departments of Psychology, Institute for Habilitative Services (includes Special Education), Education, Science and Mathematics, Sociology, Business. Classes within these departments were randomly selected for this sampling procedure.

The investigator completed a request to do research on human subjects at Eastern Montana College. This was reviewed by the Human Subjects Committee of the institution. Dr. John Dodd was the faculty sponsor at Eastern Montana College.

These students were examined on two instruments, the Rotter Locus of Control Scale and the Choice Dilemmas Questionnaire. These students also completed a consent form giving consent to participate in the study, a GPA release form to grant permission to the investigator to obtain GPAs from the registrar's office, and a survey to obtain demographic information. Please see forms and instruments in the appendices.

Setting of the Study

Eastern Montana College is located in Billings, Montana, which is the largest city in Montana. Greater Billings boasts a population of 113,000. The primary industry is agriculture.

Eastern Montana College was established March 12, 1927 as Eastern Montana State Normal School with an initial authorization to prepare elementary teachers. Since that time, Eastern Montana College has grown into a comprehensive state college. Enrollment usually exceeds 4000 students. At this time, the college consists of three academic schools: the School of Arts and Sciences; the School of Business and Economics; and the School of Education.

Eastern offers special and pre-professional programs and awards degrees at the associate's, bachelor's, and master's degree levels. It also offers several nondegree post master's supervisor endorsement programs in Elementary Curriculum, Reading K-12, and Special Education K-12. In 1988, the Board of Regents authorized a new MBA program in cooperation with the University of Montana.

Description of Measurement Instruments

Choice Dilemmas Questionnaire

This instrument was developed by Wallach and Kogan in 1959 to obtain probability preferences in everyday life situations. Twelve items represent a choice dilemma between a risky and a safe course of action. The "deterrence of failure" is reflected in a subject's selection of the probability level for the risky alternative's success that would make it sufficiently attractive to be chosen. Wallace and Kogan called their instrument "semiprojective" in nature as the subjects are asked how they would advise others in the described situations. One would assume that one's advice to others is a reflection of one's own regard for the desirability of success relative to the disutility of failure. Probability levels range from 1 in 10 to 9 in 10, and a refusal to gamble on a risky alternative is scored 10 in 10. Obviously, lower scores are related to a greater propensity for risk taking. A typical item is:

Mr. H, a college senior, has studied piano since childhood. He has won amateur prizes and given small recitals, suggesting that Mr. H has considerable musical talent. As graduation approaches, Mr. H has the choice of going to medical school to become a physician, a profession which would bring certain prestige and

financial rewards; or entering a music conservatory of music for advanced training with a well-known pianist. Mr. H realizes that even upon completion of his piano studies, which would take many more years and a lot of money, success as a concert pianist would not be assured.

Imagine that you are advising Mr. H. Listed below are several probabilities or odds that Mr. H would succeed as a concert pianist.

Please check the lowest probability that you would consider acceptable for Mr. H to continue with his musical training.

- a. Place a check here if you think Mr. H should not pursue his musical training no matter what the probabilities.
- b. The chances are 9 in 10 that Mr. H would succeed as a concert pianist.
- c. The chances are 7 in 10 that Mr. H would succeed as a concert pianist.
- d. The chances are 5 in 10 that Mr. H would succeed as a concert pianist.
- e. The chances are 3 in 10 that Mr. H would succeed as a concert pianist.
- f. The chances are 1 in 10 that Mr. H would succeed as a concert pianist.

A maximum score of 120 on the questionnaire is possible with 12 being the minimum score.

The reliability coefficients of .53 for the men and .62 for women are reported by Kogan and Wallach (odd-even coefficients stepped up by the Spearman-Brown formula) (Kogan & Wallach, 1964). Wallach, Kogan and Bem (1962) reported evidence of high test-retest reliability of the Choice Dilemmas Questionnaire. They also reported that the instrument's construct validity as a risk taking measure yielded findings consistent with a risk taking interpretation. They presented an example, i.e., that the degree of conservatism, as measured with the instrument, increases with age for both males and females, and increases with the

degree of subjective probability of personal failure as demonstrated in a motor skill game with actual motor skill controlled.

Maehr and Videbeck (1968) designed a research experiment in which one of their objectives was to assess the construct validity of the Kogan-Wallach Choice Dilemmas test. They used a behavioral index of risk inclination to compare with the Kogan-Wallach. The investigators concluded that the Kogan-Wallach items predict the actual high-risk-low-risk choices rather well. The investigators pointed out that a general overall positive relationship between risk inclination and persistence was revealed.

In addition, in regard to internal consistency, a factor analysis was performed and the results showed no evidence of a clear-cut factor structure. They suggested that the questionnaire scores are unitary measures and, coupled with the correlational data, the findings suggested that the two measures (Kogan-Wallach and the high-risk-low-risk experimental condition) are independent measures of the same variable (Maehr & Videbeck, 1968).

Rotter's I-E Locus of Control Scale

This scale was developed to determine whether an individual has a stronger belief in internal or external control. It was designed to deal with an individual's perception of relationships between his/her own behavior and subsequent events following that behavior (Rotter, 1966).

This scale was constructed with 23 question pairs, utilizing a forced-choice format. Six filler questions were utilized. For each item, one internal statement is paired with an external statement. A typical item is:

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

Topics include parental punishment, scholastic success, and fatalism.

The scale is self-administered and the average individual may complete it in 15 minutes. It may be adapted to manual or machine scoring. One point is scored for each external statement which is selected. Scores range from zero (most internal) to 23 (most external).

This scale was originally normed on 400 subjects, which included 200 subjects of each sex. Many studies have been completed with college students, although other populations are being extensively studied with this scale as reported in Chapter 2.

Measures of reliability reported in many studies have been quite consistent. Rotter reported test-retest reliability for varying samples and for intervening time periods which varied from 1 to 2 months. Reliability ranged from .49 to .83. Hersch and Scheibe (1967) found test-retest reliability coefficients that ranged between .48 to .84 for a two month period. In 1969, Harrow and Ferrante found a test-retest reliability of .75.

In regard to internal consistency, estimates of reliability have ranged from .65 to .79 with nearly all correlations in the .70s as reported by Rotter. Rotter also reported good discriminant validity, indicated by low correlations with intelligence, social desirability, and political affiliation.

Rotter admitted that the scale may not be as "pure" as it was believed to be. It appears that there may be more confounding variables involved, such as the influence of social desirability, than initially appeared. Hersch and Scheibe agreed that the stated theoretical formulation of I-E may be too simplistic. They stated that individuals scoring low on the I-E scale (internals) are more homogeneous on their test performances than are high scoring subjects. This suggests that a diversity may exist in the psychological meaning of externality. For example, an individual may be an external individual because he is truly physically weak in relation to others around him. Hersch and Scheibe suggested that theoretical and empirical differentiation of the notion of externality would more sharply define this relationship. Rotter states that in spite of this, his scale may be useful in evaluating programs whose goals include increasing the client's feeling of control over his life (Hersch & Scheibe, 1967).

Description of Variables

The variables to be investigated are (1) locus of control, (2) propensity for risk taking, (3) achievement, as measured by cumulative GPA, (4) sex, (5) years in

school, (6) age, (7) race, (8) marital status, (9) family-of-origin income level, and (10) major course of study.

Data Collection

Following approval by the Human Subjects Research Committees at Eastern Montana College, courses were randomly selected from the course catalogue. Classes were selected from the departments of Psychology, Institute for Habilitative Services, Education, Science and Mathematics, Sociology, and Business. Professors were contacted by phone or in person. Appointments were made to survey the classes. Each class was approached with the same presentation and class members were allowed to ask questions following completion of the survey. Most students were able to complete the questionnaire in less than 30 minutes.

Several meetings were held with the Registrar at Eastern Montana College and procedures were established to gain access to the students' GPAs. It took much longer to gather the data than originally planned (three semesters). Nearly 700 surveys were completed and 499 met the criteria for inclusion, i.e., gave written documentation of willingness to participate, written permission for the investigator to look at the GPAs, and completed demographic information sheet.

Statistical Hypotheses

- Ho1. There is no significant multiple relationship between the dependent variable, achievement (GPA) and the set of independent variables, locus of control, risk-taking propensity, number of years in school, age, and family-of-origin income level.
- Ho2. There is no statistically significant interaction between gender and ethnicity on locus of control.
- 2-a. There is no statistically significant difference between means of males and females.
- 2-b. There is no statistically significant difference among means of the five ethnic groups.
- Ho3. There is no statistically significant interaction between risk-taking propensity and marital status on locus of control.
- 3-a. There is no statistically significant difference among means for high, medium or low risk-taking propensity.
- 3-b. There is no statistically significant difference in means of married, single, widowed, or divorced individuals.
- Ho4. There is no statistically significant interaction between gender and ethnicity on achievement in higher education as measured by GPA.
- 4-a. There is no statistically significant difference between means of males and females.

- 4-b. There is no statistically significant difference among means of five ethnic groups.
- Ho5. There is no statistically significant interaction between marital status and choice of helping services (Y or N) on achievement in higher education as measured by GPA.
- 5-a. There is no statistically significant difference between means of individuals choosing helping services majors and those choosing other majors.
- 5-b. There is no statistically significant difference among means of single, married, divorced or widowed individuals.
- Ho6. There is no statistically significant interaction between locus of control and choice of helping services (Y or N) on achievement in higher education as measured by GPA.
- 6-a. There is no statistically significant difference between means for internal and external locus of control.
- 6-b. There is no statistically significant difference in means for choice of helping services (Y or N).
- Ho7. There is no statistically significant difference between mean scores of students who choose the helping services as a major course of study and students who choose other majors in terms of propensity for risk-taking.
- Ho8. There is no statistically significant difference between males and females in propensity for risk.

Ho9. There is no statistically significant difference among mean GPA scores of the three categories of low, medium, or high risk-taking propensity.

Analysis of Data

The two questionnaires were machine scored.

Multiple regression analysis was the method used in Hypothesis 1 to study the effects and the magnitudes of the effects of five independent variables on one dependent variable. In Hypotheses 2 through 6, a two-way ANOVA was computed on each of the sets of two independent and one dependent variable. Hypotheses 7 and 8 were tested by means of a t-test for the difference in means. Hypothesis 9 was tested with analysis of variance. The following sequence of steps were implemented in the two-way ANOVAs.

Test for Interaction

A. Where significant interaction was found, the interaction was interpreted.

B. When the interaction was not significant (hypothesis retained), then the main effects hypothesis were tested. In one case (Hypothesis 3) where the levels (categories) of an individual variable was greater than 2, the Newman Keuls post-hoc multiple comparison procedure was utilized to test all possible pairs.

Results will be discussed in Chapter 4.

Precautions Taken for Accuracy

1. Data for this study was gathered in one particular academic year.
2. A computer programmer skilled at data entry was employed as well as a consultant who verified accuracy of procedures used in the SPSS program.
3. All attempts were made to reduce threats to valid inference, such as:
 - a. There was an attempt to avoid demoralization in the subjects. The investigator did attempt to be sensitive to the needs of the students. For example, surveys were not conducted the few days before finals, as students were stressed at that time.
 - b. Students were offered the choice of whether or not to participate in the surveys to avoid the possibility of dishonest answers from hostile participants.
 - c. A large N assisted in "giving the effect" of randomization.

CHAPTER 4

RESULTS

Demographic Description of Survey Participants

Approximately 700 students at Eastern Montana College (EMC) volunteered to participate in the survey. Only 499 surveys met the criteria for inclusion. Courses selected for the survey were randomly selected from the course catalog.

Gender

As Table 1 demonstrates, only 31 percent of participants were male (154). Nearly 69 percent were female (341). Four participants did not state sex. It

Table 1. Gender.

Value Label	Frequency	Percent	Valid Percent	Cum Percent
Male	154	30.9	31.1	31.1
Female	341	68.3	68.9	100.0
	<u>4</u>	<u>.8</u>	<u>Missing</u>	
Total	499	100.0	100.0	
Valid Cases	495	Missing Cases	4	

appears that females had somewhat less resistance to completing the surveys and were more cooperative than males. The ratio of men to women is somewhat consistent with the population ratio at Eastern. Nearly twice as many women as men are currently attending school at EMC (2467 women and 1294 men).

Year in School

See Table 2 for frequencies. There were more juniors and seniors than other categories. This is not consistent with the population distribution at EMC where freshmen comprise 54 percent of the student population.

Table 2. Year in School.

Value Label	Frequency	Percent	Valid Percent	Cum Percent
Freshman	95	19.0	19.1	19.1
Sophomore	85	17.0	17.1	36.1
Junior	117	23.4	23.5	59.6
Senior	114	22.8	22.9	82.5
Graduate	87	17.4	17.5	100.0
	<u>1</u>	<u>.2</u>	<u>Missing</u>	
Total	499	100.0	100.0	
Valid Cases	498	Missing Cases	1	

Age

Of considerable interest is the fact that only 7.2 percent were under the age of 20. The largest representation was in the 20 - 24 age range (39.5 percent). Eastern Montana College has a significant number of students in the older student category, consistent with the trend toward life-long learning. Over 23 percent of the survey participants were in the 30 - 39 age range. Fourteen percent were over 40 years of age. Average age of students at EMC was 27.4 years.

Table 3. Age.

Value Label	Frequency	Percent	Valid Percent	Cum Percent
Less than 20	36	7.2	7.2	7.2
20-24 years	197	39.5	39.5	46.7
25-29 years	70	14.0	14.0	60.7
30-39 years	117	23.4	23.4	84.2
40-49 years	70	14.0	14.0	98.2
50-59 years	<u>9</u>	<u>1.8</u>	<u>1.8</u>	100.0
Total	499	100.0	100.0	
Valid Cases	499	Missing Cases	0	

Race

A disappointing under-representation of minority group members participated in this survey with 95 percent Caucasian. Although there is a fairly large Mexican-American population living in the Billings area, only four Mexican-

American students participated in this survey. This is consistent with the racial distribution at EMC in that only two percent of the students are Mexican-American. This suggests the need for aggressive outreach to this population. The low representation from the black and Asian population is consistent with the low representation of these populations in this geographic area. American Indians comprised 3.6 percent of the surveyed population. Five percent of the population at EMC is American Indian. EMC has made an effort to aggressively reach out to this population and provides specialized services to this group.

Table 4. Race.

Value Label	Frequency	Percent	Valid Percent	Cum Percent
Caucasian	473	94.8	95.0	95.0
Mexican-American	4	.8	.8	95.8
Black	1	.2	.2	96.0
Asian	2	.4	.4	96.4
American Indian	18	3.6	3.6	100.0
	<u>1</u>	<u>.2</u>	<u>Missing</u>	
Total	499	100.0	100.0	
Valid Cases	498	Missing Cases	1	

Marital Status

Fifty percent of the survey population were single and 34 percent were married. Only 15 percent were divorced.

Table 5. Marital Status.

Value Label	Frequency	Percent	Valid Percent	Cum Percent
Single	252	50.5	50.5	50.5
Married	167	33.5	33.5	84.0
Widowed	4	.8	.8	84.8
Divorced	<u>76</u>	<u>15.2</u>	<u>15.2</u>	<u>100.0</u>
Total	499	100.0	100.0	
Valid Cases	499	Missing Cases	0	

Family Income

As shown in Table 6, 28.5 percent of survey participants were from families who earned an excess of \$40,000 per year. Only 14 percent came from situations of poverty.

Table 6. Family Income.

Value Label	Frequency	Percent	Valid Percent	Cum Percent
Under 10,000	70	14.0	14.2	14.2
Under 20,000	84	16.8	17.0	31.2
Under 30,000	104	20.8	21.1	52.3
Under 40,000	93	18.6	18.9	71.2
Over 40,000	142	28.5	28.8	100.0
	<u>6</u>	<u>1.2</u>	<u>Missing</u>	
Total	499	100.0	100.0	
Valid Cases	493	Missing Cases	6	

Table 7. Norms on the Rotter Internal-External Locus of Control Scale.

Subjects - Male	N	Mean	SD
College Males (Cassell, 1992)	154	9.62	4.28
College Males (Zytowski, 1967)	62	6.82	2.49
Undergrads in Psychology (Feather, 1968)	46	9.8	1.42
Undergrads (Hamsher, Geller, & Rotter, 1968)	60	10.2	3.95
Male Undergrads (Lefcourt & Telegdi, 1971)	90	8.16	4.38
Subjects - Female	N	Mean	SD
College Females (Cassell, 1992)	341	10.45	3.89
Undergrads - Psychology (Feather, 1968)	88	11.44	1.69
Undergrads (Hamsher, Geller, & Rotter, 1968)	113	11.0	3.96
Female Undergrads (Strickland, 1970)	180	8.34	3.85
Female Student Nurses (Lefcourt & Steffy, 1970)	37	7.14	3.28

NOTE: Scores are in the external direction; the higher the score, the more external.

Table 8. Norms on the Choice Dilemma Questionnaire (Risk Taking).

Subjects - Male	N	Mean	SD
College Males (Cassell, 1992)	152	66.98	15.51
Males (Kogan & Wallach, 1964)	114	66.84	11.6
Low Defensive (Kogan & Wallach, 1964)	30	63.80	8.54
High Defensive (Kogan & Wallach, 1964)	35	63.80	12.54
Subjects - Female	N	Mean	SD
College Females (Cassell, 1992)	340	69.88	15.63
Females (Kogan & Wallach, 1964)	103	67.08	12.99
Low Defensiveness (Kogan & Wallach, 1964)	28	63.07	13.14
High Defensiveness (Kogan & Wallach, 1964)	22	64.86	11.93

NOTE: The lower the score, the greater the risk-taking propensity.

Statistical Hypotheses

Ho1. There is no significant multiple relationship between the dependent variable, achievement (GPA) and the set of independent variables, locus of control, risk-taking propensity, year in school, age and family-of-origin income level.

Findings: As Table 9 demonstrates, the multiple R arising from the multiple regression with GPA as the dependent variable and family income, locus of control, age, year in school and risk-taking propensity as the independent variables is .06592. This means, as indicated by R squared, that all of these independent variables taken together explain only .004 of the variation in the dependent variable. The probability of explaining this much of the variation by chance is .7152. Therefore, the null hypothesis is retained.

Table 9. Multiple Regression.

Multiple R	.06592
R Square	.00434
Adjusted R Square	-.00388
Standard Error	1.73860

Ho2. There is no statistically significant interaction between gender and ethnicity on locus of control.

Findings: Since 95 percent of the sample was Caucasian, a number of cells with extremely small cell counts resulted. Therefore, Hypotheses 2 and 2b were not tested.

2a. There is no statistically significant difference in means of male and females on locus of control.

Findings: There is a statistically significant difference between the means of males and females on locus of control. Males scored 9.63 and females 10.45. The probability of this difference occurring by chance is .034. Therefore, Null Hypothesis 2a is rejected.

2b. There is no statistically significant difference among means of five ethnic groups on LOC.

Findings: As reported above, 2b was not tested.

Table 10. t-test for Differences in Means of Internal-External Locus of Control.

Variable	Number of Cases	Mean	Standard Deviation	Standard Error
IE				
Group 1/Males	154	9.6169	4.275	.345
Group 2/Females	341	10.4457	3.894	.211
Pooled Variance Estimate				
t Value	Degrees of Freedom		2-tail Probability	
-2.13	493		.034	

Ho3. There is no statistically significant interaction between risk-taking propensity and marital status on locus of control.

Findings: A two-way ANOVA was performed with risk-propensity and marital status as the independent variable and locus of control as the dependent variable. When the interaction was examined, the F ratio was 1.405 with an associated probability of .211. Therefore, the null hypothesis of no interaction was retained.

- 3a. There is no statistically significant difference among means for high, medium, or low risk-taking propensity in locus of control scores.

Findings: There is no significant difference among mean locus of control scores of low, medium, and high risk-taking propensity categories. The probability associated with this test was .135. Therefore, Null Hypothesis 3a is retained.

- 3b. There is no statistically significant difference in means of married, single, widowed, or divorced individuals on locus of control.

Findings: There is a statistically significant difference in means of married (9.57), single (10.71), widowed (13.25), and divorced (9.64) individuals on locus of control scores as indicated by a probability of .013. As there were only 4 widowed respondents, the difference is somewhat less meaningful.

Note: Although a significant difference was found among the four marital status groups, the Newman Keuls post-hoc procedure did not detect any significant pairwise differences.

Table 11. Analysis of Variance: by Locus of Control, Risk Propensity Categories, Marital Status.

Source of Variation	Sum of Squares	DF	Mean Square	F	Sig of F
Main Effects	255.399	5	51.080	3.222	.007
RISKCAT	63.707	2	31.854	2.009	.135
VAR5	171.476	3	57.159	3.605	.013
2-Way Interactions	133.632	6	22.272	1.405	.211
RISKCAT VAR5	133.632	6	22.272	1.405	.211
Explained	389.031	11	35.366	2.231	.012
Residual	7673.274	484	15.854		
Total	8062.304	495	16.287		

499 cases were processed.
3 cases (.6 percent) were missing.

Ho4. There is no statistically significant interaction between gender and ethnicity on achievement in higher education.

Findings: As 95 percent of the sample was Caucasian, the test of interaction was not performed.

4a. There is no statistically significant difference between male and female means.

Findings: A t-test revealed that females scored significantly higher on achievement as measured by GPA. See Table 12. The mean score

GPA for males was 3.09 and the mean score for females was 3.46.

The probability of this difference in means occurring by chance is .025.

Therefore, the null hypothesis may be rejected.

Table 12. t-test for Differences in Means of GPAs.

Variable	Number of Cases	Mean	Standard Deviation	Standard Error
GRADE POINT				
Group 1/Male	154	3.0916	1.660	.134
Group 2/Female	341	3.4636	1.717	.093
Pooled Variance Estimate				
t Value	Degrees of Freedom		2-tail Probability	
-2.25	493		.025	

4b. There is no statistically significant difference in the means of 5 ethnic groups.

Findings: As stated earlier, no analysis of ethnic differences was performed as sample was 95 percent Caucasian.

Ho5. There is no statistically significant interaction between marital status and choice of helping service (Y or N) on achievement in higher education as measured by GPA.

Findings: A two-way ANOVA was performed with marital status and choice of helping services (Y or N) as the independent variables and grade point (achievement) as the dependent variable. Note the table below. When the interaction is examined, one can see that the F ratio is .367 associated with the probability of .693. The null hypothesis cannot be rejected and thus is retained.

5a. There is no statistically significant difference in the means of GPAs of individuals choosing helping services major and those choosing other majors.

Findings: There is not a significant difference between the two groups. Non-helping services majors had a mean GPA of 3.39 and helping service majors had a slightly lower mean GPA of 3.22 which is not a significant difference. Therefore, the null hypothesis is retained.

5b. There is no statistically significant difference among GPA means of single, married, divorced, or widowed individuals.

Findings: There is not a statistically significant difference among mean GPA scores of single (3.22), married (3.54), widowed (3.20) and divorced (3.41). Null hypothesis is again retained.

Table 13. Analysis of Variance: Grade Point by Marital Status and Helping Services.

Source of Variation	Sum of Squares	DF	Mean Square	F	Sig of F
Main Effects	13.741	4	3.435	1.151	.332
Marital Status	11.769	3	3.923	1.315	.269
HELP SERVICES	3.144	1	3.144	1.053	.305
2-way Interactions	2.192	2	1.096	.367	.693
HELPSER	2.192	2	1.096	.367	.693
Explained	15.933	6	2.656	.890	.502
Residual	1468.378	492	2.985		
Total	1484.311	498	2.981		

Ho6. There is no statistically significant interaction between locus of control and choice of helping services (Y or N) on achievement in higher education as measured by GPA.

Findings: A two-way ANOVA was performed with locus of control and choice of helping services as the independent variables and

achievement (GPA) as the dependent variable. When the interaction is examined, the F ratio appears to be .894 with an associated probability of .410. The null hypothesis cannot be rejected and thus is retained. See Table 14.

Table 14. Analysis of Variance: Grade Point by Helping Services and IE Categories.

Source of Variation	Sum of Squares	DF	Mean Square	F	Sig of F
Main Effects	11.866	3	3.955	1.329	.264
HELPING SERVICES	2.616	1	2.616	.879	.349
LOC	9.894	2	4.947	1.662	.191
2-Way Interactions	5.323	2	2.662	.894	.410
HELP SERVICES LOC	5.323	2	2.662	.894	.410
Explained	17.190	5	3.438	1.155	.330
Residual	1467.121	493	2.976		
Total	1484.311	498	2.981		

499 cases were processed.
0 cases (.0 percent) were missing.

- 6a. There are no statistically significant differences in GPAs of individuals with internal and external locus of control.

Findings: There are no significant differences between the GPAs of students with low (GPA: 3.40), medium (GPA: 3.52) and high (GPA: 3.19) I-E scores. Null hypothesis cannot be rejected and is retained.

- 6b. There are no significant differences in mean GPAs of those students who choose helping services as majors of choice and those students who choose other majors.

Findings: Students choosing helping services as majors had a mean GPA of 3.22, compared with a mean of 3.39 for students choosing other majors. The difference is not statistically significant and therefore the null is retained.

- Ho7. There are no statistically significant differences between mean scores of students who choose the helping services as a major course of study and students who choose other majors in terms of propensity for risk-taking.

Findings: In a t-test for independent samples of helping services majors and non-helping services majors to determine risk-taking propensity, it was found that there were no significant differences in risk-taking propensity. Note that helping services majors had a mean score of 69.6250 on the Choice Dilemmas questionnaire assessing risk-taking propensity. The non-helping services majors had a mean score of 68.8015. The probability of this difference in means occurring by chance is .654. Therefore, the null hypothesis is retained.

Table 15. t-test for Differences in Means of Risk Categories (Helping vs. Non-Helping Curriculum).

Variable	Number of Cases	Mean	Standard Deviation	Standard Error
RISK-TAKING PROPENSITY				
Group 1- Not Helping Services	408	68.8015	16.019	.793
Group 2- Helping Services	88	69.6250	13.704	1.461
Pooled Variance Estimate				
t Value	Degrees of Freedom	2-tail Probability		
-45	494	.654		

Ho8. There is no statistically significant difference between males and females in propensity for risk.

Findings: The mean score of males on the test for risk-propensity was 66.9803 and for females, 69.8765 which is not a significant difference (P=.057).

Table 16. t-test for Differences in Means of Risk-Taking Propensity.

Variable	Number of Cases	Mean	Standard Deviation	Standard Error
RISK TAKING PROPENSITY				
Group 1-Male	152	66.9803	15.511	1.258
Group 2-Female	340	69.8765	15.625	.847
Pooled Variance Estimate				
t Value	Degrees of Freedom		2-tail Probability	
-1.90	490		.057	

Ho9. There is no statistically significant difference among the mean GPA scores of the three categories of risk-taking propensity.

Findings: There is no statistically significant difference among the mean GPA scores of the three categories of low, medium, or high risk-taking propensity. The F ratio was .368 with an associated probability of .692. Therefore, the null hypothesis is retained.

Table 17. Analysis of Variance: Grade Point by Risk Categories.

Source of Variation	Sum of Squares	DF	Mean Square	F	Sig of F
Main Effects	2.211	2	1.106	.368	.692
RISKCAT	2.211	2	1.106	.368	.692
Explained	2.211	2	1.106	.368	.692
Residual	1479.762	493	3.002		
Total	1481.974	495	2.994		

499 cases were processed.
3 cases (.6 percent) were missing.

CHAPTER 5

CONCLUSIONS, DISCUSSION, AND RECOMMENDATIONS

Conclusions

1. Results from multiple regression indicate that there is no significant multiple relationship between achievement and locus of control, risk-taking propensity, year in school, age and family of origin income level.
2. Results from a t-test conducted to determine if there are differences between males and females on locus of control showed that females scored significantly higher on the external scale.
3. There were no significant interactions in mean scores of high, low, and medium risk categories and marital status.
4. This research demonstrated that females scored significantly higher on achievement than males in a college setting.
5. There was no significant interaction between marital status and choice of helping services major in school.
6. Students with a major in helping services do not have higher GPAs than students choosing other majors.
7. Marital status is not related to GPAs (achievement).

8. There is no significant interaction between locus of control and choice of helping services majors on achievement (GPA).
9. Individuals with internal locus of control and individuals with external locus of control do not show statistically significant differences in mean GPAs.
10. Students who choose helping services as a major course of study do not differ significantly from those who choose other majors in terms of propensity for risk-taking.
11. Males and females do not show a significant difference in risk-taking propensity.
12. Students with a low, medium, or high risk-taking propensity do not differ significantly in mean GPA scores.
13. An analysis of interactions with ethnicity could not be completed because of significant under-representation of minority survey participants.

Discussion

Locus of Control and Achievement

Individuals with an internal locus of control and individuals with external locus of control do not show statistically significant differences in mean GPAs in this investigation. This is not consistent with the majority of studies. Bar-Tal and Bar-Zohar (1977) organized a tally sheet revealing the number of studies that have affirmed the relationship between internal locus of control and achievement. They

reviewed 36 investigations out of which only one had reported a negative relationship between locus of control and achievement. This generally appears to be true even when IQ and cognitive impulsivity are controlled (Messer, 1972).

The present investigation used a much larger N (499) than used in most studies which may add weight to the present findings.

Locus of Control, Achievement and Gender

A significant difference between males and females on locus of control was found in this research. Females scored significantly higher on the external scale. There is considerable confusion on this aspect of gender differences in the literature.

One must address why females may tend to have an external locus of control in college settings. There are many speculations in the literature. For example, there has been considerable speculation that females' interest in social desirability may confound the relationship between locus of control and achievement in women. Nowicki and Walker found that the internal female scoring low in social desirability attained achievement scores higher than any other group. These researchers suggested that this group may feel in control of their environment, but also may resist the pressure to depend solely on males. The researchers pointed out that the external female may achieve less because she does not feel in control of her environment. She may fit well into the role that society expects of a woman (Nowicki and Walker, 1973). Other researchers, such as Cheryl Olson (1988),

suggest that "feminine modesty" continues to prevent women from attributing credit to themselves for ability, rather than luck.

Locus of Control and Helping Services Major

In this study there is no significant interaction between locus of control and choice of helping services majors. There is no literature available which addresses this issue. It was mere speculation that individuals with an internal locus of control might be more inclined to work in professions where the least fortunate individuals are presented. It was suggested by this investigator that internals, in the belief that individuals can change from a helpless position to a proactive position, might gravitate to helping professions. There is no evidence, however, that individuals in helping professions differ significantly in locus of control, risk-taking propensity, or achievement (GPA).

One interesting note, however, may be that individuals who believe that they have more access to professional jobs, graduate schools, etc., have an internal locus of control. This appeals to common sense. This is supported in research by McGinnies, Nordholm, Ward, and Bhanthumnavin in 1974.

Locus of Control and Marital Status

The findings from this study suggest that marital status is related to locus of control. Mean locus of control scores for singles (10.71), married (9.57), widowed (13.25) and divorced (9.64) suggest some interesting possibilities. These scores run in the direction of externality. The low score of the divorced group may be

consistent with the limited research available . Recent studies of divorce have suggested that the divorce experience may lead to enhanced personal development which may include a greater sense of personal control. A study by William Doherty (1980) explored this issue and found that divorced persons were on the average significantly more internal than married persons. The author admitted that this may not be a "divorce-as-development" issue and that the present data cannot determine the issue of causal direction, i.e., are internals apt to divorce or is the greater internality a result of a divorce?

It is interesting to note that married individuals, in this study, had the lowest mean score (most internal) of the four marital status groups which is certainly inconsistent with the previously mentioned research. Various interpretations may be possible. Perhaps the greater economic security of a marital relationship may provide a greater sense of personal control. At this point it is all speculation because of the limited research in this area.

Lefcourt (1982) makes an interesting point. He speculates that locus of control scores shift with relevant environmental events. Events may change so that individuals view themselves as more able to determine their life situations.

The widowed group had the highest score (most external) of all the groups. Interpretations should be made most cautiously as there were only four widows included in this sample. Although any interpretation of such limited data may be considered "wild", a possible suggestion may be that widows may feel that life has

moved in directions beyond which they have no control because their spouses have died.

Locus of Control and Risk Propensity

This investigation found no significant differences among means for high, medium or low risk-taking propensity in locus of control scores. There is very limited research in this area of the relationship between locus of control and risk taking. In one investigation, Liverant and Scodel (1960) found that internals chose significantly more intermediate and significantly fewer low probability bets than the externals. A significantly higher number of internals than externals never selected an extreme high or low probability bet.

Sex Differences in Risk Taking

This investigation found no significant differences in male and female propensity for risk-taking. Again, research reported in the literature is conflicting. Early differences in risk taking are in the expected direction, i.e., boys are bolder than girls (Slovik, 1966). Meyers (1975) found no sex differences in his doctoral research. Wallach and Kogan (1959) found women to be more conservative than men when unsure of their decisions and more extreme when sure of their decisions.

There is really very limited research into sex differences in risk taking.

Academic Risk Taking

Results of this investigation did not show significant differences between the three categories of risk-taking propensity in mean GPA scores. This is not consistent with the available research on risk-taking propensity. Atkinson (1957) believed that individuals with a strong achievement motive would prefer intermediate risks. Also Charlotte Gibson (1960) demonstrated that high achievers preferred intermediate risks. The low achievers' risk preferences, when tested individually, were toward small risks. In large groups they preferred large risks.

Particularly critical is the area of academic risk taking. Moderate risk taking is essential to academic motivation (Clifford et al., 1989). In today's college classroom, academic performance (grades) is valued more than academic challenge.

Gender Differences in Achievement

This investigation found significant differences in mean GPA scores for males and females. Research into gender differences in college achievement yield conflicting results. Mickelson (1989) reports that female underachievement is a myth. Other researchers such as Robertson (1991) found that women experience more slowing in academic progress than men. He suggests that this is a function of more diverse role demands experienced by women as compared to men. Females may have better study habits than males, Gonzales (1983) concluded in his University of Washington investigation.

Minority Group Representation

It was not possible to do analysis on ethnic groups as numbers involved were too small. While there is a significant under-representation of minority group members in this survey, it is consistent with minority under-representation at EMC. In fact, for the year 1992-1993, only seven percent of students were minority group members. Obviously, aggressive outreach needs to be done to bring more minority group members into the higher education arena.

Recommendations

1. Additional investigation into locus of control and the Academic Locus of Control Scale is recommended (Trice et al., 1987). This investigator discovered the existence of this scale too late to utilize it in this investigation. It appears to have some promise.
2. Since there continues to be such inconsistent results in the literature regarding locus of control and achievement, especially for women, continued investigation seems to be appropriate. Interactionist models are being used in which questions are being refined so that it can be determined when and under which conditions locus of control will offer valuable predictions. Additional research along these lines seems to be important.
3. There are significant gender differences in locus of control. It appears to be very relevant that educational establishments work with women to help them credit themselves with success. It was surprising to find that "feminine

modesty" continues to be an issue in the 1990s. There seems to be a critical need for "women's studies" and counseling programs for women to address this issue.

4. In this investigation, women had significantly better grades than males. This finding supports Mickelson (1989) who reported that female underachievement is a myth. If it is true that females have better study habits than males (Gonzales, 1983), it may be wise to emphasize training early in the academic experience for males to learn good study habits.
5. Contrary to much of the available literature on risk taking and achievement, this investigation did not find a significant difference in the GPAs of low, medium, or high risk-taking propensity categories. Continued investigation with other instruments is recommended in the belief of the investigator that academic risk taking is essential to motivation in higher education. Clifford (1988) recommends continued research with the Academic Risk Taking (ART) and the School Failure Tolerance (SFT) measures. This seems like a reasonable approach.
6. In regard to prediction of academic success, research suggests that the addition of non-intellectual variables such as locus of control adds significantly to the validity of the prediction of academic success, particularly for the middle ability group (Goodstein & Heilbrun, 1962). Continued research and exploration in this area is important as accurate prediction may

enable colleges and universities to facilitate appropriate placement of students where they can maximize their potential.

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APPENDICES

APPENDIX A
CONSENT FORM

MONTANA STATE UNIVERSITY

CONSENT FORM

RESEARCH TOPIC: Locus of control and propensity for risk-taking as related to achievement in higher education.

INVESTIGATOR: Margie Cassell, Doctoral Candidate
Montana State University
Bozeman, MT

As a graduate student at Montana State University, I am in the process of completing my dissertation on the locus of control and propensity for risk-taking as related to achievement in higher education. As part of this process, I will survey undergraduate and graduate students in your college. Your participation in this investigation is entirely voluntary. You are free to refuse, without prejudice, and may withdraw at any time.

In this packet you will find three pieces of paper attached to two questionnaires. The first is a consent form to participate in this study. The second is a GPA release form and the third is a request for demographic data. You do not need to place your name on the questionnaires, only your social security number. This will allow for considerable anonymity, but will allow me to check your scores and compare them with your cumulative GPA. I will be the only individual to see your student file and your name will not be recorded at any time.

Again, you do not need to place your name on the questionnaires. Your social security number will allow me to compare your answers with your GPA to determine if there is a relationship between locus of control, risk-taking, and achievement in higher education. Information obtained from this study will only be reported in group form, and no information in the final report will identify you. The answer sheets will be destroyed when the dissertation is complete.

Please feel free to ask any questions of the examiner. You are free, of course, to refuse to participate in this study and may withdraw at any time.

Margie Cassell, Investigator

Date

I agree to participate in this study.

Signature of Participant

Date

APPENDIX B
GPA RELEASE FORM

MONTANA STATE UNIVERSITY
GPA RELEASE FORM

I hereby grant permission for Margie Cassell, a doctoral student at Montana State University, to examine my academic transcripts on file at the Registrar's office for the purposes of research. This permission is only valid until June of 1991.

NAME _____ SOCIAL SECURITY NUMBER:

DATE _____

APPENDIX C
DEMOGRAPHIC DATA FORM

DEMOGRAPHIC DATA ON SURVEY PARTICIPANTS

Please answer the following questions which will be used for statistical analysis. Again, please be assured that answers are strictly confidential. Answers will be destroyed when research is complete.

1. Please give social security number which will code answers on this sheet to answers on the questionnaires: _____
2. Sex:
 - a. Male
 - b. Female
3. Year in school:
 - a. Freshman
 - b. Sophomore
 - c. Junior
 - d. Senior
 - e. Graduate
 Credits earned: _____
4. Age:
 - a. Less than 20 years
 - b. 20 to 24 years
 - c. 25 to 29 years
 - d. 30 to 39 years
 - e. 40 to 49 years
 - f. 50 to 59 years
 - g. 60 and over
5. Race:
 - a. Caucasian
 - b. Mexican-American
 - c. Black
 - d. Asian
 - e. Other _____
6. Present marital status:
 - a. Single, never married
 - b. Married
 - c. Widowed
 - d. Divorced
7. Family of origin income level:
 - a. Under 10,000
 - b. Under 20,000
 - c. Under 30,000
 - d. Under 40,000
 - e. Over 40,000
8. Major course of study: _____

APPENDIX D
SURVEY QUESTIONNAIRES

Social Security Number _____

THE ROTTER I-E

INSTRUCTIONS:

This is a questionnaire to find out the way in which certain important events in our society affect different people. Each item consists of a pair of alternatives lettered a or b. Please select the one statement of each pair (and only one) which you more strongly believe to be more true rather than the one you think you should choose or the one you would like to be true. This is a measure of personal belief; obviously there are no wrong or right answers.

Your answer, either a or b to each question on this inventory, is to be reported beside the question.

Please answer these items carefully but do not spend too much time on any one item. Be sure to find an answer for every choice. For each numbered question, circle the answer a or b, whichever you choose as the statement most true.

In some instances you may discover that you believe both statements or neither one. In such cases, be sure to select the one you more strongly believe to be the case as far as you're concerned. Also try to respond to each item independently when making your choice; do not be influenced by your previous choices (Rotter, 1966).

1. a. Children get into trouble because their parents punish them too much.
b. The trouble with most children nowadays is that their parents are too easy with them.
2. a. Many of the unhappy things in people's lives are partly due to bad luck.
b. People's misfortunes result from the mistakes they make.
3. a. One of the major reasons why we have wars is because people don't take enough interest in politics.
b. There will always be wars, no matter how hard people try to prevent them.
4. a. In the long run people get the respect they deserve in this world.
b. Unfortunately an individual's worth often passes unrecognized no matter how hard he tries.

5.
 - a. The idea that teachers are unfair to students is nonsense.
 - b. Most students don't realize the extent to which their grades are influenced by accidental happenings.
6.
 - a. Without the right breaks one cannot be an effective leader.
 - b. Capable people who fail to become leaders have not taken advantage of their opportunities.
7.
 - a. No matter how hard you try some people just don't like you.
 - b. People who can't get others to like them don't understand how to get along with others.
8.
 - a. Heredity plays the major role in determining one's personality.
 - b. It is one's experiences in life which determine what they're like.
9.
 - a. I have often found that what is going to happen will happen.
 - b. Trusting to fate has never turned out as well for me as making a decision to take a definite course of action.
10.
 - a. In the case of the well prepared student there is rarely if ever such a thing as an unfair test.
 - b. Many times exam questions tend to be so unrelated to course work that studying is really useless.
11.
 - a. Becoming a success is a matter of hard work, luck has nothing to do with it.
 - b. Getting a good job depends mainly on being in the right place at the right time.
12.
 - a. The average citizen can have an influence in government decisions.
 - b. This world is run by the few people in power, and there is not much the little guy can do about it.

13. a. When I make plans, I am almost certain that I can make them work.
b. It is not always wise to plan too far ahead because many things turn out to be a matter of good or bad fortune anyhow.
14. a. There are certain people who are just no good.
b. There is some good in everybody.
15. a. In my case getting what I want has little or nothing to do with luck.
b. Many times we might just as well decide what to do by flipping a coin.
16. a. Who gets to be the boss often depends on who was lucky enough to be in the right place first.
b. Getting people to do the right thing depends upon ability, luck has little or nothing to do with it.
17. a. As far as world affairs are concerned, most of us are the victims of forces we can neither understand nor control.
b. By taking an active part in political and social affairs the people can control world events.
18. a. Most people don't realize the extent to which their lives are controlled by accidental happenings.
b. There really is no such thing as "luck."
19. a. One should always be willing to admit mistakes.
b. It is usually best to cover up one's mistakes.
20. a. It is hard to know whether or not a person really likes you.
b. How many friends you have depends upon how nice a person you are.
21. a. In the long run the bad things that happen to us are balanced by the good ones.
b. Most misfortunes are the result of lack of ability, ignorance, laziness, or all three.

22. a. With enough effort we can wipe out political corruption.
- b. It is difficult for people to have much control over the things politicians do in office.
23. a. Sometimes I can't understand how teachers arrive at the grades they give.
- b. There is a direct connection between how hard I study and the grades I get.
24. a. A good leader expects people to decide for themselves what they should do.
- b. A good leader makes it clear to everybody what their jobs are.
25. a. Many times I feel that I have little influence over the things that happen to me.
- b. It is impossible for me to believe that chance or luck plays an important role in my life.
26. a. People are lonely because they don't try to be friendly.
- b. There's not much use in trying too hard to please people, if they like you, they like you.
27. a. There is too much emphasis on athletics in high school.
- b. Team sports are an excellent way to build character.
28. a. What happens to me is my own doing.
- b. Sometimes I feel that I don't have enough control over the direction my life is taking.
29. a. Most of the time I can't understand why politicians behave the way they do.
- b. In the long run the people are responsible for bad government on a national as well as on a local level.

Social Security Number _____

OPINION QUESTIONNAIRE II

INSTRUCTIONS: On the following pages you will find a series of situations that are likely to occur in everyday life. The central person in each situation is faced with a choice between two alternative courses of action, which we might call X and Y. Alternative X is more desirable and attractive than alternative Y, but the probability of attaining or achieving X is less than that of attaining or achieving Y.

For each situation on the following pages, you will be asked to indicate the minimum odds of success you would demand before recommending that the more attractive or desirable alternative X be chosen.

Read each situation carefully before giving your judgment. Try to place yourself in the position of the central person in each of the situations. There are twelve situations in all. Please do not omit any of them.

1. Mr. A., an electrical engineer, who is married and has one child, has been working for a large electronics corporation since graduating from college five years ago. He is assured of a lifetime job with a modest, though adequate, salary, and liberal pension benefits upon retirement. On the other hand, it is very unlikely that his salary will increase much before he retires. While attending a convention, Mr. A is offered a job with a small, newly founded company which has a highly uncertain future. The new job would pay more to start and would offer the possibility of a share in the ownership if the company survived the competition of the larger firms.

Imagine that you are advising Mr. A. Listed below are several probabilities or odds of the new company's proving financially sound.

Please check the lowest probability that you would consider acceptable to make it worthwhile for Mr. A to take the new job.

- a. _____ The chances are 1 in 10 that the company will prove financially sound.
- b. _____ The chances are 3 in 10 that the company will prove financially sound.
- c. _____ The chances are 5 in 10 that the company will prove financially sound.
- d. _____ The chances are 7 in 10 that the company will prove financially sound.
- e. _____ The chances are 9 in 10 that the company will prove financially sound.
- f. _____ Place a check here if you think Mr. A should not take the new job matter what the probabilities.

2. Mr. B, a 45-year-old accountant has recently been informed by his physician that he has developed a severe heart ailment. The disease would be sufficiently serious to force Mr. B to change many of his strongest life

habits--reducing his work load, drastically changing his diet, giving up favorite leisure-time pursuits. The physician suggests that a delicate medical operation could be attempted which, if successful, would completely relieve the heart condition, but its success could not be assured, and in fact, the operation might prove fatal.

Imagine that you are advising Mr. B. Listed below are probabilities or odds that the operation will prove successful.

Please check the lowest probability that you would consider acceptable for the operation to be performed.

- a. _____ Place a check here if you think Mr. B should not have the operation no matter what the probabilities.
- b. _____ The chances are 9 in 10 that the operation will be a success.
- c. _____ The chances are 7 in 10 that the operation will be a success.
- d. _____ The chances are 5 in 10 that the operation will be a success.
- e. _____ The chances are 3 in 10 that the operation will be a success.
- f. _____ The chances are 1 in 10 that the operation will be a success.

3. Mr. C., a married man with two children has a steady job that pays him about \$6,000 (1960 dollars) per year. He can easily afford the necessities of life, but few of the luxuries. Mr. C's father, who died recently, carried a \$1,000 life insurance policy. Mr. C would like to invest this money in stocks. He is well aware of the secure "blue-chip" stocks and bonds that would pay approximately 6% on his investment. On the other hand, Mr. C has heard that the stocks of a relatively unknown Company X might double their present value if a new product currently in production is favorably received by the buying public. However, if the product is unfavorably received, the stocks would decline in value.

Imagine that you are advising Mr. C. Listed below are several probabilities or odds that Company X's stocks will double their value.

Please check the lowest probability that you would consider acceptable for Mr. C to invest in Company X's Stocks.

- a. _____ The chances are 1 in 10 that the stocks will double their value.
- b. _____ The chances are 3 in 10 that the stocks will double in value.
- c. _____ The chances are 5 in 10 that the stocks will double in value.
- d. _____ The chances are 7 in 10 that the stocks will double in value.
- e. _____ The chances are 9 in 10 that the stocks will double in value.
- f. _____ Place a check here if you think that Mr. C should not invest in Company X stocks, no matter what the probabilities.

4. Mr. D is the captain of College X's football team. College X is playing its traditional rival, College Y, in the final game of the season. The game is in its final seconds, and Mr. D's team, College X is behind in the score. College X has

time to run one more play. Mr. D, the captain, must decide whether it would be best to settle for a tie score with a play which would be almost certain to work or, on the other hand, should he try a more complicated play and risky play which could bring victory if it succeeded, but defeat if not.

Imagine that you are advising Mr. D. Listed below are probabilities or odds that the risky play will work.

Please check the lowest probability that you would consider acceptable for the risky play to be attempted.

- a. _____ Place a check here if you think Mr. D should not attempt the risky play no matter what the probabilities.
- b. _____ The chances are 9 in 10 that the risky play will work.
- c. _____ The chances are 7 in 10 that the risky play will work.
- d. _____ The chances are 5 in 10 that the risky play will work.
- e. _____ The chances are 3 in 10 that the risky play will work.
- f. _____ The chances are 1 in 10 that the risky play will work.

5. Mr. E is president of a light metals corporation in the United States. The corporation is quite prosperous and has strongly considered the possibilities of business expansion by building another plant in the U.S. where there would be a moderate return on the initial investment, or building a plant in a foreign country. Lower labor costs and easy access to raw materials in that country would mean a much higher return on the initial investment. On the other hand, there is a history of political instability and revolution in the foreign country under consideration. In fact, the leader of a small minority party is committed to nationalizing, that is, taking over, all foreign investments.

Imagine that you are advising Mr. E. Listed below are several probabilities or odds of continued political stability in the foreign country under consideration.

Please check the lowest probability that you would consider acceptable for Mr. E's corporation to build a plant in that country.

- a. _____ The chances are 1 in 10 that the foreign country will remain politically stable.
- b. _____ The chances are 3 in 10 that the foreign country will remain politically stable.
- c. _____ The chances are 5 in 10 that the foreign country will remain politically stable.
- d. _____ The chances are 7 in 10 that the foreign country will remain politically stable.
- e. _____ The chances are 9 in 10 that the foreign country will remain politically stable.
- f. _____ Place a check here if you think Mr. E's corporation should not build a plant in the foreign country, no matter what the probabilities.

6. Mr. F is currently a college senior who is very eager to pursue graduate study in chemistry leading to a Doctor of Philosophy degree. He has been accepted by both University X and University Y. University X has a world-wide reputation for excellence in chemistry. While a degree from University X would signify outstanding training in this field, the standards are so very rigorous that only a fraction of the degree candidates actually receive the degree. University Y, on the other hand, has much less of a reputation in chemistry, but almost everyone admitted is awarded the Doctor of Philosophy degree, though the degree has much less prestige than the corresponding degree from University X.

Imagine that you are advising Mr. F. Listed below are several probabilities or odds that Mr. F would be awarded a degree at University X, the one with the greater prestige.

Please check the lowest probability that you would consider acceptable to make it worthwhile for Mr. F to enroll in University X rather than University Y.

- a. _____ Place a check here if you think Mr. F should not enroll in University X no matter what the probabilities.
- b. _____ The chances are 9 in 10 that Mr. F would receive a degree from University X.
- c. _____ The chances are 7 in 10 that Mr. F would receive a degree from University X.
- d. _____ The chances are 5 in 10 that Mr. F would receive a degree from University X.
- e. _____ The chances are 3 in 10 that Mr. F would receive a degree from University X.
- f. _____ The chances are 1 in 10 that Mr. F would receive a degree from University X.

7. Mr. G, a competent chess player, is participating in a national chess tournament. In an early match he draws the top-favored player in the tournament as his opponent. Mr. G has been given a relatively low ranking in view of his performance in previous tournaments. During the course of his play with the top-favored man, Mr. G notes the possibility of a deceptive though risky maneuver which might bring him a quick victory. At the same time, if the attempted maneuver should fail, Mr. G would be left in an exposed position and defeat would almost certainly follow.

Imagine that you are advising Mr. G. Listed below are several probabilities or odds that Mr. G's deceptive play would succeed.

Please check the lowest probability that you would consider acceptable for the risky play in question to be attempted.

- a. _____ The chances are 1 in 10 that the play would succeed.
- b. _____ The chances are 3 in 10 that the play would succeed.

- c. _____ The chances are 5 in 10 that the play would succeed.
- d. _____ The chances are 7 in 10 that the play would succeed.
- e. _____ The chances are 9 in 10 that the play would succeed.
- f. _____ Place a check here if you think Mr. G should not attempt the risky play, no matter what the probabilities.

8. Mr. H, a college senior, has studied piano since childhood. He has won amateur prizes and given small recitals, suggesting that Mr. H has considerable musical talent. As graduation approaches, Mr. H has the choice of going to medical school to become a physician, a profession which would bring certain prestige and financial rewards; or entering a music conservatory of music for advanced training with a well-known pianist. Mr. H realizes that even upon completion of his piano studies, which would take many more years and a lot of money, success as a concert pianist would not be assured.

Imagine that you are advising Mr. H. Listed below are several probabilities or odds that Mr. H would succeed as a concert pianist.

Please check the lowest probability that you would consider acceptable for Mr. H to continue with his musical training.

- a. _____ Place a check here if you think Mr. H should not pursue his musical training no matter what the probabilities.
- b. _____ The chances are 9 in 10 that Mr. H would succeed as a concert pianist.
- c. _____ The chances are 7 in 10 that Mr. H would succeed as a concert pianist.
- d. _____ The chances are 5 in 10 that Mr. H would succeed as a concert pianist.
- e. _____ The chances are 3 in 10 that Mr. H would succeed as a concert pianist.
- f. _____ The chances are 1 in 10 that Mr. H would succeed as a concert pianist.

9. Mr. J is an American captured by the enemy in World War II and placed in a prisoner-of-war camp. Conditions in the camp are quite bad, with long hours of hard physical labor and a barely sufficient diet. After spending several months in this camp, Mr. J notes the possibility of escape by concealing himself in a supply truck that shuttles in and out of the camp. Of course, there is no guarantee that the escape would prove successful. Recapture by the enemy could well mean execution.

Imagine that you are advising Mr. J. Listed below are several possibilities or odds of a successful escape from the prisoner-of-war camp.

Please check the lowest probability that you would consider acceptable for an escape to be attempted.

- a. _____ The chances are 1 in 10 that the escape would succeed.
- b. _____ The chances are 3 in 10 that the escape would succeed.
- c. _____ The chances are 5 in 10 that the escape would succeed.
- d. _____ The chances are 7 in 10 that the escape would succeed.

- e. _____ The chances are 9 in 10 that the escape would succeed.
- f. _____ Place a check here if you think Mr. J should not try to escape no matter what the probabilities.

10. Mr. K is a successful businessman who has participated in a number of civic activities of considerable value to the community. Mr. K has been approached by the leaders of his political party as a possible congressional candidate in the next election. Mr. K's party is a minority party in the district, though the party has won occasional elections in the past. Mr. K would like to hold political office, but to do so would involve a serious financial sacrifice, since the party has insufficient campaign funds. He would also have to endure the attacks of his political opponents in a hot campaign.

Imagine that you are advising Mr. K. Listed below are several probabilities or odds of Mr. K's winning the election in his district.

Please check the lowest probability that you would consider acceptable to make it worthwhile for Mr. K to run for political office.

- a. _____ Place a check here if you think that Mr. K should not run for political office no matter what the probabilities.
- b. _____ The chances are 9 in 10 that Mr. K would win the election.
- c. _____ The chances are 7 in 10 that Mr. K would win the election.
- d. _____ The chances are 5 in 10 that Mr. K would win the election.
- e. _____ The chances are 3 in 10 that Mr. K would win the election.
- f. _____ The chances are 1 in 10 that Mr. K would win the election.

11. Mr. L, a married 30-year-old research physicist, has been give a five- year appointment by a major university laboratory. As he contemplates the next five years, he realizes that he might work on a difficult, long-term problem which, if a solution can be found, would resolve basic scientific issues in the field and bring high scientific honors. If no solution were found, however, Mr. L would have little to show for his five years in the laboratory, and this would make it hard for him to get a good job afterwards. On the other hand, he could, as most of his professional associates are doing, work on a series of short-term problems where solutions would be easier to find, but where the problems are of lesser scientific importance.

Imagine that you are advising Mr. L. Listed below are several probabilities or odds that a solution would be found to the difficult, long-term problem that Mr. L has in mind.

Please check the lowest probability that you would consider acceptable to make it worthwhile for Mr. L to work on the more difficult long-term problem.

- a. _____ The chances are 1 in 10 that Mr. L would solve the long-term problem.
- b. _____ The chances are 3 in 10 that Mr. L would solve the long-term problem.
- c. _____ The chances are 5 in 10 that Mr. L would solve the long-term problem.

- d. _____ The chances are 7 in 10 that Mr. L would solve the long-term problem.
- e. _____ The chances are 9 in 10 that Mr. L would solve the long-term problem.
- f. _____ Place a check here if you think Mr. L should not choose the long-term, difficult problem, no matter what the probabilities.

12. Mr. M is contemplating marriage to Miss T, a girl whom he has known for a little more than a year. Recently, however, a number of arguments have occurred between them, suggesting some sharp differences of opinion in the way each views certain matters. Indeed, they decide to seek professional advice from a marriage counselor as to whether it would be wise for them to marry. On the basis of these meetings with a marriage counselor, they realize that a happy marriage, while possible, would not be assured.

Imagine that you are advising Mr. M and Miss T. Listed below are several probabilities or odds that their marriage would prove to be a happy and successful one.

Please check the lowest probability that you would consider acceptable for Mr. M and Miss T to get married.

- a. _____ Place a check here if you think Mr. M and Miss T should not marry, no matter what the probabilities.
- b. _____ The chances are 9 in 10 that the marriage would be happy and successful.
- c. _____ The chances are 7 in 10 that the marriage would be happy and successful.
- d. _____ The chances are 5 in 10 that the marriage would be happy and successful.
- e. _____ The chances are 3 in 10 that the marriage would be happy and successful.
- f. _____ The chances are 1 in 10 that the marriage would be happy and successful.

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