AN ASSESSMENT OF THE APPROPRIATENESS OF TRADITIONAL ADMISSIONS CRITERIA FOR ADMISSION AND ELIGIBILITY OF STUDENT-ATHLETES

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Submitted to the Faculty of the
Graduate College of the
Oklahoma State University
in partial fulfillment of
the requirements for
the Degree of
DOCTOR OF PHILOSOPHY
December, 1996

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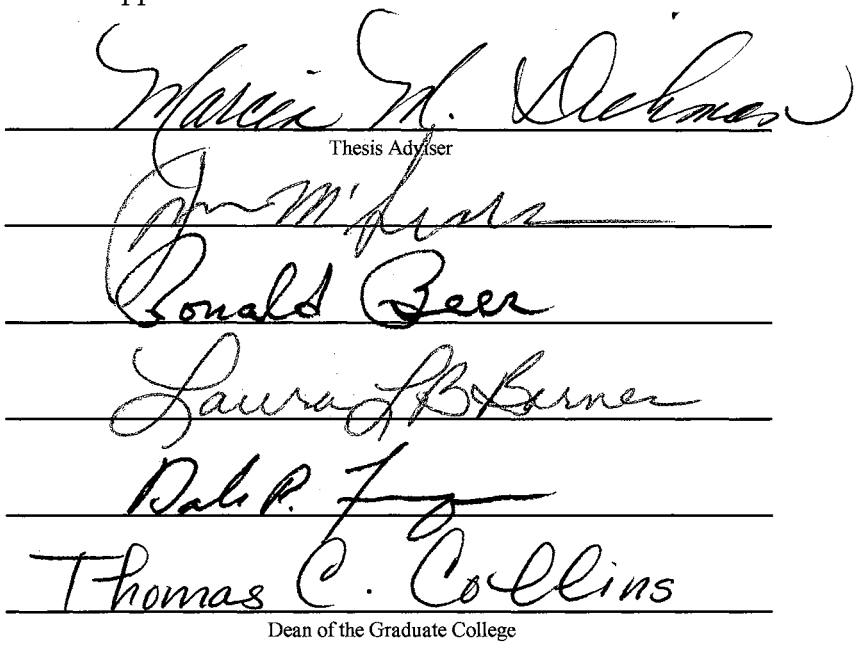
Thesis Approved:



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ACKNOWLEDGMENTS

I would like to express my sincere thanks to many individuals who made this project possible. To my committee chair, Dr. Dale Fuqua, who provided a great deal of expert help over the past four years, thanks for recognizing my potential and assisting me with opportunities that have help shape my professional future. To my major advisor, Dr. Marcia Dickman, a very special thank you for having the patience and persistence to help me through the last five years; for all of your help in reading this dissertation; and for tolerating my often controversial discussions in class. Thanks also to my other committee members, Dr. Ronald Beer, Dr. Jim Seals, and Dr. Laura Barnes. You have provided different, yet very special guidance and support for me over the last five years and particularly for this dissertation project.

I also would like to recognize those who have had a less direct influence on this project, yet have made a major contribution to my successes because of their influence on my life. Thanks to my little league baseball coach, Elbert Isley, who always had high hopes and big dreams for me and made me feel like a winner. Thanks to my high school basketball coach, Buddy Armstrong, who first discovered me as a skinny fourteen year-old basketball player "wanna-be" in the Woodson Park gymnasium and convinced me that anything was possible if I were willing to put forth the effort and commit to a goal. A thanks also goes to coach Jim Poteet who gave me the opportunity to attend an outstanding college and participate as an intercollegiate athlete. A special thanks to Dr.

Loren Gresham and Dr. Ron Johnson, both of whom taught me by example, that athletic excellence and intellectual greatness are not mutually exclusive.

Many family members have encouraged and supported me through the years. It would be too lengthy to acknowledge each individually so I would like to thank all of my nieces, nephews, aunts, uncles, cousins, and in-laws who have at one time or another encouraged me to greater heights through their love and support. And to my stepson Garrett Johnson, thanks for your innocent naiveté. Your excitement about me becoming a doctor was refreshing, even if it was because you thought that it would make us rich.

To my big brother Darrell Robinson, thanks for always being my greatest fan and investing of yourself in my goals and dreams. To my older sister Barbara Miller, thanks for always loving and supporting me, even when you did not understand my actions. To my little sister Beverly Robinson, thanks for proudly wearing the mantle of "Steve's little sister" through high school and college and for making me feel that I was someone special. To my parents, Helen Ruth and Arthur Robinson, thanks so much for giving me a stable home-life that enhanced my spiritual, intellectual, and physical development. You will never know how fortunate I feel to have been your son. I owe most of what I am today to your loving guidance.

To my loving daughter Heather, thanks so much for your encouragement and support. I remember vividly what you said during a conversation regarding the sacrifices you were being asked to make because of my academic time commitments and graduate assistant income. Your statement, "Dad, I want you to finish your doctorate and know that I am really proud of you for pursuing this goal" was my single greatest motivation to complete this degree. You are the most wonderful kid a dad could have. And also a thanks goes to

my beautiful baby daughter MacKenzie. Although not knowingly encouraging me with this project, your smile and innocent love for me made me feel so special. It did, however, make it difficult to work late hours knowing that you were at home waiting for me to play with you.

And lastly, but certainly not least, thanks to my lovely wife Rhonda. You have always been the ultimate encouragement and support for my efforts. You still believe that I am the most intelligent person you know, even if you do not always agree with me. Your sacrifice and dedication to me caused me to believe in myself in ways that I never had before. Thanks for understanding my need to work late many nights. But most of all, thanks Rhonda for continually showering me with your love and for rejoicing with me in our accomplishments.

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CHAPTER I

INTRODUCTION

For sometime, educators and other interested parties have been asking questions about the effects of intercollegiate athletics on the student-athlete (Hanford, 1979). As early as 1905, President Roosevelt admonished colleges regarding the philosophy of winning without regard to sportsmanship that was permeating college football (Lewis, 1969). The commercialization of college athletics brought with it pressure to win, thus inviting a professionalization of intercollegiate sports programs (Bloland, 1987; Hanford, 1979; and Renick, 1974). With this philosophy of competition permeating major college athletics, concern for the development of the student-athlete has become the focus of several studies (Adler & Adler, 1985, 1987; Ervin, Saunders, Gillis, & Hogrebe, 1985; Landers, Feltz, Obermeir, & Brouse, 1978; Purdy, Eitzen, & Hufnagel, 1982; Ryan, 1989; Stuart, 1985).

Along with the high level of commercialization that is present with major college athletics, come the accusations of exploitation. University athletic programs are accused of recruiting athletes based on their athletic performance regardless of their ability to perform well academically at that particular institution (Ervin, et al., 1985; Spivey & Jones, 1975). Other findings have indicated that student-athletes typically have lower

entrance credentials than non-athletes (Ervin, et al., 1985; Gurney & Stuart, 1987; Purdy, et al., 1982; Spivey & Jones, 1975; Whitner & Myers, 1986). Often these studies focus on the adjustment of the African-American student-athlete and perceived exploitation of this specific group of young people (Edwards, 1984; Spivey & Jones, 1975; Welch, 1982; Williams, 1983).

For many, the purpose of the college or university is entirely academic in nature. For them, athletic programs could be eliminated totally from college campuses and the mission of learning would not be diminished at all (Bloland, 1987). It is unlikely, however, that intercollegiate athletics will be eliminated from our college campuses due to the public demand and alumni support of the college athletic programs. With that in mind, it would serve us well to identify the advantages and disadvantages of college athletic programs and focus on minimizing the disadvantages while maximizing the potential advantages to the student-athlete, the student body, the alumni, the geographic community, and the academic community.

Most persons associated with university systems would agree, if not completely believe, that intercollegiate athletics should support the philosophy and contribute to the success of the university it represents as well as avoid exploitation of student-athletes. In an effort to encourage this type of relationship, the National Collegiate Athletic Association (NCAA) has enacted legislation designed to ensure the student-athletes' chances for academic success. One of the more publicized pieces of legislation came in the form of Rule 48 enacted in 1983 (NCAA, 1983). Under Rule 48 a student-athlete must have a minimum 2.00 high school grade point average in a core curriculum of at least 11 defined academic courses and have obtained a minimum ACT composite score of 15 or

a minimum SAT total score of 700 in order to practice, play, and receive athletically related financial aid as a college freshman. This proposal itself has become the focus of several studies (Edwards, 1984; Ervin, Saunders, & Gillis, 1984; and Williams, 1983). These studies question the proposal's legitimacy in affecting academic success and what is perceived as its discriminatory biases. Williams (1983) objected to Rule 48 claiming that standardized test scores were not valid entrance criteria for many prospective student-athletes.

Although recognized by many as less than perfect legislation, some would contend that Rule 48 is a step in the right direction. Edwards (1984) wrote, "its shortcomings not withstanding, I am fundamentally supportive of Rule 48 because it communicates to young athletes, beginning with those who are sophomores in high school, that we expect them to develop academically as well as athletically" (p. 10).

Purpose of the Study

The purpose of this study was to assess the appropriateness of traditional admission criteria for student-athletes. This study attempted to determine if admission test scores, high school grade point average, and high school rank percentile predict first semester grade point average and general education grade point average differently for student-athletes than for non-athletes and between various subgroups of athletes. More specifically, do the slopes or intercepts differ between these groups when using a simple linear regression equation to predict first semester or general education grade point average from admission test scores, high school grade point average, or high school rank percentile. These analyses are appropriate to determine if a test bias exists, or whether the

criteria are unfair, for one or both of the groups. Understanding how student-athletes differ from non-athletes, on these variables, should allow for better academic assessment of new student-athletes. It is likely that the more accurately we can predict academic success for student-athletes, the more we will be able to establish appropriate admission and eligibility criteria.

Need for the Study

The varied results of the research to date (Adelman, 1990; Purdy et al., 1982; Ryan, 1989) indicate that many factors come into play in assessing intercollegiate athletes. Much research is still needed to determine the most effective assessment techniques for student-athletes. There exists no clear cut understanding of this topic. Most studies have been conducted on the student-athlete population using case study, descriptive, or simple correlational coefficient comparison approaches. No research could be located that examined whether the traditional admission and eligibility criteria are appropriate for student-athletes by conducting slope and intercept analyses between various groups of student-athletes and non-athletes. Although based on correlations, the examination of slopes and intercepts is the appropriate method of assessing test bias and fairness (Anastasi, 1988).

Much published research has been conducted on college students in general by comparing slopes and intercepts between various ethnic groups, as well as between males and females; however, student-athletes have yet to be studied as a unique group in this fashion. Therefore, it is imperative that a more in-depth analysis of the student-athlete

population be conducted in order to ascertain whether or not bias issues exist in the admission and eligibility processes for student-athletes.

University admissions criteria have traditionally been linked to standardized test scores and high school academic performance such as high school grade point average and high school graduation class rank. As an example, the institution in the current study requires an ACT score of at least a 21, or a high school grade point average of 3.00 and ranking in the upper third of the student's graduation class as general admission criteria (Oklahoma State University, 1994). These admission criteria are built on standardized test scores, high school grade point average, and high school rank percentile (relative standing in high school graduation class). Like university admission decisions, eligibility for athletic participation is based on standardized test scores and high school grade point average (NCAA, 1995). For this reason, this study utilizes ACT/SAT scores, high school grade point average, and high school rank percentile as predictor variables.

This study was needed to attempt to determine whether or not traditional admission criteria is equally applicable to student-athletes and non-athlete students. Additionally, academic advisors will be better equipped to serve student-athletes because of a better understanding of which variables have more predictive validity with regard to the student-athlete's academic success.

Statement of the Problem

The question investigated in this study is: Are the same admissions criteria as useful in predicting academic success for student-athletes as they are for non-athletes and are these criteria equally useful in predicting academic success the same for all groups of

student-athletes? Specifically, are ACT and/or SAT scores, high school grade point average, and high school class rank percentile as predictive of general education grade point average and overall first semester college grade point average for all groups of student-athletes as for non-athletes?

Definition of Terms

ACT/SAT. A student's best American College Testing Assessment (ACT) composite score (American College Testing, 1989) or the ACT equivalent calculated from the student's Scholastic Aptitude Test (SAT) total score (Education Testing Service, 1980). This is the independent variable that accounts for the standardized admissions test.

Constant. Another term for intercept of a regression line. The point at which the regression line intercepts the Y axis. Also, the mean of Y when $X = 0$.

First semester grade point average. The cumulative college grade point average obtained by the student in their first semester of full-time enrollment at the university.

Female non-athlete. A female student enrolled in the university who was not classified in the university records as a member of an intercollegiate athletic team.

Female student-athlete. A female student enrolled in the university who was classified in the university records as a member of an intercollegiate athletic team. This included both scholarship and non-scholarship participants. Also included were female student-athletes who were not eligible for competition yet were classified as student-athletes (redshirts).

General education grade point average. The grade point average calculated from the student's grades in Freshmen Composition I (ENGL 1113), English Composition II

(ENGL 1213), College Algebra (MATH 1513), American History (HIST 1103), and American Government (POLSC 1013). This general education grade point average variable is not a reflection of all of the student's general education courses. Some of the students in this study had general education grade point averages which were computed from less than all five of these courses.

High school class size. The size of the high school graduation class in which the student graduated.

High school grade point average. High school grade point average for all of the courses taken by the student in four years of high school.

High school rank. The rank of the student in their high school graduation class as reported on their final high school transcript.

High school rank percentile. The percentile rank of the student in their high school graduation class. This is calculated by dividing high school class size into high school rank and then subtracting from one (1-[high school rank / high school class size]).

Intercept. The point at which the regression line intercepts the Y axis. Also referred to as the constant.

Male major-sport student-athlete. Male student classified in the university records as a member of a men's intercollegiate participant on either the football or basketball team either as a scholarship or non-scholarship participant. Also included were male football and basketball student-athletes who were not eligible for competition yet were classified as student-athletes (redshirts).

Male minor-sport student-athlete. Male student classified in the university records as a member of an intercollegiate athletic team who participated in men's intercollegiate

baseball, men's intercollegiate wrestling, men's intercollegiate track, men's intercollegiate golf, or men's intercollegiate tennis either as a scholarship or non-scholarship participant. Also included were male baseball, wrestling, track, golf, and tennis student-athletes who were not eligible for competition yet were classified as student-athletes (redshirts).

Male non-athlete. A male student enrolled in the university who was not classified in the university records as a member of an intercollegiate athletic team.

Regression coefficient. The coefficient obtained through a regression analysis for a given independent variable. Also referred to as "B" or "B weight."

Standardized admissions test. The American College Testing Company Assessment test (ACT) and the Scholastic Aptitude Test (SAT).

Assumptions and Limitations

1. The small number of athletes in certain sports (e.g. basketball) required the grouping of athletes from various intercollegiate sports teams into larger groups of major-sport, minor-sport, and women's sports. It would possibly be more informative if each individual sport had sufficient numbers of student-athletes so that grouping would not be necessary.
2. In developing a model for predicting academic success of student-athletes, it would be better to conduct a longitudinal study involving the entire college career of the student-athletes including graduation rate. This study is somewhat limited in that only the first semester grade point average and the grade point average in certain general education courses were considered. Graduation rate was not included because those

students matriculating in the fall 1990 class comprised the first class of entering freshmen who were required to have scores from the new enhanced ACT test. It would have been inappropriate to combine old ACT scores and enhanced ACT scores in the analyses since ACT enhanced equivalent scores could not be obtained.

3. This study only analyzed student-athletes and non-athletes enrolled at a medium-sized Midwestern state university as new college students under the age of twenty-one years who had no previous college course work (traditional freshmen). Comparisons were not made for the student-athletes coming to that university as transfer students; therefore, the results may not give a full understanding of the university's student-athlete population. Student-athletes who are not eligible for admission to the university upon high school graduation may enroll one or two years later as a transfer student after attending another non-Division I institution. These transfer students were not required to provide ACT scores, SAT scores, or high school records upon their admission to the university at which this study was conducted; therefore, they were not included in the analyses.
4. ACT/SAT, the variable used to represent standardized admission tests, was a mixture of ACT composite scores and ACT equivalent scores calculated from SAT total scores. It would have been better to have sufficient numbers of subjects to use ACT and SAT scores independently without combining the scores from the two tests. However, it is assumed that this procedure of combining the variables provides this study with more reliable data than would have been obtained by omitting data from those subjects having only SAT scores. The correlation between ACT and SAT

scores were very high (r = .86) and they each correlated with the dependent variable similarly; however, this might still be viewed as somewhat of a limitation.

5. The fact that many of the subjects had a general education grade point average calculated from fewer than the five designated courses could prove to be a limitation of this study. It is assumed that these subjects will perform relatively consistently across the five courses; however, this may not always prove to be the case.

Significance of the Study

This study will be useful in helping academic advisors of student-athletes understand how useful traditional admission criteria are in predicting academic success for student-athletes. The more accurately prediction models of academic success can be developed, the greater the possibility for intervention. One of the problems academic advisors of student-athletes face is that the traditional college admissions tests are thought to be of little use when attempting to predict academic success for student-athletes (Walter & Smith, 1986). It is imperative that academic advisors understand any usefulness of such instruments and how to apply appropriately the results to individual students. A tendency exists to use admission test scores and other admission criteria equally for all populations when admission and placement decisions are made. An understanding of how these scores and grades should be applied to the various groups within the population of college students in order to maximize a student's chances for academic success is extremely important. Also, this study could make a major contribution to the development of additional methods for assessing incoming student-athletes by identifying strengths and weaknesses of the current methods or criteria.

As new, more reliable, and valid methods of assessing this population are developed, the more effective academic support programs can become for student-athletes. Additionally, empirical support for a more appropriate method of assessing this population using standardized admission test scores and high school academic performance criteria could lead to a more efficient use of support personnel's time and athletic department moneys.

Organization of the study

Chapter 1 has identified issues relevant to the study of student-athletes and their academic success. Also mentioned has been the claim by some that student-athletes have been exploited by the system of intercollegiate athletics. The need for this statistical evaluation of the appropriateness of traditional admission criteria has been discussed. Also, this chapter states the purpose of the study as one of assessing the predictive validity of traditional admission criteria as it relates to student-athletes.

Chapter 2 provides the reader an overview of the literature related to the theories of college student development and achievement motivation. A broad discussion of college students in general, and student-athletes in particular, and the issues regarding their academic success. Also reported in this chapter is the literature related to academic preparation of student-athletes and academic attainment of student-athletes. This chapter cites the literature related to test bias and test fairness issues when predicting academic success from standardized test scores and high school record for college students, in general, and for student-athletes in particular.

Chapter 3 describes the methodology of the study. This chapter identifies the research design, the subjects of the study, the instrumentation, the null hypotheses, the procedures used, and the method by which the data were analyzed.

Chapter 4 reports the results of the tests for each of the null hypotheses as well as results from an additional t-test analysis of the groups. Chapter 5 provides a summary and discussion related to the results. Additionally, chapter 5 provides recommendations for further research, as well as suggestions for practice.

CHAPTER II

REVIEW OF THE LITERATURE

This review of the literature outlines principle areas of concern addressed in this study. The first section discusses theories that relate specifically to student academic attainment. The reasonableness of traditional measures of academic success and predictor variables are also discussed. Also reviewed is the literature regarding the effectiveness and the process of predicting academic success from these traditional variables, as well as the restrictions in predicting academic attainment for college students. Finally, this review considers the literature related specifically to intercollegiate athletes, academic success of intercollegiate athletes, and predicting academic attainment for student-athletes.

Theories Related to Academic Attainment

Many theories have been developed theories or existing theories adapted to explain the development and academic attainment of college students (Chickering, 1969; Chickering & Reisser, 1993; Perry, 1970). Although these theories attempt to explain student behavior and development in areas other than academic attainment, the implication is that academic attainment is a very important component of the overall development of the student. Exploring some of these theories might give insight into how college students progress through the higher education experience.

Traditionally, academic outcomes have been measured in terms of grade point average and degree completion. Although it is likely that the outcomes of a collegiate experience are much too broad to be measured by grade point average or a degree completion rate alone, it is also likely that a great deal can still be learned by using these traditional variables as measures of student outcomes. This section will discuss theories that have been used to explain college student achievement or outcomes. Although not an exhaustive review of theories related to achievement, this section should provide some meaningful insight into college student achievement, in general, and into the development of college students and how they are motivated to achieve academically, in particular.

Cognitive Development Theory

William Perry (1970) proposed a theory of intellectual and ethical development of college students. This theory included a nine-position sequence of development along an intellectual and ethical continuum. According to Perry, a student who was progressing through the developmental stages would pass from a dualistic state, where everything tends to be concrete and absolute, into a multiplistic state where the student values multiple answers to problems, each of which are given the same weight or value. As the student progresses past this multiplistic state into a relativistic state, he/she begins to see the relative value of different perspectives and has the ability to evaluate his/her own ideas relative to those of others. Ultimately, it is the goal of the educator to help students reach a commitment in relativism. This commitment allows the student to reach a level of self-identity that will help him/her to function as a productive member of a diverse society. This theory views intellectual growth as a greater experience than just academic

attainment as defined by grade point average; however, it may be assumed that students who progress through the various levels of intellectual and ethical growth are indeed capable of succeeding academically. At each of the stages the student sees him/herself, the instructors, and even the truth in very different terms.

Perry (1970) contends that major personal development occurs as late as the college years. Perry also recognizes a reciprocal obligation for the educational community to encourage the student as he/she risks forward movement through the stages. With this in mind, it is likely that college students are impacted academically by a of variety issues. If indeed students arrive at college at different developmental levels, with differing views of the world, and different cognitive ways of dealing with issues, it is reasonable to assume that instructional approach might impact a student's academic attainment.

In a University of Minnesota study conducted to test Perry's theory (Widlick, Knefelkamp, & Parker, 1975), it was concluded that matching the instructional approach with a student's developmental level could enhance student development. All of the subjects in this study (N=31) progressed one developmental stage from pre-assessment to post-assessment. The investigators of this study attributed this growth to a special curriculum designed to induce growth for a given stage. Additionally, this study indicated that students responded differently to varying instructional approaches dependent upon their own developmental level. Stephenson and Hunt (1977) found similar results when replicating this University of Minnesota study. They also concluded that progression through the stages can be enhanced when matched with the right instructional approach.

Understanding college student attainment in terms of Perry's (1970) scheme can be very useful in assisting students to develop intellectually while at college. Perry's scheme

goes beyond what is often thought of when ascertaining educational attainment. This theory might also help us understand the instructional impact on academic attainment, as measured by degree completion and college grade point average, as well as why some students do not appear motivated to perform academically in the ways expected of them in college. This theory could also provide understanding as to why standardized test scores account for so little variance in predicting academic attainment in college. The standardized tests do not measure developmental level, and it is likely that much of the variance in academic attainment can be attributed to the developmental level of the student.

Social Learning Theory

Social learning theory (Rotter, 1982) has been used several times as a framework for studying college student's academic attainment (Siegel, Galassi, & Ware, 1985; Nowicki & Duke, 1978; Bezjak & Lee, 1990; Eisler & Iverson, 1986; Catanzaro, 1988). The four basic concepts of social learning theory that are used in predicting behavior are behavioral potential, expectancy, reinforcement value, and the psychological situation. According to the theory as stated by Rotter (1982), the potential for a given behavior to occur in relation to a reinforcement is a function of the expectancy of the occurrence of a reinforcement following the behavior and the value that the person places on the reinforcement. There are potential benefits in viewing student development and academic attainment from a social learning theory perspective. In particular, the motivation necessary to achieve at a high level academically is possibly a behavior that is affected by an individual student's expectancy of benefit and the level of benefit received by high

academic performance. Because of the potential benefits of studying students from the social learning theory perspective, several researchers have become interested in testing this theory for its usefulness in predicting the academic attainment of college students.

Siegel, Galassi, and Ware (1985) found that the social learning theory model accounted for significantly more performance variation than did a model consisting of a math aptitude and math anxiety measure, when predicting final exam performance of 143 undergraduate students in an introductory mathematics course. This study found that the portion of variance accounted for (R^2) by social learning variables was .547 as compared to an R^2 of .164 for the model that used math aptitude and math anxiety measures only. The findings of this study support the notion that social learning theory might provide a strong explanation for student achievement.

Eisler and Iverson (1986) used social learning theory as their theoretical framework to examine the impact of parental reinforcement, modeling, and attitudes on the career choices of women. One-hundred and sixty-seven female college students participated in this study that found that parental support for academic effort was a significant predictor of career choice.

One of those persons often associated with the impact of social learning theory is Albert Bandura (1977a). In his theory of self-efficacy, Bandura (1977b) outlines a theory of behavioral change that extends the basic social learning theory of Rotter (1954). He hypothesized that "expectations of personal efficacy determine whether coping behavior will be initiated, how much effort will be expended, and how long it will be sustained in the face of obstacles and aversive experiences" (p. 191). When trying to define and

measure academic motivation of college students to succeed, one should consider self-efficacy as a framework for the research.

Lent, Brown, and Larkin (1984) investigated the relation of self-efficacy expectations to academic achievement and persistence. They found that subjects reporting higher self-efficacy for educational requirements generally obtained better grades and persisted at a higher rate than those reporting low self-efficacy for educational requirements. In another study examining self-efficacy and the prediction of academic performance and perceived career options (Lent, Brown, & Larkin, 1986), it was found that self-efficacy contributed significant unique variance to the prediction of grades, persistence, and range of perceived career options. And yet in another study comparing self-efficacy, interest congruence, and consequences thinking (Lent, Brown, & Larkin, 1987), self-efficacy surfaced as the most useful of the three in predicting grades and persistence. Self-efficacy beliefs also consistently had a positive relationship with academic performance and persistence in a meta-analytic investigation analyzing thirty-eight studies that had used self-efficacy to predict academic performance (Multon, Brown, & Lent, 1991). The empirical support for self-efficacy as a predictor of academic attainment is very strong.

Social learning theory and self-efficacy theory appear to be very applicable in attempting to understand the motivation of college students in general. It is likely that these theories would be useful in understanding certain sub-populations of college students as well. From these theories, we conclude that behavior may be a reflection of one's expectations of benefit and personal efficacy. Understanding those environmental influences impacting the behavior of the college students might be useful in explaining why certain college students perform academically better or worse than expected based on

content knowledge of subject matter as measured by standardized tests and high school record. Social learning theory and self-efficacy theory could provide us with explanations for much of the variance not accounted for when attempting to predict academic attainment with standardized test scores and high school record. Therefore, these theories could add a significant piece to the puzzle of predicting academic attainment.

Achievement Motivation Theory

Another group of theories which appear to contribute to the understanding of college student academic attainment are the achievement and motivation theories. McClelland, Atkinson, Clark, and Lowell (1953) published a new theory on motivation referred to as "The Achievement Motive." The authors suggested that motives were based on affective arousal. They wrote:

> Our definitition of a motive is this: A motive is the redintegration by a cue of a change in an affective situation. The word redintegration in this definition is meant to imply previous learning. In our system, all motives are learned. The basic idea is simply this: Certain stimuli or situations involving discrepancies between expectation (adaption level) and perception are sources of primary, unlearned affect, either positive or negative in nature. Cues which are paired with these affective states, changes in these affective states, and the conditions producing them become capable of redintegrating a state (A') derived from the original affective situation (A), but not identical with it. To give a simple example, this means that if a buzzer is associated with eating saccharine the buzzer will in time attain the power to evoke a motive or redintegrate a state involving positive

> affective change. Likewise, the buzzer if associated with shock will achieve the power to redintegrate a negative affective state. These redintegrated states, which might be called respectively appetite and anxiety, are based on the primary affective situation but are not identical with it. (p. 28)

This theory (McClelland, et al, 1953) was one of the early attempts to direct an explanation of motivation away from an intrinsic or physiological state toward a learned affective state. Much of the subsequent research on motivation has built on this theory.

Atkinson (1966) expanded on this theory of achievement motivation. His discussion of Achievement Motive (n Achievement) focused on the pleasure obtained from succeeding at a given task versus the difficulty of that task. According to Atkinson, the more pleasure that would be obtained by accomplishing a given task would provide motive to persist in spite of increased difficulty. He wrote:

> the slope of the satisfaction curve in relation to increasing difficulty of task can be taken as an index of the strength of achievement motive. In other words, individual differences (or group differences) in n Achievement can be inferred from the estimates persons make of how pleased they would be to succeed at certain levels of difficulty. (p. 166)

Several additional studies have been conducted and many positions have been stated with regard to the reasons some individuals appear to be motivated to succeed and others lack that motivation. Maehr (1974) made a compelling case for understanding motivation within a cultural framework. He argued that most understanding of motivation has been framed in an ethnocentric framework which discounts individuals motivation

expressed in ways other than those which are valued by the majority culture. Maehr (1974) wrote:

> What is needed is a framework within which culturally based conceptions of achievement motivation can arise. This need not represent a total rejection of theory for simplistic empiricism. It does involve a clearer specification of the object of study and more serious devotion to the analysis of situation, contexts, places, and events in which this object of study is to be found (p. 894).

In a study designed to measure the ethnic differences in adolescent achievement, Stienberg, Dornbusch, and Brown (1992) used a large sample of high school students from nine different high schools of contrasting social ecologies to examine the effect of social influences on school performance. The findings reported in that study have far reaching implications for understanding the achievement levels of students across ethnic groups. According to the results, White and Hispanic youngsters tended to benefit more from authoritative parenting – defined in this study as parents that scored high in acceptance, behavioral control, and psychological autonomy granting – than did African-American and Asian students. Authoritative parenting made no difference for African-American students and Asian-American students, although the Asian-American students were performing consistently higher than their classmates and the African-American students were performing consistently lower than their classmates. In this study, the African-American student's parental education level was not an important factor in the level of academic success experienced by the students. The investigators conjectured that African-American students, as well as Hispanic students, perceive the opportunity structure within society differently than do Asian-American and White

students. This idea might suggest that for African-American and Hispanic students, lower school performance may be related to a perception that education will not benefit them through additional opportunities, therefore, educational effort does not pay off.

According to this study, this perception of education not being beneficial to them can be challenged for Hispanic students by authoritative parents whereas African-American students are less influenced by authoritative parents and more influenced by their African-American peer group which tends not to support academic attainment. As with the African-American students, Asian-American students are less influenced by authoritative parents and more influenced by their peer group. However, the Asian-American student's peers tend to be supportive of academic attainment and as a group they do not perceive a limit to opportunity, thus their high achievement as a group. According to the findings for this study, White students perceive fewer limits to opportunity, thus they are more able to accept the fact that education help create long term advantages and dividends. They also are more directly impacted by the authoritative nature of their parents and, by virtue of being the majority ethnic group, have a much larger pool of peers to choose from, thus allowing them to find peers that are supportive of the types of things in which they are interested (i.e. academic attainment).

Steinberg, Dornsburg, and Brown (1992) provide a very meaningful framework for the study of college-student academic achievement. As stated by the authors, "ethnic differences in school performance can be explained more persuasively by examining the interplay between the major contexts in which youngsters develop - the family, the peer group, and the school - than by examining any one of these contexts alone" (p. 724). It is

likely that subgroup comparison of students, ethnic and other, will provide greater insight into the prediction of student performance.

Urdan and Maehr (1995) reviewed the literature related to achievement goals as they relate to achievement motivation. They concluded that achievement goals, in particular task and ability goals, stopped short of explaining motivation. They proposed future study of social goals as a means of understanding the issue of motivation of students to succeed academically. In Urdan and Maehr's (1995) call for further understanding the role social goals play in academic achievement, they wrote:

> Particularly in the case of early adolescent students, an understanding of school management will not be forthcoming unless social goals are considered. As students reach early adolescence, a number of factors converge to make social concerns particularly salient. Their social networks typically change when they make the transition to middle-level schools. Their interests broaden to include nonacademic topics, such as dating and athletics, that may conflict with academic goals. Moreover, as children move into early adolescence, they become increasingly concerned about their relationships with peers. While social goals contribute to motivation and learning at all levels of schooling, these factors may make it particularly important to examine social goals during early adolescence to gain an understanding of the motivation and learning of these students. (p. 236)

Although social goals may have the greatest impact in early adolescence, it is also likely that social goals play a very important role in determining whether or not college students are motivated to achieve academically. It is also likely that an individual's cultural heritage will have some impact on the college student's achievement.

No doubt a good understanding of achievement and motivation theory would provide a meaningful framework for the study of college-student academic attainment. A commonly discussed concern among educators is why many students that appear to have the ability to be successful in higher education, based on high school grades and/or admission test scores, do not appear to be motivated to do so. Based on the previous studies, it is likely that many factors impact a student's motivation level thus creating a situation where academic attainment is not extremely predictable based on past academic criteria or on standardized tests.

Within the population of students on a university campus there are a variety of subgroups, the study of which may provide a better means of predicting academic success. It is likely that intercollegiate athletes constitute one of these subgroups. Analyzing intercollegiate athletes as a subgroup of the student population makes a great deal of sense based on the findings in this section. It is possible that student-athletes are experiencing a unique culture based on their participation in intercollegiate athletics.

Summary

The theories discussed in this section are by no means exhaustive of the theories that relate to college students. They are, however, the ones perceived to be the most applicable to this study. It is crucial to attempt to understand college student academic attainment from a sound theoretical base. Cognitive and intellectual development should be considered when attempting to explain the academic attainment of college students. It also seems reasonable to expect that issues of self-efficacy and cultural influence impacts a

student's academic achievement. College students are complex beings and understanding what causes them to achieve academically is a complex issue.

If indeed these theories are useful in understanding college students' academic attainment, it is also extremely important to evaluate certain sub-groups of college students in light of these theories. With the focus of this study being student-athletes, the usefulness of these theories in understanding academic attainment for student-athletes is extremely relevant. It is possible that the student-athlete population is a very unique group, unlike any other group of college students. The cultural, ethnic, and geographic diversity of NCAA Division I sports programs tends to exceed the diversity proportions of the student population as a whole.

Based on the studies and theories reviewed in this section, there is reason to believe that factors related to these theories would probably impact the prediction of academic attainment for all students as a group. Although the use of these non-cognitive variables mentioned in this section will likely lead to a more fruitful understanding of student-athlete academic success, we must first determine if the prediction of academic attainment for all college students as a group is achievable utilizing the traditional admission criteria that is most often used within American higher education.

Predicting Academic Attainment

As is evident from the various theoretical perspectives that address college student development, it is difficult to establish an exact definition of a successful college experience. We often think of college success in terms of degree completion and grade point average. Likewise high school success is often thought of in terms of grade point

average, class rank, and standardized test scores. Predicting academic attainment in college is largely the function of a traditional admissions criteria of high school grade point average, high school rank, and standardized test scores (Astin, 1991). Academic attainment is generally defined as either college grade point average and/or degree completion. This raises questions as to the accuracy and appropriateness of these criteria.

Outcomes

Although the various theories mentioned in this review point to a variety of desirable outcomes of higher education separate from what is traditionally measured and reported, two outcomes of college are traditionally measured. They are college grade point average and degree completion. Astin (1993) stated, "of all the possible outcomes of higher education, cognitive development and educational credentialing are probably given the most weight by students, parents, educators, and policy makers alike" (p. 186). Astin added support to this statement by pointing to the many studies that have been conducted over the years in which the outcomes measures are either student retention or grade point average.

It is likely that degree completion and college grade point average have been used so often as outcome variables for very pragmatic reasons. Degree completion is an implied goal of students being admitted into a degree program, and college grade point average is normally used to determine academic standing within the university as well as post-baccalaureate degree program admission. Pascarella and Terenzini (1991) stated that a student's grades are the single best indicator of successful adjustment to the intellectual demands of college. They also stated, "given this, it is not particularly surprising that

undergraduate grades are perhaps the single best predictor of obtaining a bachelor's degree and also of attending graduate or professional school and obtaining an advanced degree" (p. 388).

More specific to college grade point average is the measurement of first semester college grade point average. Many studies have used first semester grade point average as a measure of academic attainment (Bank et. al., 1994; DeBoer, 1985; Bridgeman, 1989; Tracey & Sedlacek, 1987; Chase, 1981; Passons, 1967). In a study of one thousand undergraduate students, Bank et. al. (1994) found that first semester grades positively impacted student's favorable self-concept, which impacted persistence. In another study of retention predictors, Molnar (1993) found that institutional strategies to improve first semester grade point average had the greatest impact on persistence of the students. In a research report prepared by the American College Testing Program, Noble (1991) suggested that prediction of freshman year grades and grade point average is often the basis for admissions or placement decisions. Because of this understanding of the usefulness of freshman year grades, the American College Testing Program conducts a research service for institutions for the purpose of predicting first year grades for students.

As outcome variables, degree attainment, overall college grade point average, and first semester or first year grade point average appear to be reasonable as academic attainment criteria. Although these criteria do not directly measure certain developmental and/or non-cognitive issues, degree completion and grade point average are appropriate measures of academic attainment. They are used by graduate schools, scholarship and fellowship committees, academic honors societies, and employers as estimates of a student's performance within a given program of study. They are also the most obvious

estimate of performance that can be obtained prior to the completion of a degree. With degree attainment as the ultimate goal, using college grade point average as a measure of academic success has at the minimum, a great deal of practical applicability. Although academic attainment is likely relative to a given student's ability and/or personal circumstances, for the purpose of this study the more traditional variable of grade point average is considered appropriate as a quantifiable variable for assessing the predictive validity of traditional admission criteria.

High School Grade Point Average

Several studies have concluded that the best predictor of college academic attainment is high school grade point average (Kanoy, Wester, & Latta, 1989; Crouse & Trusheim, 1988; Fincher, 1986; Linn, 1986; Crouse, 1985; Linn, 1982; Chissom & Lanier, 1975; Astin, 1971). Kanoy, Wester, and Latta (1989) found that high school grade point average was the best predictor of freshman year grade point average for new college freshman women predicted to be high academic performers. No traditional variables were found to be predictive of freshman year grade point average for a group of freshman women students that were predicted to be low academic performers. This study was conducted to determine the usefulness of traditional admission criteria (e.g., SAT scores, high school grade point average) as compared to cognitive and psychological variables (e.g., cognitive complexity, locus of control, academic self concept, and effort) for predicting freshman year grade point average for forty female freshmen predicted to be high academic performers and forty female freshmen predicted to be low academic performers.

Crouse and Trusheim (1988) also concluded that the best predictor of college academic success is high school grade point average. According to their study, standardized admission tests add virtually nothing to the predictiveness of the high school record. This study assessed the admission decisions of 2,781 individuals selected randomly from the National Longitudinal Study (NLS) of the high school class of 1972. To be included in the sample, the student must have applied to a four-year college as their first choice and data must have been available on SAT scores, high school record, and selectivity for the first-choice college.

Fincher (1986) reported on a thirteen-year study to assess the incremental effectiveness of the SAT exam for admission to units of the University System of Georgia. Fincher reported that the single best predictor of college grades was a student's high school grades. Fincher went on to write:

> High school average continues to be the largest, single contributor to the prediction of grade-point average because the examining and grading practices of high school and college faculty are, in all probability, similar in structure and function. Both are forms of human judgment and both reflect human errors that are similar in their subjectivity and inconsistencies. Neither high school teachers nor college faculty receive a great deal of pre-service or in-service assistance in the assessment of student learning. (p. 74)

Fincher's primary goal in this study was to assess the incremental effectiveness of the SAT. In doing so, however, he affirms what others have reported: high school grade point average stands out as the primary means of predicting college grades. Linn (1982)

made a similar report, that high school grades consistently prove to be the most important predictor of collegiate academic success.

In yet another study, Chissom and Lanier (1975) found that high school grade point average is the best predictor of academic success in college. The subjects for this study were 669 freshman students who enrolled in an introductory English or math course at Georgia Southern College in the fall of 1973. The results of this study reported a correlation of .45 between high school grade point average and first quarter college grade point average. Using a step-wise multiple regression, it was concluded that high school grade point average was the strongest predictor of college first quarter grade point average and SAT Mathematics score was the second best predictor adding .10 to the multiple correlation.

Astin (1971), in one of the larger studies of this type (n=36,581), concluded that "of all the information available about the high school student, his record of academic performance is the best single indicator of how well he will do in college." Astin reported that the correlations between high school grade point average and freshman grade point average were .51 and .52, respectively, for men and women, while the correlations between freshman grade point average and aptitude test scores were .35 and .43.

High school grade point average continues to surface as a good predictor of college academic success. The studies in this section of the review have covered a relatively large time span and yet high school grades continue to be reported as the best predictors of college grades. Although not all high school grade point averages are comparable, by virtue of differential scales or grade inflation, it still appears that high school grade point

average as a representation of the student's high school performance is the best traditional indicator of overall college attainment.

Standardized Admission Test Scores

The appropriateness of using standardized test scores for making college admission decisions has also been studied. The degree to which these scores have been studied is reflected in the relative length of this section compared to the other traditional admissions criteria. One of the concerns often raised regarding standardized test scores is whether or not they provide colleges and universities with additional predictivity of college academic attainment over and above the predictivity provide by high school record alone. If standardized test scores do not provide unique variance accounted for when predicting college academic attainment, some would contend that they are redundant at best and inappropriate at worst.

Cueso (1994) contends that the predictive validity of standardized admissions tests, such as the SAT and ACT, has been overestimated. Based on his review and synthesis of key research findings, Cueso suggested that the best overall measure of academic success in college is high school grade point average. Standardized admissions tests prove to be weak in dealing with certain subgroups (e.g. females; students from ethnic minority groups) and for certain colleges and universities, according to this review.

In a study commissioned and published by the American College Testing Company, Noble (1991) found that ACT scores added only modestly to high school grades when predicting course grades in English, mathematics, social studies, and natural science courses as well as overall freshmen grade point average. Despite this finding, Noble

advocated the use of ACT scores along with high school grade point average, even though using ACT scores in addition to high school grade point average did not increase variance accounted for at all institutions studied. It is clear even from this study, which supports using ACT scores and high school grade point average, that at best ACT scores add modestly to the predictability of freshman grade point average.

In a study assessing the use of traditional, cognitive, and psychological measures in predicting academic achievement of seventy female freshmen, Kanoy, Wester, and Latta (1989) found that SAT scores added little to high school grade point average as predictors. The conclusion of this study is that SAT scores could be replaced by an academic self-concept measure and predictability of academic achievement would be increased. According to these authors, "admissions committees could do a more accurate job by collecting data only on high school GPA and academic self-concept rather than on measures such as SAT scores" (p. 67).

Slack and Porter (1980) concluded that SAT scores are not good predictors of college success. Based on their eleven-year research review of the predictive validity of the SAT, it was concluded that high school grades had the best correlation with college grades. According to the authors of this study, this is an expected finding since high school class experience most closely relates to college courses and high school grades are indicative of success in high school classes. Additionally, this study indicated that preparation for the SAT can cause students to obtain better scores, thus challenging the usefulness of the SAT as a measure of a student's potential to succeed in college. Based on this finding, Slack and Porter maintain that some students have been deprived

admission to the college of their choice because of limited opportunity to prepare for the SAT.

Crouse (1985), using data from the National Longitudinal Study (NLS) of the high school class of 1972, concluded that the benefit of SAT test scores was virtually non-existent. Crouse suggested that SAT scores are more predictive of where a student will attend college than whether they will be successful in college. This study reported only a modest increase in variance accounted for when adding SAT scores into a multiple regression equation with high school grade point average. Crouse also contended that this result, indicating an increase in variance accounted for, could be biased in that only students who had been admitted to the university ultimately were included in the study, thus the range of scores from the applicant pool was not represented.

In yet another study that looked at approximately 3,000 students from more than 1,000 high schools, Crouse and Trusheim (1988) found that, in approximately 90% of the cases, admission decisions would have been the same based only on high school record alone as they would have been if based on a combination of high school record and SAT scores. According to this study, SAT test scores are redundant.

Tracey and Sedlacek (1985) found that the Non-Cognitive Questionnaire (NCQ) (Tracey & Sedlacek, 1984) was more predictive of first and third semester grade point average than was the SAT. The authors concluded that SAT scores were moderately predictive of first and third semester grade point average but were not as good as the NCQ. Additionally, they found that SATs were not useful in predicting continued enrollment or persistence after three years. This study used 1,995 subjects consisting of 1,752 white students and 243 black students enrolling as freshmen in 1979. The authors

followed this sample for a four-year period in an effort to conduct a longitudinal comparison by race.

Although several findings suggest that standardized test scores are redundant or inappropriate, others have made conclusions in support of standardized tests. Hanford (1985) concluded that the SAT test is a good measure of academic potential. One of the benefits of such a standardized test is that it cuts across the differences between high schools and the various programs offered. The SAT allows individuals to demonstrate their ability in a manner not reflective of their educational background. According to Hanford, the SAT test measures a student's aptitude for success in college; therefore, a student's score should reflect this aptitude regardless of where the student attended high school.

In a discussion of the literature and issues related to admission testing, Linn (1982) suggested that standardized admission tests, such as the SAT and ACT, are useful in providing a means of obtaining a better comparison across schools and across time than are high school grades. Although standardized test scores are usually less predictive of future academic success than high school grades, Linn contends that standardized tests prove to be useful in that they add predictiveness to grades and they provide the most appropriate means of grade adjustment for the variance in high school grading practices.

Pedrini and Pedrini (1976) conducted a study designed to investigate the usefulness of multiple predictors in predicting cumulative grade point average and persistence for 143 disadvantaged and non-disadvantaged freshmen at the University of Nebraska at Omaha. The results of this study indicated that the ACT composite score was the first and foremost variable in predicting both of these criterion. No other predictor was found to

add significantly to the ACT composite score. The other predictor variables assessed for this study were race, sex, special program (a special instruction program for the disadvantaged students), and financial aid (free tuition).

Snyder and Elmore (1983) used the ACT test scores, high school percentile rank, and the Descriptive Tests of Language Skills (DTLS) of 496 students admitted to a large Midwestern university through a special admissions program, to predict college cumulative grade point average at the end of each of four years of college. For this particular sample of students, the best predictor of college cumulative grade point average was the ACT composite score. In this study, high school percentile rank was not correlated significantly with cumulative grade point average.

Rowan (1978) found that the ACT composite predicted grade point average over a four-year span for two classes of students studied. The author reported that ACT composite predicted graduation on time for these two classes. This study looked at the grade point averages and graduation rates of two full-time freshmen classes entering in two consecutive fall semesters at Murray State University. The class sizes were 1,135 for class one and 1,154 for class two. Both classes were fairly evenly divided with regard to gender. Class one had 629 males and 506 females while class two had 608 males and 546 females.

Some of the studies in this section challenge the validity of standardized admissions tests, particularly the SAT exam. Other studies in this section consider the SAT and or ACT to be useful in providing information about new students. The primary argument against the use of standardized test scores is that they tend to be redundant in relation to high school information. Proponents would argue that even with the redundancy the

standardized test scores do add some unique variance accounted for, but more importantly, they provide a basis for evaluating the academic attainment of students from various high schools and parts of the country (Hanford, 1985). Using test scores as a means of providing checks and balances to the various kinds of information obtained from a given student may be useful in helping determine levels of academic attainment for college-bound students.

Based on the differing findings of the studies discussed, it seems likely that the usefulness of standardized tests scores may vary from institution to institution and between different groups of students. It may also be said that for certain cohorts of students and for certain colleges or academic programs that standardized test scores are quite useful. However, it is also likely that appropriate use of these instruments would require analysis of their usefulness on a local basis, even to the level of analyzing cohorts within the overall student population. These findings also would lead us to believe that special care should be given to the use of the scores from these tests and that institutions should use them to complement other information but should probably not use them as the primary means of determining admission.

High school rank percentile

High school rank percentile is used in several studies as a predictor variable in attempting to predict academic attainment for college students (Colorado Commission on Higher Education, 1992; Schwartz & Wilbur, 1981; Thornell & Jones, 1986; Chase, 1981). This variable is obtained by establishing the student's relative standing in their high school graduation class. As a variable, it accounts for rank and graduation class size.

In a report published by the Colorado Commission on Higher Education (1992), high school rank percentile is declared the most significant indicator of student success in college. According to this report, "nationally students who rank in the uppermost high school quartile are three times more likely to graduate from college than those in the lowest high school quartile" (p. 3).

In a study conducted by Schwartz and Wilbur (1981), the best predictor of first semester grade point average for students attending Syracuse University who had participated in a special program, called Project Advance, as high school seniors was high school percentile rank. Project Advance was a program developed at Syracuse University in participation with high schools in a four-state region. Students in the program were concurrently enrolled in college courses. The grade point average from the Advance courses was included as an independent variable, along with high school rank percentile and SAT scores. These variables were used in predicting first semester grade point average for those students who participated in the Advance program and who ultimately attended Syracuse University. The authors concluded that high school rank percentile was a good predictor of first semester college grade point average and SAT score was not a good predictor.

Thornell and Jones (1986) used ACT scores and high school rank percentiles as predictor variables in an effort to establish a prediction equation for first semester college grade point average for one hundred freshmen students entering a small public university in Mississippi. A multiple regression procedure was used to establish the significance level of the predictor variables. The results were that ACT scores and high school rank percentile both correlated significantly with first semester college grade point average.

However, the authors concluded that the best predictor was high school rank percentile. And, in yet another study, Chase (1981) found that relative high school rank was the best predictor of first semester grade point average for both male and female students entering the University of Indiana in the fall of 1980 (n=4,260).

The studies in this section point to high school rank percentile as a useful variable in predicting academic attainment of new college students. It is likely that high school rank percentile proves to be predictive in that it is a combination of the size of the student's high school, as represented by graduation class size, and the student's rank in that class, which is a reflection of the student's high school grade point average. Both class size and rank, and/or high school grade point average, are often predictive when used as the independent variable in a one-variable model. Rank percentile appears to be capturing the predictiveness of high school grade point average; therefore, it is not surprising that certain studies have found similar predictiveness for rank percentile as has often been found for high school grade point average.

Test Bias

When considering the appropriateness of variables used in predicting academic success for college students, test bias is often cited as reason for disregarding certain tests. Test bias, however, has two faces. For those interested in test bias, the two concerns usually are slope bias and intercept bias. According to Anastasi (1988), slope bias is the real issue of bias and intercept bias is more an issue of test fairness. Slope bias is defined as unequal slopes for different groups, and intercept bias is defined as unequal intercepts for different groups, when using a regression model for predicting an occurrence. Several

studies have been conducted to look at test bias when predicting student success. Following is a review of some of those studies.

Breland (1979) concluded, after a review of studies comparing regression systems that compared male to female students and minority to non-minority students, that a consistent estimation problem exists. The academic performance of women has consistently been underestimated when using standardized tests or high school grade point average to predict college academic success. Women consistently perform better in college than would be predicted by using a common regression equation with men and women included. By virtue of this finding, it was also concluded that men are consistently overestimated when predicting college academic performance from standardized test scores and high school grade point average. Additionally, Breland concluded from the review of the studies that minority students tend to be overestimated when predicting college academic performance from standardized tests or high school grade point average using a common regression equation with non-minorities. However, the overestimation tends to be reduced for minority students when the high school grade point average and test scores are used in combination to predict academic performance.

In a study at one large urban state university, McCornack and McLeod (1988) found that female students tended to be underestimated when predicting overall college grade point average from SAT scores and high school grade point average. This underestimation did not occur, however, when individual course grades were used as the criterion. This study suggests that gender related prediction bias may be a result of gender related course selection. The conclusion of this study is that it would be counterproductive to adjust grade predictions by gender for courses since the estimation

problem is more one of course selection. These findings were arrived at by using 88 introductory level courses with enrollments ranging from 50 to 1,130.

Reilly (1973) concluded that overprediction for lower sociocultural groups should be expected when using a common regression equation to predict outcomes for minority and non-minority groups. Although equal regression lines can be expected when comparing these two groups, it is likely that different intercepts will occur. Reilly contends that this difference in intercepts is not only likely to occur but rather it is what should be expected. According to Reilly:

> When conducting minority group bias studies, investigators should recognize that they may be comparing two conditional bivariate distributions from the same general bivariate population. In such cases, the majority group line should be parallel with the minority group line (except for the special case where r23 = r12 r13). In instances where the sociocultural variable is correlated with factors common to the predictor and criterion but uncorrelated with all other factors, the findings of "overprediction" for the lower sociocultural group should be expected (p. 133).

Based on the literature reviewed, there appears to be cause for questioning the validity of traditional admission criteria for some cohorts of students entering college. The literature contains findings regarding slope and intercept differences between groups of students when using traditional admissions criteria to predict college grades. This might lead us to believe that these differences also exist between student-athletes and non-athletes. In that slope and/or intercept differences challenge the validity of admissions criteria, it is imperative that tests for intercept and slope differences be conducted between

student-athletes and non-athletes. And beyond this level of analyses, it is likely that testing for differences between certain cohorts within the student-athlete population would also be useful and appropriate.

Summary

The variables that are used to express outcomes and predict academic success appear to be somewhat entrenched in the higher education culture. Not much has been written regarding the origin of their use and most accept the outcomes criteria of degree completion and grade point average as being reasonable. On the other hand, many have questioned the validity of certain criteria for the purpose of predicting academic success in college. The reasonableness of standardized admission tests and high school record as an obstacle to university admission has also come under much scrutiny. Regardless of the criticism, however, as long as these criteria are used extensively as admission criteria it remains appropriate to analyze their effectiveness.

The studies in this section have primarily compared the usefulness of the individual variables. The predictor variables appear to be somewhat redundant, especially high school rank percentile and high school grade point average. Using these variables in combination might increase the predictability slightly, however, one would not expect to account for much unique variance. Since the redundancy of these variables has been presented in this review, it seems appropriate to assess the value of each variable independent of the others. A multiple variable model might account for more variance in the prediction, however, because of the multicollinearity issue a multiple variable model would not assess as adequately the validity of each of the independent variables.

Multicollinearity is defined by Pedhazur (1982) as problems that arise from intercorrelations between independent variables. Based on the literature presented, we can expect that some predictive usefulness exists from each of the predictor variables in a single variable model predicting college grade point average for students in general. However, further study regarding slope and intercept differences between groups of students should be conducted with these variables

Intercollegiate Athletics

Student-athletes comprise a subgroup of the general college student population. With this subgroup being the focus of this study, it is appropriate to review the literature as it relates to student-athletes and intercollegiate athletic participation. Several studies have been conducted to assess the impact of intercollegiate athletic participation on student-athletes. Intercollegiate athletics is a multi-million dollar enterprise on many university campuses. There is much discussion regarding student-athletes and their priorities regarding education. This section includes findings from several of those studies in an effort to understand what has been learned regarding student-athletes and their academic attainment.

Benefits of Intercollegiate Athletic Participation

Pascarella and Smart (1991) studied the impact of intercollegiate athletic competition on black and white student-athletes. They summarized data collected from the Cooperative Institutional Research Program (CIRP) Survey. The sample consisted of 290

African American and 1,716 Caucasian men. Their findings indicated that there was a net positive impact on a number of educational outcomes for both African-American and Caucasian men. The marginally significant effect of athletic participation was positive on bachelor's degree attainment and social self-esteem. Additionally, the investigators of this study concluded that a positive indirect effect of athletic participation exists on social involvement and satisfaction with college.

Stuart (1985) found that NCAA Division I-A football players performed academically as well as non-athletes in their first two years of college when matched on sex, year of entry, race, and major. These results occurred despite evidence that the athletes were less prepared academically upon beginning their college career. The sample for this study consisted of 309 athletes and 285 non-athletes. The athletes were freshmen students receiving scholarships to participate in football at a large Midwestern state university between 1977 and 1980.

In another study, Ryan (1989) found that athletic participation was associated positively with overall satisfaction with the college experience, motivation to earn a degree, and the development of interpersonal skills and leadership. These findings were reported from the Cooperative Institutional Research Program (CIRP) data obtained from a survey of 192,248 freshmen from a variety of participating institutions during the Fall 1981 semester. The institutions participating in this program consisted of 368 randomly selected colleges and universities. These colleges and universities included 2-year colleges, 4-year colleges, and universities.

Adler and Adler (1988) studied a basketball team in the south central United States in an effort to examine the development of intense loyalty. This qualitative study chronicled

the nature of loyalty development that transpired with the athletes of this major college basketball program. Adler and Adler contended that through involvement with the organizational dimensions of domination, identification, commitment, integration, and alignment the student-athletes develop feelings of intense loyalty.

A positive relationship between participation in varsity sports and economic mobility is suggested by Adelman (1990). He found that, despite having lower academic credentials as new college students, overall the degree completion rate for student-athletes is only slightly lower than non-athletes. Adelman also found that black varsity athletes completed the bachelor's degree at a higher rate than did black non-athletes. Another finding of this study was that in the first decade of their work lives, ex-varsity football and basketball players do very well economically even if they did not earn college degrees. This study was the result of the National Longitudinal Study of the High School Class of 1972, a study which included data from high school records and test scores and twelve years of college transcripts along with large amounts of information collected from participants in 1972, 1973, 1974, 1976, 1979, and 1986.

It appears that participation in intercollegiate athletics can have a positive effect on students. Athletic participation has been linked to positive impact in college in several areas of the student-athlete's life including enhanced ability to have meaningful social involvement as well as performing better academically than non-athletes when matched on academic credentials. Additionally, there is support for post graduation success of student-athletes in terms of economic mobility and attainment.

Academic preparation of new student-athletes

Concerns have been expressed by many with regard to student-athletes and their academic pursuits. The degree to which athletes are prepared to enter college and have the ability to succeed academically is vitally important to all involved with student-athletes. The following section reviews various studies related to these academic issues.

In a study that included football players receiving scholarships between 1977 and 1980 at a large Midwestern state university, Stuart (1985) found that scholarship football players had a lower mean high school rank, lower mean high school grade point average, lower average number of high school mathematics courses, and lower mean ACT composite scores than non-athletes. To control for race, sex, year of entry, and major, student-athletes were matched randomly with non-athletes for the purpose of determining significant differences. Also, Purdy et al. (1982) found that athletes were less prepared academically than non-athletes and that they achieved less academically. The Purdy et al. study found that scholarship holders, Blacks, and those athletes who participated in football and basketball had the poorest academic performance and preparation. This study consisted of more than two thousand athletes over a ten year period at a major western university.

In the National Longitudinal Study of High School Class of 1972, Adelman (1990) found that athletes in major varsity sports had the lowest mean high school percentile ranking of the six groups studied. The groups were varsity football and basketball (major sports) participants, varsity athletes from all other sports, performing arts students, intramural sports participants, and everybody else. Major-sport varsity athletes were least

likely to come from the top quartile of their high school class. The major-sport athletes had significantly lower SAT and ACT scores. However, this study also found that varsity minor-sport athletes had the highest SAT scores of the six groups.

Based on these studies, major-sport student-athletes arrive at college with less academic preparation than non-athletes. Standardized admissions test scores, high school grade point average, and high school rank are typically lower for major-sport athletes than for non-athletes. However, it appears that student-athletes participating in sports other than football and men's basketball are quite similar to non-athletes in terms of academic preparation.

Academic Attainment

The rate at which student-athletes attain academic goals and complete degree programs is a source of concern for many. Several studies, finding abnormally low graduation rates, have questioned the commitment to academic success for student-athletes.

Purdy et al. (1982) studied 2,091 male and female student-athletes over a ten-year period and found that athletes had significantly lower educational attainment than non-athletes. This study suggests that athletes in the aggregate differ from non-athletes on every academic dimension. Degree completion rates were also significantly lower for athletes than non-athletes. Additionally, athletes consistently were less prepared than non-athletes for college on traditional measures such as high school grade point, ACT and SAT scores, and high school class rank percentile.

In a study of the academic attainment of Black University of Illinois student-athletes, Spivey and Jones (1975) found that the graduation rate for student-athletes was far lower than for non-athletes. Another finding was that Black athletes were often advised to major in physical education, advice that 66% of the athletes took. The authors reported that often Black athletes were advised to take easy courses designed to maintain eligibility instead of courses necessary for graduation.

Wittmer, Bostic, Phillips, and Waters (1981) proposed solutions to a situation at the University of New Mexico in which a decade-long study found only 5.7% of the football players and 7.3% of the basketball players earned degrees in four years. A conclusion of this study was that not enough attention was being targeted at obtaining a degree. This study proposed an innovative program which deals specifically with the development of the student-athlete.

Others have found similar graduation rates for athletes as compared to non-athletes. Adelman (1990) found that varsity athletes complete the bachelor's degree at only a slightly lower rate than non-athletes and that black varsity athletes complete the bachelor's degree at a higher rate than do black non-athletes. This study was the result of the National Longitudinal Study of the High School Class of 1972, a study which included data on high school records and test scores and twelve years of college transcripts along with large amounts of information collected from participants in 1972, 1973, 1974, 1976, 1979, and 1986. According to Adelman, varsity athletes start college at a disadvantage; less adequate high school preparation, lower high school performance, and lower SAT and ACT scores. Yet, over the twelve-year period covered by this study, they do no worse than their non-athlete counterparts on degree completion rates.

Ryan (1989) found that participation in intercollegiate athletics was associated with a high level of satisfaction with the overall college experience, development of interpersonal skills and leadership abilities, and motivation to earn a degree. These findings were the result of a study of a nationally representative sample of college freshmen (n = 192,248) obtained by the Cooperative Institutional Research Program (CIRP) using participant institutions which administered Student Information Forms (SIFs) to randomly selected first time full-time freshmen.

Schumaker, Small and Wood (1986) found that athletes had slightly higher grade point averages (although not significantly higher) and significantly higher self-concept scores than non-athletes when studying 45 high school athletes and 40 high school non-athletes. Although not specifically studying college athletes, this study might provide useful information in understanding college student-athletes. However, one potential problem with generalizing this information to the collegiate level is that the high school student-athletes that participate at the intercollegiate level are only the elite high school performers athletically.

The discrepancy between the findings of the various studies with regard to the academic attainment of student-athletes might be indicative of differences that exist between institutions in relation to academic service priorities for student-athletes. From this review, it also appears that intercollegiate athletics might have a positive effect on the academic attainment of student-athletes when the total student-athlete population is studied. However, when specific groups of student-athletes are studied, there are certain cohorts that do not have levels of academic attainment equal to those of non-athletes. The cohorts that appear to have lower academic attainment levels are black student-athletes in

general and major-sport student-athletes (football and basketball players). According to this review, it appears likely that some advances have been made in the academic preparation and attainment of student-athletes as a whole since the 1983 NCAA ruling increasing the eligibility requirements of intercollegiate athletes.

Summary

This section of the review addressed the benefits of athletic participation, the level of preparation student-athletes have compared to non-athletes, and the level at which they attain academically. From the studies reviewed in this section it seems apparent that intercollegiate athletic participation can have a positive effect on student-athletes. The studies in this section lead us to believe that bachelor degree attainment, overall satisfaction with the collegiate experience, development of interpersonal and leadership skills, loyalty, and economic mobility after college may be products of intercollegiate athletic competition. All of this occurs even though student-athletes enter college less academically prepared than non-athletes.

However, some studies reported in this section found lower academic attainment for student-athletes. These differential findings indicate that student-athletes' academic success can vary from study to study. There are probably several factors that impact this variation. Since several of the studies used subjects from several institutions, it is likely that institutional characteristics or admission standards impact this variation. It is also likely that the level of competition (i.e. NCAA Division I, NCAA Division III) accounts for much of the variance. Even within institutions, differing philosophies of individual coaches and athletic programs could cause student-athletes to perform differently than

other student-athletes. Additionally, cultural influence within certain sub-groups of student-athletes could be impacting these studies.

Based on these varied findings, it is appropriate to conduct studies on an institution-by-institution basis. More specifically, attempts should be made to identify the meaningful subgroups of students that might not be predicted by a common regression model for college student attainment. No doubt a study analyzing the various groups within the student-athlete population would provide a more meaningful understanding of how this cohort fits within the overall college student population on a given campus.

Predicting Academic Attainment for Student-Athletes

Predicting academic attainment for student-athletes is inherent in the establishment of admission and eligibility criteria. By establishing minimal test scores and/or high school record, it is reasoned that academic success should be obtainable for most individuals admitted. This reasoning only holds true if the standardized test scores and high school record are significantly correlated with the outcomes variable, most notably college grade point average and graduation. Since these criteria are currently in place, it is essential that the predictive validity of these criteria be established. If indeed they are not predictively valid, then certain athletes may be excluded on the bases of invalid criteria. This section reviews the predictive validity of these criteria for student-athletes.

Standardized Tests

Sedlacek and Adams-Gaston (1989) found that SAT scores were not predictive of first semester grade point average of incoming freshmen student-athletes. The sample for

this study included 105 new student-athletes. SAT scores and scale scores from an instrument designed to measure non-cognitive characteristics of athletes were analyzed. Three non-cognitive areas were significantly predictive, but neither the SAT verbal nor SAT quantitative scores were useful in predicting first semester grades. Sedlacek and Adams-Gaston concluded that SAT scores should not be used to prevent freshmen student-athletes from competing and that it is more appropriate to view student-athletes as non-traditional students with their own cultures and problems relating to the larger system.

In another study, Adelman (1990) found student-athletes completed degrees at a rate similar to non-athletes even though their high school preparation was less adequate. According to this study, student-athletes have lower ACT and SAT scores, lower high school grade point averages, and are ranked lower in their high school graduation class than their non-athlete counterparts.

SAT scores and high school grade point average were not correlated significantly for a group of student-athletes enrolled in a developmental studies program (Ervin et al., 1985). However, both SAT and high school grade point average were moderately correlated (.51 and .42 respectively) with grades after two quarters in the developmental studies program. These findings might indicate that for certain groups of student-athletes little or no relationship exists between high school grade point average and college admissions tests when attempting to predict academic success.

In evaluating the relationship of SAT scores to college success for over 100 football players at the University of Michigan from 1981 to 1985, it was concluded by Walter and Smith (1986) that there was consistently a lack of relationship between the two variables. The only predictor that proved to be useful was high school grade point average and even

that proved to be weak. And in a discussion of this issue, Allen (1988) called for a new testing rationale, with emphasis on skills testing, when so much is at stake in establishing admission and eligibility for student-athletes. This author's contention was that using the SAT for determining eligibility for participation in NCAA athletic events undermines the purpose for which this test was designed.

The studies in this section call into question the appropriateness of using standardized test scores as the bases for admission and eligibility decisions for student-athletes. However, we must not reject the use of these tests based purely on the literature to date. Even though there appears to be little or no correlation between college academic attainment and standardized test scores for student-athletes, it might still be appropriate to use these scores for admission and eligibility decisions. Several issues have yet to be adequately addressed in the literature with regard to this population of students. One such issue is how do the small correlations for the student-athlete group compare to the correlations for the overall student body on a given campus. Another issue concerns the lack of variance accounted for and whether it is a bias or fairness issue. Slope and intercept comparisons are necessary for a better understanding of the appropriateness of using standardized tests to determine admissions and eligibility decisions for student-athletes

High School Record

Of the traditional criteria used for predicting academic success – SAT scores, high school rank, and high school grade point average – Walter and Smith (1986) found that high school grade point average was the most useful predictor of academic success for

football players in a major football program. Neither SAT nor high school rank were predictive of academic success for this particular group of student-athletes. Although high school grades were the most predictive of the three traditional variables, the authors contended that personal interviews were the best means of predicting academic success.

Collegiate student-athletes had lower high school grade point averages and were ranked lower in their high school graduation class than their non-athlete counterparts, according to Adelman (1990). These student-athletes also had limited study in college preparatory courses while in high school, which may account for the lower SAT and ACT scores.

High school grade point average was not significantly correlated with SAT scores for a group of student athletes enrolled in a developmental studies program (Ervin, et al., 1985). However, high school grade point average was moderately correlated (.51) with grades after two quarters in the developmental studies program.

It appears that high school grade point average may have some predictive validity for student-athletes. It is still unclear how useful high grade point average might be; but, based on the small amount of research that has been conducted, these data appear to be more useful than standardized test scores. In that SAT scores, ACT scores, and high school grade point average are the measures used for eligibility, no studies have been found which look specifically at rank percentile as a predictor of academic success for student-athletes.

Summary

It appears from the limited studies reviewed in this section, that standardized test scores have not proven to be extremely useful in predicting academic success of student-athletes. High school record, especially grade point average, has proven to be more useful. In light of this, it seems appropriate to examine the predictive validitity of these admission criteria by analyzing the slope and intercept differences when using these criteria to predict academic attainment for student-athletes and non-athletes. This allows for testing the bias and fairness issue of using these criteria and goes beyond what has been previously done with the student-athlete population.

Summary

The student-athlete population is one that has received much anecdotal and qualitative attention. Many case studies have been conducted in which perceived problems with intercollegiate athletics and student-athletes are outlined and proposed solutions are announced. However, the scientific investigation of this issue is relatively sparse. Few attempts have been made to identify variables that are statistically significant predictors of academic success or persistence for student-athletes. When attempts have been made to quantify data from studies of student-athletes, the result are often inconsistent.

From this review of the literature, some direction for this study can be determined. Many of the inconsistencies in the research reviewed may be accounted for by the differences that seem to occur on various levels within the student-athlete population.

Institution, sport, level of competition, gender, and the individual athlete are a few of the levels where differences exist. It appears that concern should be taken to understand the student-athlete population on an institution-by-institution basis.

This review of the literature has also raised serious questions about the usefulness of traditional admissions tests such as the ACT and SAT tests. Based on this review, it appears that student-athletes may differ from non-athletes on how useful traditional admission criteria are for predicting academic success. It seems appropriate to examine the ways in which bias impacts prediction of academic success for the student-athlete population. Although standardized admissions tests are challenged for both student-athletes and non-athletes, there appears to be a more politically-charged challenge with regard to these tests lacking validity for the student-athletes than for non-athletes.

CHAPTER III

METHOD AND DESIGN

Based on the review of the literature and the practical implications of using ACT/SAT scores, high school grade point average, and high school rank percentile as admission and/or eligibility criteria, the methods for this study were established. To answer the questions regarding the meaningfulness of these criteria , it was deemed appropriate to assess the usefulness of these variables when predicting college academic success. This chapter outlines the methodology chosen for this study.

Research Design

This study utilized a comparative research design. The data for this study were archival data obtained from the student-record data base maintained by the Office of the Registrar at the university. No additional instruments or data collection procedures were necessary. New freshmen students, under the age of 21 and not classified by the Office of the Registrar as a transfer student, who had enrolled at the university from the fall semester of 1990 through the fall semester of 1994 were considered subjects for this study. The independent variables used for this study were ACT and/or SAT scores, high school grade point average, and high school rank percentile. The dependent variables were first semester grade point average and general education grade point average.

This study investigated one central question: Are measures that prove to be useful in projecting academic success for non-athlete college students also appropriate in projecting academic success for student-athletes? Academic success has been defined, for the purpose of this study, by first semester grade point average and general education grade point average. Comparisons of slopes and intercepts were conducted when predicting first semester grade point average and general education grade point average from ACT/SAT scores, high school grade point average, and high school rank percentile. The comparisons were not multivariate analyses. They were made using one independent variable and one dependent variable at a time. These simple linear regression models were used in an effort to isolate the usefulness of each of the predictor variables when used alone in a prediction equation. Although it is likely that multiple variable equations would account for more variance when predicting collegiate academic performance, the predictor variables tend to be used as individual criteria when admission and/or eligibility decisions are made.

The comparison groups were male major-sport student-athletes and male non-athletes; male minor-sport student-athletes and male non-athletes; male major-sport student-athletes and male minor-sport student-athletes; female student-athletes and female non-athletes; male major-sport student-athletes and female student-athletes; and male minor-sport student-athletes and female student-athletes. See Table 1 for a listing of group comparison.

Table I

Comparison groups for the null hypotheses

	Group 1		Group 2
Comparison 1.	Male major-sport student-athlete	←→	Male non-athletes
Comparison 2.	Male minor-sport student-athlet	←→	Male non-athlete
Comparison 3.	Male major-sport student-athlete	←→	Male minor-sport student-athlete
Comparison 4.	Female student-athlet	←→	Female non-student
Comparison 5.	Male major-sport student-athlete	←→	Female student-athlete
Comparison 6.	Male minor-sport student-athlet	←→	Female student-athlete

The comparisons were made using models generated by simple linear regression analysis. For each comparison, the slopes were analyzed for difference by comparing the regression coefficients for the independent variable predicting the dependent variable. If no difference existed on the slopes, a comparison of the intercepts was conducted for the same groups using the same variables. For each group comparison, analyses were conducted for slope and intercept differences on each of the three independent variables predicting each of the two dependent variables individually. Therefore, at each group comparison level, as many as six individual comparisons were conducted. These analyses were performed in an effort to determine if a slope or intercept difference existed between the groups in question when using the variables previously mentioned.

This study investigated the traditional academic variables of ACT/SAT scores, high school grade point average, and high school rank percentile. These variables were used

because they are the criteria used for admission and eligibility decisions for student-athletes. Admission decisions traditionally have been made from a student's standardized admission test score and/or high school grade point average and relative standing in high school graduating class (OSU, 1994). Additionally, eligibility decisions established by the National Collegiate Athletic Association (NCAA, 1995) are based on standardized admission test scores and high school grade point average.

One concern regarding the predictors chosen was that high school grade point average and high school rank percentile might be redundant variables. Since rank in high school graduating class is established by grade point average relative to other graduating students, it seemed likely that little new information would be obtained by using both variables. For this reason, a correlation analysis was conducted between rank percentile and high school grade point average for students in this study that had both scores recorded. This analysis found a correlation between these two variables of .91 (n=9,428). With such a strong correlation, it is probable that these two variables are measuring the same thing. Both are included in this study, however, because of the indication we have from the literature that some institutions and individuals prefer one measure over the other. As the models for this study are one-variable models, rank percentile and high school grade point average are being investigated individually; thus, multicollinearity will not be an issue.

The two dependent variables, general education grade point average and first semester grade point average, were chosen to reflect academic performance from two perspectives. First semester grade point average is an indicator of a student's overall academic performance in his/her first semester of college. This indicator is the primary

concern for maintaining eligibility and remaining in academic good standing with the university. General education grade point average, on the other hand, is an indication of academic performance in courses needed for degree completion. This study used both criteria as a means of controlling for placement decisions made by academic advisors. At least partially due to the placement decisions made by advisors, students may obtain a satisfactory overall grade point average by virtue of being selectively placed in courses; however, this overall grade point average may not be as valuable as a grade point average from courses required for degree completion. While overall first semester grade point average is important, it is also necessary for progress to be made toward obtaining a degree.

Subjects

The subjects for this study consisted of 11,810 freshmen under twenty-one years of age at time of enrollment and not identified as a transfer student by the Office of the Registrar. They matriculated at a medium-sized Midwestern state university from the fall semester of 1990 through the fall semester of 1994. The subjects were classified according to their athletic status and gender. Subjects classified as student-athletes included athletes from each of the intercollegiate sports programs within the university, as classified by the Office of the Registrar, and included scholarship and non-scholarship participants. The university intercollegiate athletics programs include men's football, men's basketball, men's baseball, women's softball, men's track, men's wrestling, men's golf, men's tennis, women's basketball, women's track, women's golf, and women's tennis.

Table 2 describes the number of the students in this study by participant level and by group.

Table II

Number of subjects by participant category and analysis group

Participant category	Group	n
Male non-athletes	Male non-athlete	5,596
Female non-athletes	Female non-athlete	5,927
Men's football	Male major-sport student-athlete	97
Men's basketball	Male major-sport student-athlete	11
Men's baseball	Male minor-sport student-athlete	30
Women's softball	Female student-athlete	10
Men's track	Male minor-sport student-athlete	28
Men's wrestling	Male minor-sport student-athlete	21
Men's golf	Male minor-sport student-athlete	17
Men's tennis	Male minor-sport student-athlete	9
Women's basketball	Female student-athlete	16
Women's track	Female student-athlete	32
Women's golf	Female student-athlete	8
Women's tennis	Female student-athlete	8

Instrumentation

Data on the subjects were obtained from the university's student records data base. Data elements obtained for each of the subjects consisted of the Enhanced ACT composite score and/or SAT total score, high school grade point average, high school rank, and high school graduation class size. Although no new data were selected for this study, archival data were obtained which included test scores obtained from the subjects' official score report provided by American College Testing on the Enhanced ACT Assessment test and/or College Board on the Scholastic Aptitude Test (SAT). High school grade point average, high school rank, and high school graduation class size were obtained by the Office of the Registrar from the subject's official high school transcript.

The Enhanced ACT Assessment

The Enhanced ACT Assessment test is comprised of a composite score, four subject area test scores (English, mathematics, reading, and science reasoning), and seven subtest scores (English usage, rhetorical skills, pre-algebra/elementary algebra, intermediate algebra/coordinate geometry, plane geometry/trigonometry, social studies/sciences, and art and literature) (American College Testing Program, 1989). The composite score is the average of the four subject area tests. The Enhanced ACT Assessment was normed and reliability established in a national study conducted in 1988 involving 16,334 high school students from 147 high schools. Of these 16,334 students, 13,945 indicated plans to attend college. Estimates of reliability were established for each of the four subject area

scale scores as well as for the composite. The Kuder-Richardson 20 (KR20) internal consistency reliability coefficient for the composite score was .96 with the standard error of measurement being .92. For the purpose of this study, only the composite score was used; thus, only the composite reliabilities are reported; however, similar reliabilities were found on the individual scale scores. For the norm group, the scores ranged from 1 to 36 with a mean composite score of 20.6 and a standard deviation of 4.5 (American College Testing, 1991).

According to the results of the ACT Prediction Research Services study conducted for 510 institutions during the 1989-1990 academic year, the median correlation between the Enhanced ACT Assessment and freshman grade point average was .45 (American College Testing, 1991). The use of ACT scores in combination with high school record increased the correlation to .56. These correlations are similar to several studies summarized by Breland (1979) with the original ACT assessment; however, any predictive studies conducted on the Enhanced ACT assessment are not yet available in large enough quantities to confirm or disconfirm these findings.

The Scholastic Aptitude Test

The Scholastic Aptitude Test (SAT) is designed to measure the verbal and mathematical abilities of high school students aspiring to enter college. The verbal and mathematics score are reported separately. Each form of the SAT includes six sections that are timed with a thirty-minute limit. Two of the sections are verbal, two are mathematics, one is the Test of Standard Written English, and one is for research purposes such as equating different forms of the test and pretesting items (Cohn, 1985).

The verbal section has four different item types: antonyms, analogies, sentence completions, and reading comprehension. The mathematical section includes only two types of questions; regular mathematics items and quantitative comparisons. The SAT consists entirely of multiple choice questions. The test format discourages guessing by correcting for wrong answers using the formula (Number Right) - (Number Wrong) / (k - 1), where k = the number of choices. Scores reported are scaled scores comparable across different forms of the test and across different groups of test-takers. The SAT scores range from 200 to 800 for both tests (Cohn, 1985). In 1986, the mean SAT verbal score was 431, with a standard deviation of 111 and the mean SAT quantitative score was 475, with a standard deviation of 119 (The College Board, 1986).

The reliability of the SAT is based on internal consistency estimations using an adaptation of the KR20. Internal consistency reliability coefficients exceed .90 with test-retest correlations averaging approximately .87 for verbal and mathematics (Cohn, 1985). According to The College Board (The College Board, 1986) the reliability of the SAT score was derived from item response theory estimates of standard errors of estimate computed as one minus the ratio of the average squared SEM to total score variance.

The SAT test was developed with three forms or versions. Form 1 has a reliability coefficient of .91 for the verbal section and .91 for the mathematical section. Form 2 has a reliability coefficient of .91 for the verbal section and .92 for the mathematical section. Form 3 has a reliability coefficient of .90 for the verbal section and .91 for the mathematical section. Form 1 was normed using 1,555 college-bound high school students. Form 2 was normed with 1,515 college-bound high school students, and form 3 with 1,605 college-bound high school students.

The predictive validity of the SAT has been documented by The College Board in a series of studies conducted for universities through the Validity Study Service. For the 685 colleges that conducted a study of their entire freshman class, the correlations between SAT verbal scores and freshman grade point averages were above .52 for 10% of the colleges, between .36 and .52 for forty percent of the colleges, between .21 and .36 for 40% of the colleges, and below .21 for 10% of the colleges. The SAT math scores were similar in that for 10% of the colleges the correlation was above .50, for 40% of the colleges it was between .35 and .50, for 40% of the colleges the correlation was between .20 and .35, and for 10% of the colleges it was below .20 (The College Board, 1986). These correlations reported by The College Board are similar to those reported in numerous studies summarized by Breland (1979) who found median correlations between SAT scores and college grade point average to range from .32 to .52.

High School Grade Point Average

The reliability of high school grade point average is of concern in this study. However, reliability of high school grades is quite difficult to measure. Therefore, it is appropriate to discuss the predictive validity of high school grades as predictors of college grade point average success. Breland (1979) reported that the students' high school record provided the highest median correlation (.48) with freshman or cumulative grade point average between high school record, verbal test scores, quantitative test scores, or cumulative test scores. These findings were the result of analyzing 206 studies conducted to compare high school record and test scores as predictors of freshman or cumulative grade point average. These findings are supported by Noble (1991), who reported that

the ACT Prediction Research Services have consistently reported that high school grades and college grades correlate between .40 and .47.

High School Rank Percentile

High school rank percentile is very difficult to discuss in terms of reliability. Since it is so closely related to high school grade point average, the reliability of high school grade point average will dictate the reliability of this variable. Rank percentile is a ranking measure; thus, no two individuals in a given graduation class will have the same ranking. Predictive validity is, therefore, the important issue with this variable. Although few studies have attempted to assess the predictive validity of high school rank percentile, we do have an indication as to what type of correlation exists between this variable and college grade point averages. A few of the studies that have attempted to determine the predictive validity for high school rank percentile have obtained correlations similar to correlations found for high school grade point average. The correlations that are reported range from .15 to .63 (Schwartz & Wilbur, 1981; Nisbet, Ruble, & Schurr, 1982; Chase, 1981; Roesler & Armstrong, 1981).

Null Hypotheses

The following null hypotheses were tested in this study. For each of the hypotheses as many as six different comparisons were made. The six comparisons were separate slope comparisons for each of the independent variables and, when necessary, separate intercept comparisons for any or all of the independent variables for which no slope

difference was found. A null hypothesis was rejected if a difference is found on any of the slope or intercept comparisons when predicting the dependent variable for these groups.

1. When comparing the slopes and, when necessary the intercepts, for male major-sport student-athletes and male non-athletes, no significant difference exists in predicting general education grade point average from either ACT/SAT, high school grade point average, or high school rank percentile.
2. When comparing the slopes and, when necessary the intercepts, for male major-sport student-athletes and male non-athletes, no significant difference exists in predicting cumulative first semester grade point average from either ACT/SAT, high school grade point average, or high school rank percentile.
3. When comparing the slopes and, when necessary the intercepts, for male minor-sport student-athletes and male non-athletes, no significant difference exists in predicting general education grade point average from either ACT/SAT, high school grade point average, or high school rank percentile.
4. When comparing the slopes and, when necessary the intercepts, for male minor-sport student-athletes and male non-athletes, no significant difference exists in predicting cumulative first semester grade point average from either ACT/SAT, high school grade point average, or high school rank percentile.
5. When comparing the slopes and, when necessary the intercepts, for male major-sport student-athletes and male minor-sport student-athletes, no significant difference exists in predicting general education grade point average from either ACT/SAT, high school grade point average, or high school rank percentile.

6. When comparing the slopes and, when necessary the intercepts, for male major-sport student-athletes and male minor-sport student-athletes, no significant difference exists in predicting cumulative first semester grade point average from either ACT/SAT, high school grade point average, or high school rank percentile.
7. When comparing the slopes and, when necessary the intercepts, for female student-athletes and female non-athletes, no significant difference exists in predicting general education grade point average from either ACT/SAT, high school grade point average, or high school rank percentile.
8. When comparing the slopes and, when necessary the intercepts, for female student-athletes and female non-athletes, no significant difference exists in predicting cumulative first semester grade point average from either ACT/SAT, high school grade point average, or high school rank percentile.
9. When comparing the slopes and, when necessary the intercepts, for male major-sport student-athletes and female student-athletes, no significant difference exists in predicting general education grade point average from either ACT/SAT, high school grade point average, or high school rank percentile.
10. When comparing the slopes and, when necessary the intercepts, for male major-sport student-athletes and female student-athletes, no significant difference exists in predicting cumulative first semester grade point average from either ACT/SAT, high school grade point average, or high school rank percentile.
11. When comparing the slopes and, when necessary the intercepts, for male minor-sport student-athletes and female student-athletes, no significant difference exists in

predicting general education grade point average from either ACT/SAT, high school grade point average, or high school rank percentile.

12. When comparing the slopes and, when necessary the intercepts, for male minor-sport student-athletes and female student-athletes, no significant difference exists in predicting cumulative first semester grade point average from either ACT/SAT, high school grade point average, or high school rank percentile.

Procedure

The data for this study were obtained from the student record data base at the university. Data files were obtained on all new freshmen who had enrolled at the university from the fall semester of 1990, through the fall semester of 1994. The data elements for each subject included ACT composite score and/or SAT total score, high school grade point average, high school rank, high school class size, first semester cumulative grade point average, grade in English 1113, grade in English 1213, grade in History 1103, grade in Math 1513, grade in Political Science 1013, gender, and athletic participation status. The first semester cumulative grade point average was based on all courses in which the subject received a grade in his/her first semester of enrollment. The five additional course grades were required in order to calculate the subject's general education grade point average. These courses were chosen because they are the only courses that all students at the university are required to complete successfully.

By using only these courses as a representation of general education grade point average, some control for differing course taking patterns was accomplished. If, for example, a student was being encouraged to maintain an acceptable overall grade point

average by taking courses perceived to be "easier," even though these courses may not contribute to the student's graduation requirements, the general education grade point average would provide a measure of correction for this situation. Some course that are thought to be reasonable for use in calculating a general education grade point average (e.g.. science courses) were not included because they were not required for all students.

A general education grade point average was computed for each of the subjects from the grades they received in English 1113, English 1213, History 1103, Math 1513, and Political Science 1013. This computation involved finding the mean score of any of the courses completed from this set of general education courses based on a four point scale (A = 4, B =3, C = 2, D = 1, F or W = 0). A general education grade point average was computed for any subject having completed at least one of the five general education courses. The grades used in calculating the general education grade point average were used even if the student took the course in a semester other than the student's first semester of enrollment at the university. For the purpose of this study, the mean of the above mentioned courses appears to be the best method of providing a relatively stable dependent variable of general education grade point average.

The high school rank percentile variable was computed for each of the subjects by dividing high school class size into high school rank and subtracting from one [1-(high school rank / high school class size)]. High school rank is the student's academic position in the student's high school graduation class based on the official final transcript obtained from the high school. A high school rank of one would be an indication that the student finished as the highest academically rated student of his or her graduating class. High school class size is the size of the graduating class in which the student graduated from

high school. This information was obtained by the Office of the Registrar from the student's official final high school transcript.

High school rank percentile is an indication of a student's relative standing in their high school graduating class. It is included in this study primarily because it is currently being used as one of the admission criteria at the university in which this study was conducted. Although several studies (Colorado Commission on Higher Education, 1992; Schwartz & Wilbur, 1981; Thornell & Jones, 1986; Chase, 1981) have found high school rank percentile to be useful in projecting academic success for college students, this variable appears to be redundant after reviewing the data from this study. There were 9,428 subjects who had a rank percentile score and a high school grade point average recorded on their official university record. For these subjects, the correlation between rank percentile and high school grade point average was very high ($r = .91$). Both of these variables correlated similarly with the dependent variables of first semester grade point average and general education grade point average (see Table 3). Also when adding rank percentile to a multiple regression using high school grade point average to predict either of the dependent variables, the unique variance accounted for (R^2) was less than .01.

Table III

Correlations between high school grade point average, high school rank percentile, general education grade point average, and first semester grade point average

	1.	2.	3.	4.
1. H. S. Rank Percentile	— —	.9111	.4677	.4855
		(9428)	(7935)	(9450)
		p=.0000	p=.0000	p= .0000
2. H. S. G.P.A.		— —	.4905	.5087
			(7568)	(9041)
			p= .0000	p= .0000
3. First Sem. G.P.A.			— —	.8306
				(8469)
				p= .0000
4. Gen. Ed. G.P.A.				— —

Based on its relationship with high school grade point average it is unlikely that rank percentile will add new information to this study. The correlation comparisons were made to fully assess this variable. It is also possible that for certain institutions this variable might not be as redundant as it appears to be in this study. If an institution has a geographically diverse student population, rank percentile may be an appropriate

adjustment for differing grading practices between states and also between local school districts.

The student-athlete population in this study is more geographically diverse than the overall student-body. While 86.1% of the overall student body are students from within the state, only 47.7% of the student-athlete population are from within the state. However, this geographic diversity did not drastically impact the population of student-athletes in this study. The correlations previously depicted (see Table 3) for the entire student body were very similar to those for the student-athlete population.

In order to maximize the number of observations for the student-athlete population, ACT equivalent scores were calculated for those students with only SAT scores. ACT equivalent scores were calculated using a regression equation. The equation was developed for this study by regressing scores of the 2,179 students from the total population who had both ACT and SAT scores. The regression equation used to form the ACT equivalent score was ACTEQ = 5.308480 + .019821 (SAT total score). For those students possessing results from both ACT and SAT tests, the two tests were highly correlated ($\underline{r} = .86$). The correlation between ACT composite scores and general education grade point average for this group was $\underline{r} = .33$. ACT composite scores correlated with first semester grade point average $\underline{r} = .31$. SAT total scores correlated with general education grade point average $\underline{r} = .31$, and with first semester grade point average $\underline{r} = .31$. See Table 4 for correlations between ACT, SAT, general education grade point average, and first semester grade point average.

Table IV

Correlations between ACT composite, SAT total score, general education grade point average, and first semester grade point average

	1.	2.	3.	4.
1. ACT Comp	— —	.8630 (2181) p=.0000	.3303 (9575) p=.0000	.3099 (8043) p= .0000
2. SAT Total		— —	.3033 (2365) p= .0000	.3048 (2008) p= .0000
3. Gen. Ed. G.P.A.			— —	.8306 (8469) p= .0000
4. First Sem. G.P.A.				— —

An assumption of this study is that ACT equivalent scores calculated by this regression technique were appropriate; further, any error introduced was random error and did not systematically create a bias in the data. The similar correlations with the dependent variables and the strong correlation with each other for this group of 2,179 indicated that the tests appear to predict academic attainment similarly. Creating an ACT

equivalent score from SAT scores is, for this study, considered preferable to loosing data from individuals not possessing an ACT composite score.

The independent variable ACT/SAT was then computed to represent the best score obtained by an individual student from his/her ACT composite score or his/her ACT equivalent score. The ACT composite score is scaled from 1 to 36 and is the rounded average of the four subject area test scores. The ACT equivalent score is also scaled from 1 to 36, as is the ACT/SAT variable.

The high school grade point averages were obtained from the official high school transcript of the student. The high school grade point average was the grade point average earned by the subject in all courses taken during four years of high school. Averages not based on the four-point scale had been converted to a four-point scale by the Office of the Registrar.

The 11,810 subjects were divided into groups based on their gender and athletic participation status. Male intercollegiate football participants and male intercollegiate basketball participants were combined into a group classified as male major-sport student-athletes. Male intercollegiate baseball, male intercollegiate track, male intercollegiate wrestling, male intercollegiate golf, and male intercollegiate tennis participants were classified as male minor-sport student-athletes. All females participating on an intercollegiate sports team were classified as female student-athletes and female students not participating on an intercollegiate sports team were classified as female non-athletes. Likewise, male students not participating on an intercollegiate sports team were classified as male non-athletes.

The purpose of grouping the subjects in this fashion is that male athletic programs are typically classified into groups of revenue producing sports and non-revenue producing sports while female athletics programs are typically considered non-revenue producing. In the men's programs, the revenue producing athletics programs are identified as major sports while the non-revenue producing athletic programs are classified as minor sports for the men's programs. All female sports programs are non-revenue producing; therefore, the female programs are grouped together. The rationale for this grouping is that revenue producing athletic programs have a greater likelihood of experiencing extreme pressures to "win at any cost" and the public scrutiny that accompanies such pressure causes a very different environment for this group of student-athletes. Thus, it is possible that major-sport student-athletes are experiencing the collegiate community in a different way than female or minor-sport athletes (Adelman, 1990).

Data Analysis

Comparisons were made by analyzing differences found between the various groups on the slopes and the intercepts. The data analysis consisted of regression analyses using ACT/SAT, high school grade point average, and high school rank percentile as independent variables and general education grade point average and first semester grade point average as the dependent variables. Each group comparison consisted of comparing the regression coefficients for the independent variables individually, predicting either general education grade point average or first semester grade point average. One set of equations used general education grade point average as the dependent variable and the other used the student's first semester grade point average as the dependent variable.

Each analysis compared two participation groups using one independent variable with one dependent variable. For each group comparison, there were three comparisons conducted for each dependent variable to determine slope differences, and as many as three comparisons conducted for each dependent variable to determine intercept differences. According to Pedhazur (1982), the appropriate method of comparing slopes between two groups is to test the regression coefficient of the independent variable. This method accounts for group membership by including a grouping variable by means of coding the groups using effect coding. It is also necessary to include a variable which is the product of the grouping variable and the score on the independent variable. The independent variable, the grouping variable, and the product variable were entered into the regression analysis. To determine if a difference existed between the slopes of the two groups, the product variable was the focus. If the product variable was significant, a difference in slope existed. An analysis included one of the independent variables, an effect-coded variable (groups were coded 1 and -1), and a product variable (I.V. x coded variable).

The first set of analyses was conducted in an attempt to determine if a significant difference existed between the groups on the regression coefficient. If a significant difference was found on the product variable, then it was concluded that a difference existed between the groups on the regression coefficient. This would be an indication that the slopes of the two groups differed.

When the product variable was not significant, an analysis to determine difference in intercepts was conducted. The analysis conducted to determine intercept differences included the independent variable and the grouping variable in a regression analysis. Difference in intercept was determined by the significance level of the grouping variable.

If the grouping variable was significant, it was determined that an intercept difference existed (Pedhazur, 1982). These analyses were conducted to test each of the null hypotheses.

In comparing the regression models of the various groups, simple linear regression analyses were run for each independent variable predicting a dependent variable. The comparison of regression coefficients (slopes) consisted of a simple linear regression that included the independent variable of interest (i.e., ACT/SAT), a grouping variable for groups of interest (coded 1 or -1), and a product variable (e.g., ACT/SAT X 1). In the test for difference between the regression coefficients, it was concluded that a difference existed between the slopes of the two groups if the product variable contributed a significant amount of variance accounted for (R^2) to the equation. If the product variable was not significant, a test for intercept difference was conducted between the same two groups using the same independent and dependent variables (Pedhazur, 1982).

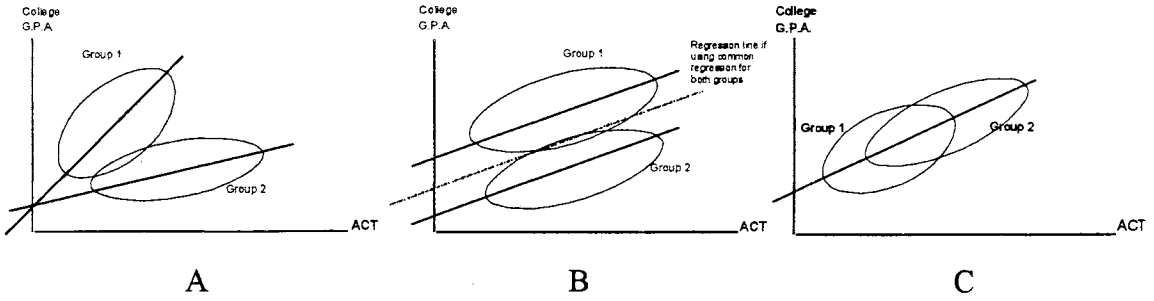
These coefficient comparisons are only appropriate when the regression coefficients for each group significantly differed from zero. This means that there is a significant slope for the independent variable when predicting the dependent variable for the given group. When the coefficient does not differ from zero, it is determined that the independent variable has no effect on the dependent variable.

In the analyses comparing the intercepts, the product variables were dropped from the equation. The independent variables entered into the equation were the independent variable of interest (e.g., ACT/SAT) and the grouping variable. If a significant R^2 was found for the grouping variable, it was concluded that a difference in intercepts existed.

The tests of coefficients were for the purpose of examining equality of slope between the two groups on the independent variable of interest. This test is the one that addresses the test bias issue. Equality of slopes meant that the effect of the independent variable on the dependent variable was the same for both groups.

If no difference existed between the coefficients, it was then appropriate to determine if a difference existed between the intercepts of the two groups. This was equivalent to testing for the effect of group membership. If a difference existed between the intercepts, it was concluded that a constant difference between the groups along the continuum of the independent variable was present. If an intercept difference (also referred to as intercept bias) existed, one of the groups would have been systematically overestimated and the other systematically underestimated when combined in a common regression equation predicting the dependent variable.

The underestimation and overestimation of a given group is accomplished by the regression lines being parallel (same slopes) yet significantly different on the intercept. When this occurs, the mean of the two regression lines, which is the regression line that would exist if a common regression were conducted using the two groups, would be less than the group with the higher intercept and greater than the group with the lower intercept. Thus, a common regression would predict group members from the group with the lower intercept to perform at a higher level than would be predicted on a regression for only that group and would predict members of the group with the higher intercept to perform a lesser level than would be predicted on a regression for only that group (see Figure 1).



A B C

Figure I. Regression line differences are depicted. Section 'A' represents two groups with equal intercepts but different slopes. Section 'B' represents two groups with equal slopes but different intercepts. Section 'C' represents two groups with equal slopes and equal intercepts.

For each of the hypotheses a table reports the statistics related to that hypothesis. These tables include the number of subjects for the groups (n), the correlation between the independent variables and the dependent variables for each group (r_{xy}), the unstandardized regression coefficient for each of the independent variables predicting the dependent variable (b), and the intercept for each of the independent variables. Only the unstandardized coefficients are reported. In a simple linear regression analysis where only one independent variable is used to predict one dependent variable, the standardized regression coefficient is the same as the correlation (r_{xy}) between the independent variable and the dependent variable. Therefore, to report both the correlation and the standardized regression coefficient would be redundant. The correlation between the independent variable are also reported in these tables.

In an effort to minimize failure to reject the null hypothesis when it should have been rejected, Type II error, Pedhazur (1982) suggests that a relatively large level of

significance be used for tests of significance of differences between coefficients. For this reason, $\alpha = .10$ has been used for the significance tests for each of the null hypotheses. Also, some general descriptive data for the comparison groups in this study are reported in Table 5. These data are presented to provide a better understanding of the comparisons analyzed for each of the null hypothesis.

Table V

Mean ACT/SAT, high school grade point average, high school rank percentile, General Education Grade Point Average, and First Semester Grade Point Average of subjects by group

Group	n	ACT /SAT	H.S. G.P.A.	H.S. Rank Pctl.	Gen Ed GPA	First Sem GPA
Male major-sport athlete	108	21	2.96	0.60	2.17	2.10
Male minor-sport athlete	105	23	3.15	0.68	2.70	2.68
Male non-athlete	5,596	24	3.24	0.70	2.45	2.44
Female athlete	74	22	3.37	0.73	2.57	2.49
Female non-athlete	5,927	23	3.42	0.78	2.74	2.74

CHAPTER IV

RESULTS

The results of the analyses conducted for each of the null hypotheses are reported in this chapter. Also reported in this chapter are the results from the additional comparisons made between the various groups on the variables that have been used for this study.

Test of the Null Hypotheses

Null Hypothesis 1

For null hypothesis one, the regression coefficients and intercepts of male major-sport student-athletes and male non-athletes were tested for significant difference. The coefficients for ACT/SAT, high school grade point average, and high school rank percentile were compared separately for slope differences between the two groups. For this hypothesis, the comparison was made predicting general education grade point average. Table 6 depicts the correlations, unstandardized regression coefficients, intercepts, and significance test results for this hypothesis. When comparing the regression coefficients, none of the slopes for the independent variables were significantly different ($p \leq .10$) for the two groups.

Since no differences were found between the two groups when comparing regression coefficients, it was appropriate to test for differences between intercepts on each of these

three independent variables. Between these two groups, no significant differences ($p \leq .10$) were found between the intercepts on either ACT/SAT, high school grade point average, or high school rank percentile.

The results of these analyses indicated that male major-sport student-athletes do not differ from male non-athletes on the effect of ACT/SAT, high school grade point average, or high school rank percentile in predicting general education grade point average. Therefore, null hypothesis one was not rejected. It is reasonable to expect that these independent variables will be equally predictive for male major-sport student-athletes and male non-athletes. For these two groups, a common regression equation would be appropriate for predicting general education grade point average from either ACT/SAT, high school grade point average, or high school rank percentile.

Table VI

Comparison of male major-sport student-athletes and male non-athletes predicting general education grade point average

	Male Major-sport Athletes				Male Non-Athletes				Slope Statistics		Intercept Statistics	
Predicting Y from:	n	r_{xy}	b	Inter.	n	r_{xy}	b	Inter.	t	p	t	p
ACT/SAT	100	0.34	0.119	-0.300	4,549	0.35	0.096	0.176	0.65	0.517	0.04	0.971
H S G.P.A.	87	0.47	0.773	-0.142	4,132	0.51	0.990	-0.773	1.25	0.213	0.18	0.859
H S RANK PCTL.	97	0.43	1.770	1.142	4,327	0.50	2.444	0.737	1.65	0.101	0.04	0.971
Correlations Between I.V.s:		r_{xy}				r_{xy}						
ACT/SAT, HSGPA		0.36				0.41						
HSGPA, RANK PCTL.		0.86				0.91						
RANK PCTL., ACT/SAT		0.27				0.41						

Null Hypothesis 2

For null hypothesis two, the regression coefficients and intercepts of male major-sport student-athletes and male non-athletes were tested for significant difference. The coefficients for ACT/SAT, high school grade point average, and high school rank percentile were compared for slope differences between the two groups. For this hypothesis, the comparison was made predicting first semester grade point average. Table 7 depicts the correlations, unstandardized regression coefficients, intercepts, and

significance test results for this hypothesis. When comparing the regression coefficients, none of the slopes for the independent variables were significantly different ($p \leq .10$) for the two groups.

Since no differences were found between the two groups when comparing regression coefficients, it was then appropriate to test for difference in intercepts on each of these three independent variables. Between these two groups, no significant differences ($p \leq .10$) were found between the intercepts on either ACT/SAT, high school grade point average, or high school rank percentile.

The results of these analyses indicated that male major-sport student-athletes do not differ from male non-athletes on the effect of ACT/SAT, high school grade point average, or high school rank percentile in predicting first semester grade point average. Therefore, null hypothesis two was not rejected. It is reasonable to expect that these independent variables will be equally predictive for male major-sport student-athletes and male non-athletes. For these two groups, a common regression equation would be appropriate for predicting first semester grade point average from either ACT/SAT, high school grade point average, or high school rank percentile.

Table VII

Comparison of male major-sport student-athletes and male non-athletes predicting first semester grade point average

	Male Major-sport Athletes				Male Non-Athletes				Slope Statistics		Intercept Statistics	
Predicting Y from:	n	r_{xy}	b	Inter.	n	r_{xy}	b	Inter.	t	p	t	p
ACT/SAT	77	0.35	0.100	0.010	3,804	0.32	0.081	0.490	0.52	0.600	0.63	0.529
H S G.P.A.	68	0.45	0.613	0.354	3,425	0.49	0.877	-0.446	1.43	0.153	0.26	0.799
H S RANK PCTL.	75	0.43	1.495	1.265	3,588	0.47	2.167	0.901	1.52	0.129	0.27	0.788
Correlations Between I.V.s:		r_{xy}				r_{xy}						
ACT/SAT, HSGPA		0.36				0.41						
HSGPA, RANK PCTL.		0.86				0.91						
RANK PCTL., ACT/SAT		0.27				0.41						

Null Hypothesis 3

For null hypothesis three, the regression coefficients and intercepts of male minor-sport student-athletes and male non-athletes were tested for significant difference. The coefficients for ACT/SAT, high school grade point average, and high school rank percentile were compared for slope differences between the two groups. For this hypothesis, the comparison was made predicting general education grade point average. Table 8 depicts the correlations, unstandardized regression coefficients, intercepts, and significance test results for this hypothesis. When comparing the regression coefficients, none of the slopes for the independent variables were significantly different ($p \leq .10$) for the two groups.

Since no differences were found between the two groups when comparing regression coefficients, it was then appropriate to test for differences in intercepts on each of these three independent variables. Between these two groups, significant differences were found between the intercepts on ACT/SAT ($p \leq .10$), high school grade point average ($p \leq .10$), and high school rank percentile ($p \leq .10$).

The results of these analyses indicated that male minor-sport student-athletes do not differ from male non-athletes on the slope of the independent variables ACT/SAT, high school grade point average, and high school rank percentile in predicting general education grade point average. However, significant differences were found on each of these independent variables on the intercepts. Therefore, null hypothesis three is rejected. It is concluded that male minor-sport student-athletes would be underestimated and male non-athletes would be overestimated by a common regression equation developed from either ACT/SAT, high school grade point average, or high school rank percentile for these two groups to predict general education grade point average.

Table VIII

Comparison of male minor-sport student-athletes and male non-athletes predicting general education grade point average

	Male Minor-sport Athletes				Male Non-Athletes				Slope Statistics		Intercept Statistics	
Predicting Y from:	n	r_{xy}	b	Inter.	n	r_{xy}	b	Inter.	t	p	t	p
ACT/SAT	87	0.48	0.098	0.400	4,549	0.35	0.096	0.176	0.08	0.936	2.48	0.013
H S G.P.A.	78	0.55	0.872	-0.175	4,132	0.51	0.990	-0.773	0.58	0.563	2.07	0.038
H S RANK PCTL.	80	0.52	1.986	1.230	4,327	0.50	2.444	0.736	0.93	0.352	1.67	0.095
Correlations Between I.V.s:		r_{xy}				r_{xy}						
ACT/SAT, HSGPA		0.40				0.41						
HSGPA, RANK PCTL.		0.93				0.91						
RANK PCTL., ACT/SAT		0.36				0.41						

Null Hypothesis 4

For null hypothesis four, the regression coefficients and intercepts of male minor-sport student-athletes and male non-athletes were tested for significant difference. The coefficients for ACT/SAT, high school grade point average, and high school rank percentile were compared for slope differences between the two groups. For this hypothesis, the comparison was made predicting first semester grade point average. Table 9 depicts the correlations, unstandardized regression coefficients, intercepts, and significance test results for this hypothesis. When comparing the regression coefficients, none of the slopes for the independent variables were significantly different ($p \leq .10$) for the two groups.

Since no differences were found between the two groups when comparing regression coefficients, it was appropriate to test for differences in intercepts on each of these three independent variables. Between these two groups, significant differences were found between the intercepts on ACT/SAT ($p \leq .10$), high school grade point average ($p \leq .10$), and high school rank percentile ($p \leq .10$).

The results of these analyses indicate that male minor-sport student-athletes do not differ from male non-athletes on the slopes of the independent variables ACT/SAT, high school grade point average, or high school rank percentile in predicting first semester grade point average. However, significant differences were found on each of these independent variables on the intercepts. Therefore, null hypothesis four is rejected. It is concluded that male minor-sport student-athletes would be underestimated and male non-athletes would be overestimated by a common regression equation developed from either ACT/SAT, high school grade point average, or high school rank percentile for these two groups to predict first semester grade point average.

TABLE IX

Comparison of male minor-sport student-athletes and male non-athletes predicting first semester grade point average

	Male Minor-sport Athletes				Male Non-Athletes				Slope Statistics		Intercept Statistics	
Predicting Y from:	n	r_{xy}	b	Inter.	n	r_{xy}	b	Inter.	t	p	t	p
ACT/SAT	68	0.49	0.093	0.520	3,804	0.32	0.081	0.490	0.40	0.690	2.53	0.012
H S G.P.A.	62	0.49	0.773	0.096	3,425	0.49	0.877	-0.446	0.45	0.655	1.81	0.070
H S RANK PCTL.	65	0.45	1.596	1.469	3,588	0.47	2.167	0.901	1.08	0.279	1.77	0.080
Correlations Between I.V.s:		r_{xy}				r_{xy}						
ACT/SAT, HSGPA		0.40				0.41						
HSGPA, RANK PCTL.		0.93				0.91						
RANK PCTL., ACT/SAT		0.36				0.41						

Null Hypothesis 5

For null hypothesis five, the regression coefficients and intercepts of male major-sport student-athletes and male minor-sport student-athletes were tested for significant differences. The coefficients for ACT/SAT, high school grade point average, and high school rank percentile were compared for slope differences between the two groups. For this hypothesis, the comparison was made predicting general education grade point average. Table 10 depicts the correlations, unstandardized regression coefficients, intercepts, and significance test results for this hypothesis. When comparing the regression coefficients, none of the slopes for the independent variables were significantly different ($p \leq .10$) for the two groups.

Since no differences were found between the two groups when comparing regression coefficients, it was appropriate to test for differences in intercepts on each of these three independent variables. Between these two groups, significant differences were found between the intercepts on ACT/SAT ($p \leq .10$), high school grade point average ($p \leq .10$), and high school rank percentile ($p \leq .10$).

The results of these analyses indicate that male major-sport student-athletes do not differ from male minor-sport student-athletes on the slopes of the independent variables ACT/SAT, high school grade point average, or high school rank percentile in predicting general education grade point average. However, significant differences of intercepts were found for each of the independent variables. Therefore, null hypothesis five is rejected. It is concluded that male minor-sport student-athletes would be underestimated and male major-sport student-athletes would be overestimated by a common regression equation developed from either ACT/SAT or high school rank percentile to predict general education grade point average. It is also concluded that male minor-sport student-athletes would be overestimated and male major-sport student-athletes would be underestimated by a common regression equation developed from high school grade point average to predict general education grade point average.

Table X

Comparison of male major-sport student-athletes and male minor-sport student-athletes predicting general education grade point average

	Male Major-sport Athletes				Male Minor-sport Athletes				Slope Statistics		Intercept Statistics	
Predicting Y from:	n	r_{xy}	b	Inter.	n	r_{xy}	b	Inter.	t	p	t	p
ACT/SAT	100	0.34	0.119	-0.300	87	0.48	0.098	0.400	0.56	0.576	1.96	0.052
H S G.P.A.	87	0.47	0.773	-0.142	78	0.55	0.872	-0.175	0.45	0.656	2.22	0.028
H S RANK PCTL.	97	0.43	1.770	1.142	80	0.52	1.986	1.230	0.40	0.687	1.86	0.064
Correlations Between I.V.s:		r_{xy}				r_{xy}						
ACT/SAT, HSGPA		0.36				0.40						
HSGPA, RANK PCTL.		0.86				0.93						
RANK PCTL., ACT/SAT		0.27				0.36						

Null Hypothesis 6

For null hypothesis six, the regression coefficients and intercepts of male major-sport student-athletes and male minor-sport student-athletes were tested for significant differences. The coefficients for ACT/SAT, high school grade point average, and high school rank percentile were compared for slope differences between the two groups. For this hypothesis, the comparison was made predicting first semester grade point average. Table 11 depicts the correlations, unstandardized regression coefficients, intercepts, and significance test results for this hypothesis. When comparing the regression coefficients, none of the slopes for the independent variables were significantly different ($p \leq .10$) for the two groups.

Since no differences were found between the two groups when comparing regression coefficients, it was appropriate to test for differences in intercepts on each of these three independent variables. Between these two groups, significant differences were found between the intercepts on ACT/SAT ($p \leq .10$), high school grade point average ($p \leq .10$), and high school rank percentile ($p \leq .10$).

The results of these analyses indicates that male major-sport student-athletes do not differ from male minor-sport student-athletes on the slopes of the independent variables ACT/SAT, high school grade point average, and high school rank percentile in predicting first semester grade point average. However, significant differences were found on each of the independent variables on the intercepts. Therefore, null hypothesis six is rejected. It is concluded that male minor-sport student-athletes would be underestimated and male major-sport student-athletes would be overestimated by a common regression equation developed from either ACT/SAT or high school rank percentile for these two groups to predict first semester grade point average. It is also concluded that male minor-sport student-athletes would be overestimated and male major-sport student-athletes would be underestimated by a common regression equation developed from high school grade point average for these two groups to predict first semester grade point average.

TABLE XI

Comparison of male major-sport student-athletes and male minor-sport student-athletes predicting first semester grade point average

	Male Major-sport Athletes				Male Minor-sport Athletes				Slope Statistics		Intercept Statistics	
Predicting Y from:	n	r_{xy}	b	Inter.	n	r_{xy}	b	Inter.	t	p	t	p
ACT/SAT	77	0.35	0.100	0.010	68	0.49	0.093	0.520	0.21	0.830	2.71	0.010
H S G.P.A.	68	0.45	0.613	0.353	62	0.49	0.773	0.096	0.69	0.490	1.87	0.060
H S RANK PCTL.	75	0.43	1.495	1.265	65	0.45	1.596	1.496	0.19	0.850	2.37	0.020
Correlations Between I.V.s:		r_{xy}				r_{xy}						
ACT/SAT, HSGPA		0.36				0.40						
HSGPA, RANK PCTL.		0.86				0.93						
RANK PCTL., ACT/SAT		0.27				0.36						

Null Hypothesis 7

For null hypothesis seven, the regression coefficients and intercepts of female student-athletes and female non-athletes were tested for significant differences. The coefficients for ACT/SAT, high school grade point average, and high school rank percentile were compared for slope differences between the two groups. For this hypothesis, the comparison was made predicting general education grade point average. Table 12 depicts the correlations, unstandardized regression coefficients, intercepts, and significance test results for this hypothesis. When comparing the regression coefficients, none of the slopes for the independent variables were significantly different ($p \leq .10$) for the two groups.

Since no differences were found between the two groups when comparing regression coefficients, it was appropriate to test for differences in intercepts on each of these three independent variables. Between these two groups, no significant differences ($p \leq .10$) were found between the intercepts on either ACT/SAT, high school grade point average, or high school rank percentile.

The results of these analyses indicates that female student-athletes do not differ from female non-athletes on the effect of ACT/SAT, high school grade point average, or high school rank percentile in predicting general education grade point average. Therefore, null hypothesis seven is not rejected. It is reasonable to expect that these independent variables will be equally predictive for female student-athletes and female non-athletes. For these two groups, a common regression equation would be appropriate for predicting general education grade point average from either ACT/SAT, high school grade point average, or high school rank percentile.

Table XII

Comparison of female student-athletes and female non-athletes predicting general education grade point average

	Female Athletes				Female Non-Athletes				Slope Statistics		Intercept Statistics	
Predicting Y from:	n	r_{xy}	b	Inter.	n	r_{xy}	b	Inter.	t	p	t	p
ACT/SAT	64	0.35	0.107	0.280	5,100	0.36	0.093	0.610	0.34	0.734	0.33	0.745
H S G.P.A.	55	0.50	0.874	-0.309	4,679	0.48	0.988	-0.651	0.47	0.637	0.36	0.720
H S RANK PCTL.	57	0.52	2.543	0.779	4,879	0.45	2.429	0.862	0.17	0.862	0.01	0.996
Correlations Between I.V.s:		r_{xy}				r_{xy}						
ACT/SAT, HSGPA		0.31				0.45						
HSGPA, RANK PCTL.		0.87				0.90						
RANK PCTL., ACT/SAT		0.25				0.44						

Null Hypothesis 8

For null hypothesis eight, the regression coefficients and intercepts of female student-athletes and female non-athletes were tested for significant differences. The coefficients for ACT/SAT, high school grade point average, and high school rank percentile were compared for slope differences between the two groups. For this hypothesis, the comparison was made predicting first semester grade point average. Table 13 depicts the correlations, unstandardized regression coefficients, intercepts, and significance test results for this hypothesis. When comparing the regression coefficients, none of the slopes for the independent variables were significantly different ($p \leq .10$) for the two groups.

Since no differences were found between the two groups when comparing regression coefficients, it was appropriate to test for differences in intercepts on each of these three independent variables. Between these two groups, no significant difference ($p \leq .10$) was found between the intercepts on either ACT/SAT, high school grade point average, or high school rank percentile.

The results of these analyses indicates that female student-athletes do not differ from female non-athletes on the effect of either ACT/SAT, high school grade point average, or high school rank percentile in predicting first semester grade point average. Therefore, null hypothesis eight is not rejected. It is reasonable to expect that these independent variables will be equally predictive for female student-athletes and female non-athletes. For these two groups, a common regression equation would be appropriate for predicting first semester grade point average from either ACT/SAT, high school grade point average, or high school rank percentile.

TABLE XIII

Comparison of female student-athletes and female non-athletes predicting first semester grade point average

	Female Athletes				Female Non-Athletes				Slope Statistics		Intercept Statistics	
Predicting Y from:	n	r_{xy}	b	Inter.	n	r_{xy}	b	Inter.	t	p	t	p
ACT/SAT	56	0.38	0.099	0.320	4,318	0.34	0.081	0.860	0.46	0.645	1.26	0.207
H S G.P.A.	47	0.49	0.779	-0.129	3,956	0.46	0.891	-0.353	0.46	0.647	1.31	0.190
H S RANK PCTL.	49	0.42	1.943	1.059	4,148	0.43	2.167	1.042	0.33	0.742	1.23	0.218
Correlations Between I.V.s:		r_{xy}				r_{xy}						
ACT/SAT, HSGPA		0.31				0.45						
HSGPA, RANK PCTL.		0.87				0.90						
RANK PCTL., ACT/SAT		0.25				0.44						

Null Hypothesis 9

For null hypothesis nine, the regression coefficients and intercepts of male major-sport student-athletes and female student-athletes were tested for significant differences. The coefficients for ACT/SAT, high school grade point average, and high school rank percentile were compared for slope differences between the two groups. For this hypothesis, the comparison was made predicting general education grade point average. Table 14 depicts the correlations, unstandardized regression coefficients, intercepts, and significance test results for this hypothesis. When comparing the regression coefficients, none of the slopes for the independent variables were significantly different ($p \leq .10$) for the two groups.

Since no differences were found between the two groups when comparing regression coefficients, it was appropriate to test for differences in intercepts on each of these three independent variables. Between these two groups, significant differences were found between the intercept on ACT/SAT ($p \leq .10$). The intercepts for high school grade point average, and high school rank percentile were not significantly different ($p \leq .10$).

The results of these analyses indicates that male major-sport student-athletes do not differ from female student-athletes on the slope of the independent variables ACT/SAT, high school grade point average, or high school rank percentile in predicting general education grade point average. These two groups do not differ on the intercepts for high school grade point average or high school rank percentile. However, significant differences were found on the intercept for ACT/SAT. Therefore, null hypothesis nine is rejected. It is concluded that female student-athletes would be underestimated and male major-sport student-athletes would be overestimated by a common regression equation developed from ACT/SAT for these two groups to predict general education grade point average.

Table XIV

Comparison of male major-sport student-athletes and female student-athletes predicting general education grade point average

	Male Major-sport Athletes				Female Athletes				Slope Statistics		Intercept Statistics	
Predicting Y from:	n	r_{xy}	b	Inter.	n	r_{xy}	b	Inter.	t	p	t	p
ACT/SAT	100	0.34	0.119	-0.300	64	0.35	0.107	0.280	0.24	0.810	2.24	0.030
H S G.P.A.	87	0.47	0.773	-0.142	55	0.50	0.874	-0.309	0.37	0.710	1.10	0.270
H S RANK PCTL.	97	0.43	1.770	1.142	57	0.52	2.543	0.779	1.09	0.280	1.20	0.230
Correlations Between I.V.s:		r_{xy}				r_{xy}						
ACT/SAT, HSGPA		0.36				0.31						
HSGPA, RANK PCTL.		0.86				0.87						
RANK PCTL., ACT/SAT		0.27				0.25						

Null Hypothesis 10

For null hypothesis ten, the regression coefficients and intercepts of male major-sport student-athletes and female student-athletes were tested for significant differences. The coefficients for ACT/SAT, high school grade point average, and high school rank percentile were compared for slope differences between the two groups. For this hypothesis, the comparison was made predicting first semester grade point average. Table 15 depicts the correlations, unstandardized regression coefficients, intercepts, and significance test results for this hypothesis. When comparing the regression coefficients, none of the slopes for the independent variables were significantly different ($p \leq .10$) for the two groups.

Since no differences were found between the two groups when comparing regression coefficients, it was appropriate to test for differences in intercepts on each of these three independent variables. Between these two groups, significant differences were found between the intercept on ACT/SAT ($p \leq .10$). The intercepts for high school grade point average and high school rank percentile were not significantly different ($p \leq .10$).

The results of these analyses indicates that male major-sport student-athletes do not differ from female student-athletes on the slope of the independent variables ACT/SAT, high school grade point average, and high school rank percentile in predicting first semester grade point average. These two groups do not differ on the intercepts for high school grade point average or high school rank percentile. However, significant differences were found on the intercept for ACT/SAT. Therefore, null hypothesis ten is rejected. It is concluded that female student-athletes would be underestimated and male major-sport student-athletes would be overestimated by a common regression equation developed from ACT/SAT for these two groups to predict first semester grade point average.

TABLE XV

Comparison of male major-sport student-athletes and female student-athletes predicting first semester grade point average

	Male Major-sport Athletes				Female Athletes				Slope Statistics		Intercept Statistics	
Predicting Y from:	n	r_{xy}	b	Inter.	n	r_{xy}	b	Inter.	t	p	t	p
ACT/SAT	77	0.35	0.100	0.010	56	0.38	0.099	0.320	0.04	0.969	2.03	0.044
H S G.P.A.	68	0.45	0.613	0.353	47	0.49	0.779	-0.129	0.65	0.520	0.36	0.718
H S RANK PCTL.	75	0.43	1.495	1.265	49	0.42	1.943	1.059	0.64	0.525	0.72	0.471
Correlations Between I.V.s:		r_{xy}				r_{xy}						
ACT/SAT, HSGPA		0.36				0.31						
HSGPA, RANK PCTL.		0.86				0.87						
RANK PCTL., ACT/SAT		0.27				0.25						

Null Hypothesis 11

For null hypothesis 11, the regression coefficients and intercepts of male minor-sport student-athletes and female student-athletes were tested for significant differences. The coefficients for ACT/SAT, high school grade point average, and high school rank percentile were compared for slope difference between the two groups. For this hypothesis, the comparison was made predicting general education grade point average. Table 16 depicts the correlations, unstandardized regression coefficients, intercepts, and significance test results for this hypothesis. When comparing the regression coefficients, none of the slopes for the independent variables were significantly different ($p \leq .10$) for the two groups.

Since no differences were found between the two groups when comparing regression coefficients, it was appropriate to test for differences in intercepts on each of these three independent variables. Between these two groups, no significant differences ($p \leq .10$) were found between the intercepts on either ACT/SAT, high school grade point average, or high school rank percentile.

The results of these analyses indicates that male minor-sport student-athletes do not differ from female student-athletes on the effect of either ACT/SAT, high school grade point average, or high school rank percentile in predicting general education grade point average. Therefore, null hypothesis 11 is not rejected. It is reasonable to expect that these independent variables will be equally predictive for male minor-sport student-athletes and female student-athletes. For these two groups, a common regression equation would be appropriate for predicting general education grade point average from either ACT/SAT, high school grade point average, or high school rank percentile.

Table XVI

Comparison of male minor-sport student-athletes and female student-athletes predicting general education grade point average

	Male Minor-sport Athletes				Female Athletes				Slope Statistics		Intercept Statistics	
Predicting Y from:	n	r_{xy}	b	Inter.	n	r_{xy}	b	Inter.	t	p	t	p
ACT/SAT	87	0.48	0.098	0.400	64	0.35	0.107	0.280	0.23	0.821	0.55	0.584
H S G.P.A.	78	0.55	0.872	-0.175	55	0.50	0.874	-0.309	0.01	0.993	1.01	0.316
H S RANK PCTL.	80	0.52	1.986	1.230	57	0.52	2.543	0.779	0.85	0.396	0.44	0.663
Correlations Between I.V.s:		r_{xy}				r_{xy}						
ACT/SAT, HSGPA		0.40				0.31						
HSGPA, RANK PCTL.		0.93				0.87						
RANK PCTL., ACT/SAT		0.36				0.25						

Null Hypothesis 12

For null hypothesis 12, the regression coefficients and intercepts of male minor-sport student-athletes and female student-athletes were tested for significant differences. The coefficients for ACT/SAT, high school grade point average, and high school rank percentile were compared for slope differences between the two groups. For this hypothesis, the comparison was made predicting first semester grade point average. Table 17 depicts the correlations, unstandardized regression coefficients, intercepts, and significance test results for this hypothesis. When comparing the regression coefficients, none of the slopes for the independent variables were significantly different ($p \leq .10$) for the two groups.

Since no differences were found between the two groups when comparing regression coefficients, it was appropriate to test for differences in intercepts on each of these three independent variables. Between these two groups, no significant differences ($p \leq .10$) were found between the intercepts on either ACT/SAT, high school grade point average, or high school rank percentile.

The results of these analyses indicates that male minor-sport student-athletes do not differ from female student-athletes on the effect of either ACT/SAT, high school grade point average, or high school rank percentile in predicting first semester grade point average. Therefore, null hypothesis 12 is not rejected. It is reasonable to expect that these independent variables will be equally predictive for male minor-sport student-athletes and female student-athletes. For these two groups, a common regression equation would be appropriate for predicting first semester grade point average from ACT/SAT, high school grade point average, and high school rank percentile.

TABLE XVII

Comparison of male minor-sport student-athletes and female student-athletes predicting first semester grade point average

	Male Minor-sport Athletes				Female Athletes				Slope Statistics		Intercept Statistics	
Predicting Y from:	n	r_{xy}	b	Inter.	n	r_{xy}	b	Inter.	t	p	t	p
ACT/SAT	68	0.49	0.093	0.520	56	0.38	0.099	0.320	0.16	0.877	0.53	0.594
H S G.P.A.	62	0.49	0.773	0.096	47	0.49	0.779	-0.129	0.02	0.983	1.58	0.117
H S RANK PCTL.	65	0.45	1.596	1.496	49	0.42	1.943	1.059	0.49	0.625	1.43	0.157
Correlations Between I.V.s:		r_{xy}				r_{xy}						
ACT/SAT, HSGPA		0.40				0.31						
HSGPA, RANK PCTL.		0.93				0.87						
RANK PCTL., ACT/SAT		0.36				0.25						

The null hypotheses analyses were conducted to determine whether or not ACT/SAT scores, high school grade point average, and high school rank percentile were appropriate criteria for making admissions and eligibility decisions for certain groups of student-athletes. A summary of the findings by comparison are listed in Table 18. This table is provided to give an overview of the slope and intercept comparisons.

Table XVIII

Summary of the slope and intercept tests conducted for the null hypotheses and the post hoc analyses

	Groups	Slope ≠ 0	Unequal Slopes	Unequal Intercpts	Under estimated
Null Hypothesis 1	Male Major-sport - Male Non-Athl				
	ACT/SAT	yes	no	no	
	H.S.G.P.A.	yes	no	no	
	H.S. Rank Pctl.	yes	no	no	
Null Hypothesis 2	Male Major-sport - Male Non-Athl				
	ACT/SAT	yes	no	no	
	H.S.G.P.A.	yes	no	no	
	H.S. Rank Pctl.	yes	no	no	
Null Hypothesis 3	Male Minor-sport - Male Non-Athl				
	ACT/SAT	yes	no	yes	MMinS
	H.S.G.P.A.	yes	no	yes	MMinS
	H.S. Rank Pctl.	yes	no	yes	MMinS
Null Hypothesis 4	Male Minor-sport - Male Non-Athl				
	ACT/SAT	yes	no	yes	MMinS
	H.S.G.P.A.	yes	no	yes	MMinS
	H.S. Rank Pctl.	yes	no	yes	MMinS
Null Hypothesis 5	Male Major-sport - Male Minor-sport				
	ACT/SAT	yes	no	yes	MMinS
	H.S.G.P.A.	yes	no	yes	MMajS
	H.S. Rank Pctl.	yes	no	yes	MMinS
Null Hypothesis 6	Male Major-sport - Male Minor-sport				
	ACT/SAT	yes	no	yes	MMinS
	H.S.G.P.A.	yes	no	yes	MMajS
	H.S. Rank Pctl.	yes	no	yes	MMinS
Null Hypothesis 7	Female Athletes - Female Non-Athletes				
	ACT/SAT	yes	no	no	
	H.S.G.P.A.	yes	no	no	
	H.S. Rank Pctl.	yes	no	no	

(table continues)

Table XVIII continued

	Groups	Slope ≠ 0	Unequal Slopes	Unequal Intercpts	Under estimated
Null Hypothesis 8	Female Athletes - Female Non-Athletes				
	ACT/SAT	yes	no	no	
	H.S.G.P.A.	yes	no	no	
	H.S. Rank Pctl.	yes	no	no	
Null Hypothesis 9	Male Major-sport - Female Athletes				
	ACT/SAT	yes	no	yes	FemA
	H.S.G.P.A.	yes	no	no	
	H.S. Rank Pctl.	yes	no	no	
Null Hypothesis 10	Male Major-sport - Female Athletes				
	ACT/SAT	yes	no	yes	FemA
	H.S.G.P.A.	yes	no	no	
	H.S. Rank Pctl.	yes	no	no	
Null Hypothesis 11	Male Minor-sport - Female Athletes				
	ACT/SAT	yes	no	no	
	H.S.G.P.A.	yes	no	no	
	H.S. Rank Pctl.	yes	no	no	
Null Hypothesis 12	Male Minor-sport - Female Athletes				
	ACT/SAT	yes	no	no	
	H.S.G.P.A.	yes	no	no	
	H.S. Rank Pctl.	yes	no	no	

Additional Results

In an effort to represent the data more fully and to provide better insight into the findings reported for the null hypotheses, independent t-tests were conducted between the comparison groups, on each of the independent and dependent variables. The purpose of these tests is to ascertain whether or not the groups differ on the independent or

dependent variables. These comparisons were made in order to present the data more fully for this study and to identify possible explanations for the results of the regression analyses.

Comparison 1

When comparing the variable means for male major-sport student-athletes with the variable means for male non-athletes, significant differences ($p \leq .05$) were found on all of the independent and dependent variables. The means were tested using a two-tailed independent t-test. Male non-athletes had significantly higher ACT/SAT scores, high school grade point averages, high school rank percentiles, general education grade point averages, and first semester grade point averages. In addition to these mean differences, the standard deviation on ACT/SAT for the male major-sport student-athletes was considerably less than for male non-athletes. Table 19 depicts this finding.

Table XIX

Results of independent t-tests of variable means for male major-sport student-athletes and male non-athletes

	Male Major-sport Athletes n = 106			Male Non-Athletes n = 4,992			Independent t-test	
	n	M	SD	n	M	SD	t-value	2-tail sig
Independent variables								
ACT/SAT	106	20.76	2.87	4,864	24.21	4.11	12.11	0.000
H S G.P.A.	93	2.96	0.59	4,404	3.24	0.59	4.41	0.000
H S Rank Pctl.	103	0.60	0.24	4,611	0.70	0.23	4.39	0.000
Dependent variables								
Gen Ed G.P.A.	104	2.17	1.01	4,992	2.45	1.13	2.75	0.007
First Sem G.P.A.	81	2.10	0.86	4,340	2.44	1.06	3.47	0.001

Comparison 2

When comparing the variable means for male minor-sport student-athletes with the variable means for male non-athletes, significant differences ($p \leq .05$) were found on one of the independent variables and both of the dependent variables. The means were tested using a two-tailed independent t-test. Male non-athletes had significantly higher ACT/SAT scores than male minor-sport student-athletes, however, minor-sport student-athletes had significantly higher general education grade point averages and first semester grade point averages. For high school grade point average and high school rank percentile, no significant differences were found. Table 20 depicts this finding.

Table XX

Results of independent t-test of variable means for male minor-sport student-athletes and male non-athletes

	Male Minor-sport Athletes			Male Non-Athletes			Independent t-test	
	n	M	SD	n	M	SD	t-value	2-tail sig
Independent variables								
ACT/SAT	94	22.65	3.98	4,864	24.21	4.11	3.76	0.000
H S G.P.A.	85	3.15	0.53	4,404	3.24	0.59	1.51	0.136
H S Rank Pctl.	87	0.68	0.22	4,611	0.70	0.23	1.12	0.268
Dependent variables								
Gen Ed G.P.A.	99	2.70	0.83	4,992	2.45	1.13	-2.97	0.004
First Sem G.P.A.	79	2.68	0.77	4,340	2.44	1.06	-2.72	0.008

Comparison 3

When comparing the variable means for male major-sport student-athletes with the variable means for male minor-sport student-athletes, significant differences ($p \leq .05$) were found on all of the independent and dependent variables. The means were tested using a two-tailed independent t-test. Male minor-sport student-athletes had significantly higher ACT/SAT scores, high school grade point averages, high school rank percentiles, as well as general education grade point averages, and first semester grade point averages. Table 21 depicts this finding.

Table XXI

Results of independent t-test of variable means for male major-sport student-athletes and male minor-sport student-athletes

	Male Major-sport Athletes			Male Minor-sport Athletes			Independent t-test	
	n	M	SD	n	M	SD	t-value	2-tail sig
Independent variables								
ACT/SAT	106	20.76	2.87	94	22.65	3.98	-3.80	0.000
H S G.P.A.	93	2.96	0.59	85	3.15	0.53	-2.23	0.027
H S Rank Pctl.	103	0.60	0.24	87	0.68	0.22	-2.34	0.021
Dependent variables								
Gen Ed G.P.A.	104	2.17	1.01	99	2.70	0.83	-4.08	0.000
First Sem G.P.A.	81	2.10	0.86	79	2.68	0.77	-4.46	0.000

Comparison 4

When comparing the variable means for female student-athletes with the variable means for female non-athletes, significant differences ($p \leq .05$) were found on two of the independent variables and one of the dependent variables. The means were tested using a two-tailed independent t-test. Female non-athletes had significantly higher ACT/SAT scores and high school rank percentiles, as well as first semester grade point averages. Table 22 depicts this finding.

Table XXII

Results of independent t-test of variable means for female student-athletes and female non-athletes

	Female Athletes			Female Non-Athletes			Independent t-test	
	n	M	SD	n	M	SD	t-value	2-tail sig
Independent variables								
ACT/SAT	67	21.55	2.94	5,440	23.24	3.88	4.63	0.000
H S G.P.A.	58	3.37	0.48	5,006	3.42	0.49	0.79	0.431
H S Rank Pctl.	60	0.73	0.18	5,224	0.78	0.19	2.07	0.043
Dependent variables								
Gen Ed G.P.A.	71	2.57	0.87	5,408	2.74	1.01	1.60	0.113
First Sem G.P.A.	62	2.49	0.79	4,672	2.74	0.94	2.39	0.020

Comparison 5

When comparing the variable means for male major-sport student-athletes with the variable means for female student-athletes, significant differences ($p \leq .05$) were found on two of the independent and both of the dependent variables. The means were tested using a two-tailed independent t-test. Female student-athletes had significantly higher high school grade point averages and high school rank percentiles, as well as general education grade point averages and first semester grade point averages. No significant difference was found for ACT/SAT. Table 23 depicts this finding.

Table XXIII

Results of independent t-test of variable means for male major-sport student-athletes and female student-athletes

	Male Major-sport Athletes			Female Athletes			Independent t-test	
	n	M	SD	n	M	SD	t-value	2-tail sig
Independent variables								
ACT/SAT	106	20.76	2.87	67	21.55	2.94	-1.74	0.084
H S G.P.A.	93	2.96	0.59	58	3.37	0.48	-4.56	0.000
H S Rank Pctl.	103	0.60	0.24	60	0.73	0.18	-3.86	0.000
Dependent variables								
Gen Ed G.P.A.	104	2.17	1.01	71	2.57	0.87	-2.81	0.005
First Sem G.P.A.	81	2.10	0.86	62	2.49	0.79	-2.83	0.005

Comparison 6

When comparing the variable means for male minor-sport student-athletes with the variable means for female student-athletes, significant differences ($p \leq .05$) were found on two of the independent variables. The means were tested using a two-tailed independent t-test. Male minor-sport student-athletes had significantly higher ACT/SAT scores while female student-athletes had significantly higher high school grade point averages. No significant differences were found for high school rank percentile, general education grade point averages, or first semester grade point averages. Table 24 depicts this finding.

Table XXIV

Results of independent t-test of variable means for male minor-sport student-athletes and female student-athletes

	Male Minor-sport Athletes			Female Athletes			Independent t-test	
	n	M	SD	n	M	SD	t-value	2-tail sig
Independent variables								
ACT/SAT	94	22.65	3.98	67	21.55	2.94	2.00	0.047
H S G.P.A.	85	3.15	0.53	58	3.37	0.48	-2.53	0.013
H S Rank Pctl.	87	0.68	0.22	60	0.73	0.18	-1.49	0.138
Dependent variables								
Gen Ed G.P.A.	99	2.70	0.83	71	2.57	0.87	0.95	0.346
First Sem G.P.A.	79	2.68	0.77	62	2.49	0.79	1.38	0.169

Summary

The results of this study indicate that no slope differences exist on any of the comparisons made for the null hypotheses. For male major-sport student-athletes, male minor-sport student-athletes, female student-athletes, female non-athletes, and male non-athletes no findings of test bias existed. However, intercept differences did occur between male minor-sport student-athletes and male non-athletes. The minor-sport student-athletes differed on intercepts with the male major-sport student-athletes as well. The male minor-sport student-athletes and the female athletes did not differ on intercepts as was the case with female student-athletes and female non-athletes. The intercepts were

different for the female student-athletes and the male major-sport student-athletes, however.

The intercept differences indicated that, for the groups that differed, using a common regression equation consisting of a variable on which the groups differed, would underestimate one group and overestimate the other group when predicting the college grade point average of interest. Male minor-sport student-athletes are underestimated on all three of the independent variables when grouped with male non-athletes. Female student-athletes are underestimated on the ACT/SAT variable when grouped with male major-sport student-athletes. Additionally, male major-sport student-athletes and male minor-sport student-athletes differed on the intercepts for all three independent variables, although not all in the same direction. Male minor-sport student-athletes would be underestimated when grouped with male major sport-student athletes predicting college grade point average from ACT/SAT scores. However, when using high school grade point average or high school rank percentile as the predictor variables, male major-sport student-athletes were the underestimated group.

Additional findings include the results of the t-tests. In these findings, male non-athletes had significantly higher ($p \leq .05$) ACT/SAT scores, high school grade point averages, high school rank percentiles, general education grade point averages, and first semester grade point averages than did male major-sport student-athletes. Also, male minor-sport student-athletes had significantly higher ($p \leq .05$) general education grade point average and first semester grade point average than male non-athletes. However, male non-athletes had significantly higher ($p \leq .05$) ACT/SAT scores than male minor-sport student-athletes.

Female student-athletes differed from female non-athletes on three variables. Female non-athletes had significantly higher ($p \leq .05$) ACT/SAT scores, high school rank percentiles, and first semester grade point averages when compared to female student-athletes. However, female athletes were significantly higher ($p \leq .05$) on high school grade point averages, high school rank percentiles, general education grade point averages, and first semester grade point averages when compared to male major-sport student-athletes. The only difference between female student-athletes and male minor-sport student-athletes was that the male minor-sport student-athletes had significantly higher ($p \leq .05$) ACT/SAT scores than did the female student-athletes.

CHAPTER V

DISCUSSION, CONCLUSIONS, THEORETICAL IMPLICATIONS, AND RECOMMENDATIONS

Based on the results of this study as reported in the previous chapter, it is very important to understand the relevance of these findings as they relate to the study of college students and, in particular, student-athletes. A discussion of the results follows, along with conclusions and recommendations. It is hoped that these discussions, conclusions, and recommendations will help shape future investigation of the student-athlete population.

Discussion

This study looked at student-athletes as compared to non-athletes at one medium-sized Midwestern state university when predicting college grade point average from the traditional admissions criteria of ACT or SAT scores, high school grade point average, and high school rank percentile. The study was designed to determine whether or not differences existed on the slopes or intercepts for various classifications of student-athletes and non-athletes on slopes and intercepts when predicting college grade point average from these traditional admission criteria. The comparison groups tested in these hypotheses were arrived at using Adelman's (1990) comparison group arrangement

of the student-athlete population in this United States Department of Education study of 8,101 students in a national longitudinal study. The use of this grouping procedure was also supported by the fact that several studies found different results regarding student-athletes which appeared to be attributable to sport type or participation level (Ryan, 1989; Stuart, 1985; Adleman, 1990).

The results of this study indicated, however, that no differences were found between these comparison groups on the regression coefficients, based on participation level. With no significant difference between the regression coefficients of these comparison groups, it was concluded that the slopes for these groups were not significantly different. Because for the purpose of this study, test bias is defined as a difference in regression coefficient or slope between two groups being compared, it was concluded that no test bias existed between these participation groups when using either ACT/SAT, high school grade point average, or high school rank percentile to predict either first semester grade point average or general education grade point average. The results of this study indicate that ACT/SAT, high school grade point average, and high school rank percentile are not biased for male major-sport student-athletes, male minor-sport student-athletes, female student-athletes, female non-athletes, and male non-athletes.

The test fairness issue was addressed by looking for intercept differences between the comparison groups, when predicting either first semester grade point average or general education grade point average from either ACT/SAT, high school grade point average, or high school rank percentile. If an intercept difference was found between two comparison groups, it was concluded that the group with the higher intercept would be systematically underestimated and the group with the lower intercept would be systematically

overestimated in a common regression equation used to predict either first semester grade point average or general education grade point average. For the purpose of this study, this overestimation and underestimation issue is equated with fairness of prediction for the particular group of individuals.

A few notable differences were found between the comparison groups when comparing the intercepts. However, the findings of this study suggest that although intercept differences do exist between certain participation groups of student-athletes, overall the student-athlete population is not put at a disadvantage by the use of ACT/SAT, high school grade point average, or high school rank percentile as criteria for admissions or eligibility. The only disadvantage found for any group was for male minor-sport student-athletes, who were systematically underestimated by ACT/SAT, high school grade point average, or high school rank percentile when combined in a common regression with male non-athletes. Male minor-sport student-athletes were also systematically underestimated when ACT/SAT and high school rank percentile were the predictors for a common regression including male major-sport student-athletes; however, when using high school grade point average as the predictor variable, male major-sport student-athletes are systematically underestimated.

A plausible explanation for the ACT/SAT and high school rank percentile underestimation is that although minor-sport student-athletes tend to arrive at college with higher academic credentials than male major-sport student-athletes (see Table 3), they still receive the same academic support made available to all student-athletes by the Office of Academic Services for Student-Athletes (the student-athlete academic support services unit at the university studied); therefore, they perform higher than both their

student-athlete peers with lower academic credentials and their non-athlete peers that have higher academic credentials. This additional support might reflect why this group tends to be underestimated even when compared to male non-athletes with similar academic credentials. Also, male minor-sport student-athletes tend to participate in their particular sporting event even with fewer scholarships available. It is likely that non-scholarship male minor-sport student-athletes are more intrinsically motivated to pursue academic goals as their professional athletic aspirations are likely less strong than major-sport student-athletes, most of whom have full athletic scholarships.

Female student-athletes differ on ACT/SAT intercepts when compared with male major-sport student-athletes; however, since they do not differ from female non-athletes, it is assumed that this difference is more a gender issue than a sports participation group issue. Gender differences have been documented with regard to the underestimation of females when compared to males (Breland, 1979).

These intercept differences between the comparison groups were informative. Based on the results of this study, it is appropriate to control for group membership when ACT/SAT scores, high school grade point average, and high school rank percentile are used for predicting collegiate academic success for male major-sport student-athletes, male minor-sport student-athletes, and female student-athletes. However, it does not seem necessary to establish separate regression equations for each of the various groups.

Conclusions

The conclusions arrived at from the analyses conducted to examine the null hypotheses are: 1) male minor-sport student-athletes tend to benefit from the academic support services provided for all student-athletes; 2) differences between female student-athletes and male major-sport student-athletes are gender-related and not related to participation level; and 3) male major-sport student-athletes are underestimated on high school grade point average, when compared to male minor-sport student-athletes, because of a "glass floor" effect. A "glass floor" is the opposite of what has been referred to as the "glass ceiling." Theoretically it is possible to fall below a given point, however, artificial barriers are imposed that limit a student's likelihood of falling below this point.

Since male minor-sport student-athletes have similar test scores and high school records as do non-athletes, it is not surprising that they would perform better than predicted when combined in a regression equation with non-athletes predicting first semester and general education grade point averages. Non-athletes are not exposed to the same level of academic support services that student-athletes are; therefore, these intercept differences could be anticipated.

It is also understandable that female student-athletes tend to be underestimated when combined in a regression equation with male major-sport student-athletes predicting either first semester grade point average or general education grade point average from ACT/SAT scores. This underestimation is likely gender-related since female student-athletes do not differ from female non-athletes. Gender-related differences on ACT and SAT scores have been reported by Breland (1979). This gender-related

underestimation does not seem to occur with high school grade point average and high school rank percentile. This is likely because the same factors that contribute to good grades in high school are the same ones contributing to good grades in college.

On the other hand, a more difficult result to interpret is the underestimation of male major-sport student-athletes and the overestimation of male minor-sport student-athletes when predicting either first semester grade point average or general education grade point average from high school grade point average. It is possible that male minor-sport student-athletes have high school grade point averages that are over-representative of their true academic attainment level and/or that male major-sport student-athletes have a high school grade point average under-representative of their true academic attainment level. It is also possible that minor sport-student athletes have experienced high school grade inflation for one reason or another. However, a more reasonable conclusion is that a "glass floor" exists within the student-athlete population that has a greater impact on the male major-sport student-athletes.

The male major-sport student-athletes had the lowest mean scores on all of the admission criteria as well as on college grade point averages of any of the groups studied (21 ACT/SAT, 2.96 high school grade point average, .60 high school rank percentile, 2.17 gen. ed. g.p.a., 2.10 first sem. g.p.a.). University academic minimums and athletic eligibility are based on maintaining a cumulative college grade point average of 2.00. Although the goals and activities of the Office of Academic Services for Student-Athletes are conducted to assist all student-athletes reach their fullest academic potential, keeping student-athletes above the 2.00 cumulative college grade point average is probably the most visible and important task of this office. Therefore, a student-athlete that is at risk of

falling below this 2.00 barrier will receive very personalized attention to ensure at least a 2.00 grade point average.

This "glass floor" effect could also be the result of the male major sport-athlete not experiencing such grade pressures in high school because, even with a modest high school grade point average (2.96) by comparison to the other students in this study, most would have been at or above average for high school students. Therefore, it was not necessary to receive the special academic assistance in high school to remain eligible yet a great deal of attention was given to their academic success upon arriving at college. It is not clear, however, why this "glass floor" effect is evident only with the high school grade variable. One plausible explanation is that high school grade point average has the highest correlation with first semester grade point average and general education grade point average (.49 and .51 respectively). ACT and SAT scores correlate with these college grade point averages in the .30 range. This stronger relationship between high school grade point average and college grade point average contributes to this conclusion.

Although this "glass floor" will impact student-athletes other than male major-sport student-athletes, it will obviously affect this group to the largest degree because of their lower academic credentials. The "glass floor" effect would likely cause the data for the male major-sport student-athletes to be less meaningful by virtue of being artificially restricted on the bottom end; therefore, the results of this analysis must be interpreted very cautiously.

This study does not address graduation rates, which are probably a better criteria for whether or not student-athletes are succeeding academically. Even if a lower grade point

average is earned, the rate of degree attainment is likely a better assessment of an institution's commitment to the student-athlete's academic success.

Theoretical Implications

The theoretical implications from this study are several. The degree to which student-athletes are impacted by the theories discussed in chapter two of this study could have major relevance to the interpretation of the results of this study. The degree to which student-athletes are treated differently with regard to the highly structured environment in which they exist, likely has an impact on the academic performance of the athlete. The student-athlete's relationship to coaches might also shape the student-athlete's understanding of authorities including their classroom instructors. It is possible that the tension between athletic obligations and academic obligations for the student-athlete can create unique challenges for the student-athlete's development.

In attempting to reconcile Perry's (1970) cognitive developmental theory with the development of student-athletes', the "win-or-lose" perspective of the athletes' world poses some interesting dilemmas for these young people as well as for educators. According to Perry, the goal of the university should be to assist students in moving beyond a dualistic stage (black or white, right or wrong) toward a state of relativism. This progression might be restricted in this population due to the excessively rigid schedules and supervision imposed on them by the intercollegiate system. It is possible that the relationship between the student-athlete and his/her coach as well as a perspective of winning as the ultimate accomplishment will greatly determine whether or not the athlete will develop cognitively as Perry suggests is appropriate. When participating for a coach

that insists on being the ultimate authority and requires unquestioned obedience from the athlete, it is likely more difficult for the student-athlete to develop through the stages proposed by Perry while maintaining good standing with his/her coach. This same dilemma is likely true when viewing the student-athlete from other student development theories.

Another theoretical implication is identified when viewing the student-athlete population from social learning theory or self-efficacy theory. If indeed it is important in accomplishing a given task to feel that ones efforts will be rewarded at a sufficient level and that one is capable of performing at the necessary level to accomplish the given task, then viewing student-athletes' academic efforts from this perspective will likely yield some interesting findings. The student-athletes in this study entered the university with significantly lesser academic preparation, as identified by admission criteria, than their non-athlete counterparts; therefore, it would not be surprising if the student-athletes felt less capable of performing academically at a level that would be competitive with the more academically prepared non-athletes. The possibility that a lack of confidence exists for many student-athletes regarding academic accomplishments is a worthwhile concern for persons interested in understanding this population of students.

It could also be important to understand the possible explanations to this study provided through the achievement motivation theories. The student-athletes that are selected to compete at the NCAA Division I level are considered premiere athletes in his/her field. For these individuals a great deal of reinforcement has likely been forthcoming over most of his/her life related to his/her athletic performance. On the other hand, most of these athletes are at or below average on academic criteria. In light of the

achievement motivation theory it is not difficult to understand the possible lack of motivation to perform academically if the possibility of academic success is thought to be remote and if the value of academic success is questioned. It appears that much useful information could be obtained by studies that evaluated the motivational characteristics of student-athletes. It is possible that much understanding of this particular college student population would be forthcoming by assessing the types and levels of achievement motivation that is present within these student-athletes.

Although this study focused on the intercept and slope comparisons between athletic participation groups, it should provide very meaningful information to study these groups from a more theoretical basis. It seems likely that the approach used for this study, which was necessary to establish a bases for the research, does not provide adequate information for understanding the student-athlete population. Therefore, much additional research is necessary.

Recommendations

The following research recommendations are presented as a result of the study:

1. It is recommended that additional research be conducted using multiple variables to predict academic success. This study only analyzed the predictor variables one at a time using simple linear regression. Although the multiple R will likely not be much higher than the individual correlations, it is likely that some interesting findings may be obtained when comparing the groups using multiple variables in the regression. The multicollinearity issue would necessarily need to be addressed using a multiple regression analysis.

2. It is recommended that additional studies be conducted to examine the usefulness of ACT/SAT, high school grade point average, and high school rank percentile for predicting college graduation rate. Graduation rate is a more preferable indicator of academic attainment than general education grade point average or first semester grade point average. Grade point average is a necessary measure for determining eligibility for graduation; however, receiving a degree is the longer term measure of academic persistence and success.
3. It is recommended that larger, more comprehensive studies be conducted to determine if more useful information can be obtained regarding the appropriateness of ACT/SAT scores and high school grade point average when predicting collegiate academic success. It is possible that larger studies could yield more stable results due to the inherent problems associated with the small numbers of subjects in participation level groups and restricted range issues in this study. It is possible, however, that the population of student-athletes used for this study are quite similar to student-athletes at other Division I institutions. A larger study could confirm or disconfirm this possibility.
4. It is recommended that studies be conducted to determine if affective variables might be more useful in predicting academic success for student-athletes. It is possible that a better understanding of predicting student-athletes' academic attainment can be gained by using non-cognitive and/or non-academic variables. These variables, such as psychosocial developmental measures, family income, or cultural attitudes and values could add to the understanding of this particular population of students.

5. It is recommended that further studies be conducted to ascertain the meaningfulness of social learning theory and/or self-efficacy theory in understanding the student-athlete population, particularly as they relate to academic performance. It seems possible that student-athletes may be affected by lack of self-efficacy when faced with academic demands and perceive a limit to the benefits of high academic performance.
6. It is recommended that achievement motivation theory be the bases for attempting to understand the student-athlete population. It is possible that a cultural influence is impacting the student-athlete's motivation to achieve academically.
7. It is recommended that an attempt be made to replicate these analyses with even more specific categorizations of student-athletes by individual sport (i.e., baseball, wrestling). Successfully reducing this population to the most homogenous categories possible would better allow us to identify appropriate measures of prediction.
8. It is recommended that studies be conducted to determine whether or not the differences found within the student-athlete population are a result of factors within the student's life other than athletic participation level or type. It is possible that the differences noticed within this population are a result of factors unrelated to athletic participation such as socioeconomic status, family of origin, religion, high school size, geographical location (rural or urban), or intrinsic motivation. Additional studies are needed to determine if these other factors are the influences most prevalent for the student-athlete population.
9.

References

Adelman, C. (1990). Light and shadows on college athletes (December, 1990) Washington, DC: U.S. Department of Education.

Adler, P., & Adler, P. A. (1988). Intense loyalty in organizations: A case study of college athletics. Administrative Science Quarterly, 33, 401-417.

Adler, P., & Adler, P. A. (1987). Role conflict and identity salience: College athletics and the academic role. Social Science Journal, 24, 443-455.

Adler, P., & Adler, P.A. (1985). From idealism to pragmatic detachment: The academic performance of college athletes. Sociology of Education, 58, 241-250.

Allen, W. B. (1988). Rhodes handicapping, or slowing the pace of integration. Journal of Vocational Behavior, 33, 365-378.

American College Testing Program (1989). Preliminary Technical Manual for the Enhanced ACT Assessment. Iowa City, IA: American College Testing.

American College Testing Program (1991). Supplement to the preliminary technical manual for the Enhanced ACT Assessment. Iowa City, IA: American College Testing.

Anastasi, A. (1988). Psychological Testing. New York: Macmillan Publishing Company.

Astin, A. W. (1971). Predicting academic performance in college: Selectivity data for 2300 American colleges. New York, NY: The Free Press.

Astin, A. W. (1991). Assessment for excellence: The philosophy and practice of assessment and evaluation in higher education. New York: MacMillan Publishing Company.

Astin, A. W. (1993). What matters in college? Four critical years revisited. San Francisco: Jossey-Bass Publishers.

Atkinson, J. W. (1966). A theory of achievement motivation. New York: John Wiley & Sons, Inc..

Bandura, A. (1977a). Self-efficacy: Toward a unifying theory of behavioral change. Psychological Review, 84, 191-215.

Bandura, A. (1977b). Social learning theory. Englewood Cliffs, NJ: Prentice-Hall.

Bank, B. J. (1994). First-semester grades, thought modes, and undergraduate persistence. Contemporary Educational Psychology, 19, 416-429.

Bezjak, J. E., & Lee, J. W. (1990). Relationship of self-efficacy and locus of control constructs in predicting college students' physical fitness behaviors. Perceptual and Motor Skills, 71, 499-508.

Bloland, P. A. (1987). A student affairs perspective on intercollegiate athletics. Paper presented at the National Conference on Student Affairs and the Student-athlete, Los Angeles, CA.

Breland, H. M. (1979). Population validity and college entrance measures (Research Monograph No. 8) . Princeton, NJ: The College Board.

Bridgeman, B. (1989). Comparative validity of multiple-choice and free-response items on the Advanced Placement Examination in Biology (College Board Report No. 89-2). New York: College Entrance Examination Board.

Cantazaro, S. J. (1988). Effects of enhancement expectancies on expectancy and minimal goal statements. The Journal of Psychology, 123, 91-100.

Chase, C. I. (1981). GPA prediction procedures and normative data for freshmen. (Indiana studies in higher education No. 44) . Bloomington, IN: Indiana University, Bloomington. Bureau of Evaluative Studies and Testing.

Chickering, A. W. (1969). Education and Identity. San Francisco: Jossey-Bass.

Chickering, A. W., & Reisser, L. (1993). Education and Identity (2nd ed.). San Francisco: Jossey-Bass.

Chissom, B. S., & Lanier, D. (1975). Prediction of first quarter freshman GPA using SAT scores and high school grades. Education and Psychological Measurement, 35, 461-463.

Cohn, F. J. (1985). Review of College Board Scholastic Aptitude Test and Test of Standard Written English. In J. V. Mitchell, Jr. (Ed.), The ninth mental measurements yearbook (pp. 360-362) . Lincoln, NE: The Buros Institute of Mental Measurements.

Colorado Commission on Higher Education (1992). How can the postsecondary education process become more effective, particularly at the undergraduate level? Colorado Commission on Higher Education master plan background paper. Denver: Colorado Commission on Higher Education. (ERIC Document Reproduction Service No. ED 351 935)

Crouse, J. (1985). Does the SAT help colleges make better selection decisions? Harvard Educational Review, 55, 195-218.

Crouse, J., & Trusheim, D. (1988). The case against the SAT. Chicago: The University of Chicago Press.

Cueso, J. P. (1994). Limitations in the predictive validity of standardized college-admissions tests. Unpublished manuscript.

DeBoer, G. E. (1985). Success and failure in the 1st year of college: Effects on expectations, affect, and persistence. Journal of College Student Personnel, 26, 234-239.

Educational Testing Service (1980). Test use and validity. Princeton, NJ: Author.

Edwards, H. (1984). The black "Dumb Jock": An American sports tragedy. College Board Review, 131, 8-13.

Eisler, T. A., & Iverson, B. (1986, November). Predicting career choice in college women: Emperical test of a theory-based model. Paper presented at the annual conference of the National Council on Family Relations, Dearborn, MI.

Ervin, L., Suanders, S. A., & Gillis, H. L. (1984). The right direction but short of the mark: The NCAA's proposal 48. College Board Review, 131, 15-19.

Ervin, L., Saunders, S. A., Gillis, H. L., & Hogrebe, M. (1985). Academic performance of student athletics in revenue producing sports. Journal of College Student Personnel, 26, 199-124.

Fincher, C. (1986). The predictive contribution of the SAT in a statewide system of public higher education. In College Board (Ed.), Measures in the college admissions process: A College Board Colloquium. New York: College Entrance Examination Board.

Gurney, G. S., & Stuart, D. L. (1987). Effects of special admission, varsity competition, and sports on freshman student-athletes' academic performance. Journal of College Student Personnel, 28, 298-302.

Hanford, G. H. (1979). Controversies in college sports. Educational Record, 60, 351-366.

Hanford, G. H. (1985). Yes the SAT does help colleges. Harvard Educational Review, 55, 324-331.

Kanoy, K. W., Wester, J., & Latta, M. (1989). Predicting college success of freshmen using traditional, cognitive, and psychological measures. Journal of Research and Development in Education, 22, 66-70.

Landers, D. M., Feltz, D. L., Obermeir, G. E., & Brouse, T. R. (1978). Socialization via interscholastic athletics: Its effects on educational attainment. Research Quarterly, 49, 475-483.

Lent, R. W., Brown, S. D., & Larkin, K. C. (1984). Relation of self-efficacy expectatitons to academic achievement and persistence. Journal of Counseling Psychology, 31, 356-362.

Lent, R. W., Brown, S. D., & Larkin, K. C. (1986). Self-efficacy in the prediction of academic performance and perceived career options. Journal of Counseling Psychology, 33, 265-269.

Lent, R. W., Brown, S. D., & Larkin, K. C. (1987). Comparison of three theoretically derived variables in predicting career and academic behavior: Self-efficacy, interest congruence, and consequence thinking. Journal of Counseling Psychology, 34, 293-298.

Lewis, G. M. (1969). Theodore Roosevelt's role in the 1905 football controversy. Research Quarterly, 40, 717-724.

Linn, R. L. (1982). Admissions testing on trial. American Psychologist, 37, 279-291.

Maehr, M. L. (1974). Culture and achievement motivation. American Psychologist, 29, 887-896.

McClelland, D. C., Atkinson, J. W., Clark, R. A., & Lowell, E. L. (1953). The achievement motive. New York: Appleton-Century-Crofts, Inc..

McCornack, R. L., & McLeod, M. M. (1988). Gender bias in the prediction of college course performance. Journal of Educational Measurement, 25, 321-331.

Multon, K. D., Brown, S. D., & Lent, R. W. (1991). Relation of self-efficacy beliefs to academic outcomes: A meta-analytic investigation. Journal of Counseling Psychology, 38, 30-38.

Nisbet, J., Ruble, V. E., & Schurr, K. T. (1982). Predictors of academic success with high risk college students. Journal of College Student Personnel, 5, 227-235.

NCAA (1983). Program of the 77th Annual Convention of the National Collegiate Athletic Association (NCAA:1983), 32-33.

NCAA (1995). 1995-96 NCAA division I operating manual. Kansas City: National Collegiate Athletic Association.

Noble, J. P. (1991). Predicting college grades from ACT Assessment scores and high school course work and grade information (ACT Research Report Series 91-3). Iowa City, IA: The American College Testing Program.

Nowicki, S., & Duke, M. P. (1978). Examination of counseling variables within a social learning framework. Journal of Counseling Psychology, 25, 1-7.

Oklahoma State University (1994). The 1994-95 Catalog. Stillwater: Oklahoma State University.

Pascarella, E. T., & Smart, J. C. (1991). Impact of intercollegiate athletic participation for African American and Caucasian men: Some further evidence. Journal of College Student Development, 32, 123-130.

Pascarella, E. T., & Terenzini, P. T. (1991). How college affects students. San Francisco: Jossey-Bass Publishers.

Passons, W. R. (1967). Predictive validities of the ACT, SAT, and high school grades for first semester gpa and freshman courses. Educational and Psychological, 27, 1143-1144.

Pedhazur, E. J. (1982). Multiple Regression in Behavioral Research (2nd ed.). Fort Worth: Holt, Rinehart and Winston, Inc..

Pedrini, D. T., & Pedrini, B. C. (1976). Assessment and prediction of grade point and/or attrition/persistence for disadvantaged and regular college freshmen. College Student Journal, 10, 260-264.

Perry, W. G., Jr. (1970). Forms of intellectual and ethical development in the college years. New York: Holt, Rinehart and Winston, Inc..

Purdy, D. A., Eitzen, D. S., & Hufnagel, R. (1982). Are athletes also students? The educational attainment of college athletes. Social Problems, 29, 439-448.

Reilly, R. R. (1973). A note on minority group test bias studies. Psychological Bulletin, 80, 130-132.

Renick, J. (1974). The use and misuse of college athletics. Journal of Higher Education, 45, 545-552.

Roesler, J. S., & Armstrong, R. A. (1981). Correlates of performance in the dental hygiene program. OSA Research Bulletin, 22(5), 2-13.

Rotter, J. B. (1954). Social learning and clinical psychology. New York: Prentice-Hall.

Rotter, J. B. (1982). The development and application of social learning theory: Selected papers. New York: Praeger Publishers.

Rowan, R. W. (1978). The predictive value of the ACT at Murray State University over a four-year college program. Measurement and Evaluation in Guidance, 11, 143-149.

Ryan, F. J. (1989). Participation in intercollegiate athletics: Affective outcome. Journal of College Student Development, 30, 122-128.

Sedlacek, W. E., & Adams-Gaston, J. (1989). Predicting the academic success of student-athletes using SAT and Noncognitive variables. (Research Report #20-89). College Park, MD: Maryland University, Counseling Center.

Schumaker, J. F., Small, L., & Wood, J. (1986). Self-concept, academic achievement, and athletic participation. Perceptual and Motor Skills, 62, 387-390.

Schwartz, S. M., & Wilbur, F. P. (1981, March). Predicting college achievement using performance in college-level courses taken in high school, SAT scores, and high school rank. Paper presented at the annual meeting of the Eastern Educational Research Association, Philadelphia, PA.

Siegel, R. G., Galassi, J. P., & Ware, W. B. (1985). A comparison of two models for predicting mathematics performance: Social learning versus math aptitude-anxiety. Journal of Counseling Psychology, 32, 531-538.

Slack, W., & Porter, D. (1980). The scholastic aptitude test: A critical appraisal. Harvard Educational Review, 50, 154-170.

Snyder, V., & Elmore, P. B. (1983). The validity of the ACT and Descriptive Tests of Language Skills for developmental students over a four-year college program. Paper presented at the annual meeting of the American Educational Research Association, Montreal, Quebec.

Spivey, D., & Jones, T. A. (1975). Intercollegiate athletic servitude: A case study of the black Illini student-athletes, 1931-1967. Social Science Quarterly, 55, 939-947.

Steinberg, L., Dornbusch, S. M., & Brown, B. B. (1992). Ethnic differences in adolescent achievement. American Psychologist, 47, 723-729.

Stephenson, B. W., & Hunt, C. (1977). Intellectual and ethical development: A dualistic curriculum intervention for college students. The Counseling Psychologist, 6, 39-42.

Stuart, D. L. (1985). Academic preparation and subsequent performance of intercollegiate football players. Journal of College Student Personnel, 26, 124-129.

The College Board (1986). ATP guide for high schools and colleges: SAT and achievement tests. Princeton NJ: The College Board.

Thornell, J., & Jones, R. (1986, November). The college admissions equation: ACT scores versus secondary school grade performance. Paper presented at the annual meeting of the Mid-South Educational Research Association, Memphis, TN.

Tracey, T. J., & Sedlacek, W. E. (1984). Non-cognitive variables in predicting academic success by race. Measurement and Evaluation in Guidance, 16, 171-178.

Tracey, T. J., & Sedlacek, W. E. (1985). The relationship of non-cognitive variables to academic success: A longitudinal comparison by race. Journal of College Student Personnel, 26, 405-409.

Tracey, T. J., & Sedlacek, W. E. (1987). A comparison of white and black student academic success using noncognitive variables: A LISREL analysis (Research Report No. 6-87). College Park: Maryland University Counseling Center.

Urdan, T. C., & Maehr, M. L. (1995). Beyond a two-goal theory of motivation and achievement: A case for social goals. Review of Educational Research, 65, 213-243.

Walter, T., & Smith, D. E. (1986). Taking athletes across the academic finish line. Educational Record, 67, 41-44.

Welch, H., Jr. (1982). The exploitation of the black athlete: A proposal for change. NASPA Journal, 19, 10-14.

Whitner, P. A., & Myers, R. C. (1986). Academics and an athlete: A case study. Journal of Higher Education, 57, 659-672.

Widlick, C., Knefelkamp, L. L., & Parker, C. A. (1975). The counselor as a developmental instructor. Counselor Education and Supervision, 14(4), 286-296.

Williams, J., Jr. (1983). The impact of rule 48 upon the black student-athlete: A comment. The Journal of Negro Education, 52, 362-373.

Wittmer, J., Bostic, D., Phillips, T. D., & Waters, W. (1981). The personal, academic, and career problems of college student athletes: Some possible answers. The Personnel and Guidance Journal, 60, 52-55.

OKLAHOMA STATE UNIVERSITY
INSTITUTIONAL REVIEW BOARD
HUMAN SUBJECTS REVIEW

Date: 04-05-95 IRB#: ED-95-064

Proposal Title: COMPARING THE MODELS FOR PREDICTING ACADEMIC SUCCESS FOR INTERCOLLEGIATE ATHLETE AND NON-ATHLETES

Principal Investigator(s): Marcia Dickman, Stephen Robinson

Reviewed and Processed as: Exempt

Approval Status Recommended by Reviewer(s): Approved

APPROVAL STATUS SUBJECT TO REVIEW BY FULL INSTITUTIONAL REVIEW BOARD AT NEXT MEETING.
APPROVAL STATUS PERIOD VALID FOR ONE CALENDAR YEAR AFTER WHICH A CONTINUATION OR RENEWAL REQUEST IS REQUIRED TO BE SUBMITTED FOR BOARD APPROVAL.
ANY MODIFICATIONS TO APPROVED PROJECT MUST ALSO BE SUBMITTED FOR APPROVAL.

Comments, Modifications/Conditions for Approval or Reasons for Deferral or Disapproval are as follows:

Signature: John K. Wyatt Date: April 10, 1995

Chair of Institutional Review Board

VITA

Stephen Perkins Robinson

Candidate for the Degree of

Doctor of Philosophy

Thesis: AN ASSESSMENT OF THE APPROPRIATENESS OF TRADITIONAL ADMISSIONS CRITERIA FOR ADMISSION AND ELIGIBILITY OF STUDENT-ATHLETES

Major Field: Applied Behavioral Studies

Biographical:

Personal Data: Born in Oklahoma City, Oklahoma, On June 16, 1956, the son of Arthur Lester and Helen Ruth Robinson.

Education: Graduated from Capitol Hill High School, Oklahoma City, Oklahoma in May 1974; received Associate of Arts degree in Religion from Oklahoma City Southwestern Junior College in May 1977; received Bachelor of Arts degree in Multi-divisional Studies with emphasis in religion and music from Bethany Nazarene College, Bethany, Oklahoma in December 1981; received Master of Arts degree in Education from Southern Nazarene University, Bethany, Oklahoma in May 1991. Completed the requirements for the Doctor of Philosophy degree in Applied Behavioral Studies in Education at Oklahoma State University, Stillwater, Oklahoma in July 1996.

Experience: Associate Pastor, Muskogee, Oklahoma January 1981 - June 1982; Sales representative, Oklahoma City, Oklahoma and Dallas, Texas August 1982 - August 1984; Cost estimator, Euless, Texas August 1984 - June 1986; Real Estate Sales, Colorado Springs, Colorado and Pagosa Springs, Colorado August 1986 - August 1988; Admissions Counselor, Southern Nazarene University, August 1988 - May 1990; Director of Student Recruitment, Southern Nazarene University, May 1990 - January 1991; Director of Special Events, Southern Nazarene University, January 1991 - August 1991; Graduate Research Associate, Oklahoma State University, Department of Applied Behavioral Studies, August 1991 - January 1992; Graduate Research Associate, Oklahoma State University, Office of University Assessment, January 1992 - July 1992; Associate Director, Office of University Assessment, Oklahoma State University, July 1992 - July 1994; Director, Office of University Assessment, Oklahoma State University, July 1994 - October 1995; Director of Student Academic Services, Oklahoma State University, Graduate College, October 1995 - present.