A REEXAMINATION OF THE ACADEMIC ACHIEVEMENT OF MALE HIGH SCHOOL ATHLETES

by

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CHAPTER I

INTRODUCTION

Athletics play a significant role in American society. The importance of athletics to the American public is evidenced by the visibility of high school, college, and professional sports events; public media coverage; revenues produced by sports events and products; salaries of outstanding athletes; and the multitudes of spectators who attend sporting events annually. American society appears to be both fascinated and captivated by athletics.

The importance of athletics to the male high school student appears to be equally great. Coleman (1961a) suggests that the fundamental competition in high school is for the attainment of recognition and respect. Athletics appears to be the means by which most high school males achieve these objectives. Coleman (1961a) and Eitzen (1975) found that those who participated in athletics were the most admired and respected group in high school. Coleman (1961a, 1961b) also found athletics to be of greater importance to high school students than intellectual achievement and maintains that athletics actually detract from students scholarship.

The inclusion of athletics into the high school program created a controversy in which critics claimed athletics would decrease scholarship and academic achievement of its participants (Jacobsen, 1931). Jacobsen (1931), in his review of the literature on athletics and scholarship, concluded that high school athletes are of average mental ability, receive as high or higher grades, and do not demonstrate decreases in scholarship during the period of participation as compared to nonathletes.

Recently, researchers have again involved themselves in the investigation of the relationship between interscholastic athletics and high school athletes' academic achievement and educational aspirations. The research in these areas is not extensive, but appears to be in concordance. Birrell (1977), McDill and Coleman (1963), Otto and Alwin (1977), Picou and Curry (1974), Rehberg and Schafer (1968), and Schafer and Rehberg (1970) all found positive associations between athletic participation and educational aspirations (i.e., expressed interest in continuing education beyond high school). Schafer and Rehberg (1970) also found high school athletes (vs. nonathletes) reported receiving more encouragement from teachers and guidance counselors to continue their education beyond high school. Schafer and Rehberg (1970) also suggest that high school athletes' higher educational aspirations may be due to their greater encouragement from teachers and guidance counselors.

Male high school athletes have compared favorably to nonathletes in their academic achievement. Birrell (1977), Braddock (1981), Edwards (1967), Eidsmoe (1960, 1964), Horine (1968), and Schafer and Armer (1968) found athletes to receive higher grades than nonathletes while Airoldi, Peterson, and Webb (1967); Martens (1974); and Pangle (1956) found no differences between athletes' and nonathletes' grades. The argument that athletics inhibit scholarship and academic achievement does not appear to be valid in light of the research presented. Recent research seems to corroborate Jacobsen's (1931) conclusion that high school athletes receive as high or higher grades than nonathletes.

Studies of male college student athletes have not reflected the academic optimism of research on high school athletes. Underwood (1980) presents a grim description of the collegiate athletic system and claims

that American colleges exploit their scholarship athletes by resorting to anything which renders the athlete eligible (i.e., avoidance of core curriculum courses). Underwood suggests that the majority of college football players never receive their degrees.

Purdy, Eitzen, and Hufnagel (1981) found college student athletes (male and female) have lower high school grade point averages (GPA's), lower Scholastic Aptitude Test (SAT) Combined scores, lower American College Test (ACT) Composite scores, lower high school class ranks, lower college GPA's and lower college graduation rates than the general student population. Harrison (1981); Lanning (1982); Remer, Tongate, and Watson (1978); and Wittmer, Bostic, Phillips, and Waters (1981) all recognize minimal academic skills as one of the problems facing the majority of college student athletes. It appears that academic achievement may be the most salient problem facing college student athletes.

Purdy, Eitzen, and Hufnagel (1982), in the discussion of their results, pose an important question; "Why is the relationship [between athletic participation and academic achievement] positive in the high school and negative at the college level?" (p. 446). Research related to high school and college student athletes' academic achievement does seem to offer different interpretations of data gathered. However, college student athletes may be truly a different population of athletes and direct comparison is a risky business. Remer et al. (1978) cited a report by the National Collegiate Athletic Association (NCAA), which presents figures affirming only a 3.6% carry over of high school athletes participating in intercollegiate athletics. The number of high school athletes who participate at the collegiate level is indeed quite small in comparison to the number of participants in high school athletics.

Superior high school athletes who are likely to participate in intercollegiate athletics have not yet been identified in the experimental literature as a special group of athletes within the high school athlete population.

Research regarding the academic achievement of athletes has shown a positive relationship between athletic participation and academic achievement for male high school athletes but a negative relationship for male college athletes. High school and college athletes appear to be different populations and are therefore hazardous to compare. By identifying superior male high school athletes who are likely to compete at the college level, one might compare the academic achievement of superior athletes, average athletes, and nonathletes.

Previous studies of high school athletes' academic achievement have used high school grades or GPA's as the measure of achievement. The appropriateness of high school grades or GPA as the only measure of academic achievement may be questioned because of the subjective nature of school grades. Moreover, the comparison of athletes' and nonathletes' GPA's may be an erroneous method if the high school curriculum is not similar for both groups. More objective measures (viz., standardized achievement tests), in addition to GPA, would provide another sample of the academic achievement of athletes.

The purpose of the present study was to clarify the disparity between the research regarding male college student athletes and high school athletes. Male high school athletes are dichotomized so that athletes who are likely to participate in college athletics may be compared to athletes who are not likely to participate in college athletics, and nonathletes. By utilizing standardized achievement

measures, in addition to GPA, the academic achievement of athletes may be objectively assessed and compared. To further examine the disparity between male college athlete and high school athlete research, the high school curricula of high school athletes were compared.

Statement of the Problem

Approach to the Problem

The present study was directed toward the examination of the academic achievement and high school curricula of male high school students in one of three levels of athletic participation or status (i.e., nonathlete, average athlete, and superior athlete). In this way, differences between nonathletes, average athletes, and superior athletes (viz., those high school athletes likely to compete at the college level) could be examined.

The present study attempted to objectively assess high school athletes' academic achievement by utilizing scores from The American College Testing (ACT) Program's test of academic ability. High school GPA was also examined to determine if discrepancies exist between the subjective (GPA) and the objective (ACT) measures of academic achievement.

To gain further insight into the potential causes of college student athlete academic difficulties, the high school curricula of nonathletes, average athletes, and superior athletes were compared by examining how many years students studied basic education subjects (English, mathematics, social science, and natural science).

Questions for Hypotheses

The present study was designed to clarify the disparity between research on male college student athletes and male high school athletes by answering the following questions:

1. Do male high school superior athletes, average athletes, and nonathletes differ in their academic achievement measured by both objective measures (ACT) and subjective measures (GPA)?
2. Do male high school superior athletes, average athletes, and nonathletes differ in their respective high school basic education curricula?

Purpose of the Study

The present study was conducted to clarify the relationship between athletic participation and academic achievement of male high school athletes. Clarification was deemed necessary due to the disparity between the research on college student athletes (athletes demonstrate lower academic achievement than nonathletes) and the research on male high school athletes (athletes demonstrate as high or higher achievement than nonathletes). To date, only two studies (Dowell, Badgett, & Hunkler, 1972; Hauser & Lueptow, 1978) allude to the superior high school athlete. The present study appears to be the first to dichotomize high school athletes into two groups; average athletes and superior athletes (those likely to participate in college athletics). By dichotomizing high school athletes into average athletes and superior athletes, the present study approximated the proportion of high school athletes who participate in college athletics. Differences in academic achievement

between average athletes and superior athletes may establish a link to the research on college athletes' academic difficulties.

Previous research on high school athletes' academic achievement has utilized high school grades and GPA's as the measure of achievement. The present study questioned the appropriateness of high school grades and GPA's as the only measure of academic achievement and utilized both objective measures (ACT) and subjective measures (GPA) in the assessment of high school athletes' academic achievement.

Recent research has shown that college athletes often experience academic difficulties. To examine a potential factor in college athletes' academic difficulties, the present study also compared the high school basic education curricula of high school athletes.

Significance of the Study

The examination of the academic achievement of high school athletes was conducted with the expectation that the study would prove to be useful in the following respects:

1. The results of the present study should be useful to researchers interested in the study of male high school athletes' and college athletes' academic achievement by examining and clarifying the disparity between the past research of male high school and college athletes' academic achievement.

2. The results of the present study should also be useful to researchers by stressing the value of objective standardized achievement measures. Standardized achievement measures (viz., ACT), in comparison to GPA's which are highly influenced by subjective evaluation and selection of courses, allow for comparison with other studies utilizing standardized

achievement measures.

3. The present study's examination of male high school athletes' basic education curricula may suggest that changes are needed in the advisement and educational programs of male high school superior athletes to avoid academic problems of college if the student wishes to pursue a college education.

4. Another significant aspect of the present study is that current data is provided. There appears to be little data available after the 1960's.

CHAPTER II

REVIEW OF RELATED LITERATURE

A review of the research on athlete's academic achievement has shown that as early as 1928, researchers had begun to examine what effects, if any, athletics had on the academic achievement of athletes (Cook & Thompson, 1928; Hall, 1928). This review of the related literature on the academic achievement of male high school athletes consists of three sections; (a) a review of the early research, (b) a detailed examination of the current research, and (c) a summary of the status of the current research relevent to the study of the academic achievement of male high school athletes.

The overwhelming majority of research on the academic achievement of high school athletes has been on the male population. This may be primarily due to the interscholastic athletics system, which in the past (prior to Title IX), almost totally excluded women. The study of sex differences is beyond the scope of the present study thus the research reviewed is exclusively for male high school athletes.

Early Research

Research on the academic achievement of athletes seems to have evolved from the controversial nature of the initial inclusion of athletics into the high school program. Jacobsen's (1931) literature review revealed methodological shortcomings in the majority of studies on

the academic achievement of high school athletes, including:

1. failure to clearly define criteria determining what constituted an athlete

2. failure to analyze results statistically

3. failure to include control groups.

These problems made comparison of the studies difficult (if not impossible). After the findings of the reviewed studies were compiled, Jacobsen (1931) concluded that the general trend of the studies suggested three (tentative) conclusions:

1. High school athletes are of average mental ability.

2. High school athletes receive similar, if not higher, school marks than nonathletes.

3. The academic achievement of high school athletes does not appreciably decrease during the period of participation.

In a review of the research on athletic participation and academic performance, Shaw and Cordts (1960) found that the research to date concerning high school athletes was inconclusive and conflicting. "Approximately as many studies of high school students tend to reflect no difference in academic performance between athletes and nonathletes as support an advantage for one group or the other" (p. 623). The discussion of the limitations of the reviewed studies and suggestions for further research indicated that larger sample sizes (100 for each group), valid and reliable academic achievement tests, and teachers grades (for comparative purposes) should be used.

Recent Research

Research to date is not yet extensive and consists mainly of descriptive and correlational studies. Extensions of the research on the academic achievement of high school athletes have incorporated such variables as occupational attainment and significant others' influence (Otto & Alwin, 1977), social participation (Hanks & Eckland, 1976), race (Braddock, 1981; Hanks, 1981), self-concept (Dowell, Badgett, & Hunkler, 1972), and sex (Hanks, (1981). Birrell (1977) analyzed several models which attempted to explain the causal relationships between achievement motivation, athletic participation, academic achievement, and educational aspirations, but was unable to substantiate any of the models. Research related to the academic achievement of male high school athletes is reviewed below.

Pangle (1955) examined the Final Grade Averages from the permanent records of male students for five consecutive graduating classes (1951-1955). Of the 101 male graduates of this rural Tennessee high school, 41.6% participated in athletics. Athletes (M = 82.71) were not shown to differ statistically from nonathletes (M = 83.25) in academic achievement as measured by Final Grade Averages. There is, however, no mention of the method of determining Final Grade Averages or its relationship to GPA.

Eidsmoe (1960) surveyed the academic standing of the 12 basketball players of each team which participated in the 1960-61 Iowa Boy's Sub-State and State Tournament. It was thought that the training season and practice periods of these teams would be among the most intense in the state. Of the 16 schools, 14 returned completed records of the athletes'

GPA'S (N = 168) and the GPA's of the entire class (N not reported) in which the athlete was enrolled. The results of the survey showed that the basketball players' GPA (M = 2.566) exceeded the entire class GPA (M = 2.186); however, the statistical procedure and significance level of the results was not reported. Eidsmoe (1960) concluded that the basketball players were indeed above the average of their classmates in academic performance.

Eidsmoe (1964) utilized the same procedure as Eidsmoe (1960) to assess the academic standing of football players from the top 30 football teams in the state of Iowa. The rationale that these schools would be among the most intense in training and practice periods was again applied. Eidsmoe (1964) found the students who participated in football (N = 592) to have higher GPA's (M = 2.523) than the nonparticipants (N not reported, M = 2.085). Further study by Eidsmoe (1964) found as compared to nonparticipants, football players to obtain higher GPA's in English, mathematics, history, and science; however, the statistical test and significance levels of the results were again not reported.

Edwards (1967) paired 50 athletes and 50 nonathletes according to verbal and numerical subtests of their freshman year Differential Aptitude Tests (DAT) and results of the Ohio Psychological Test administered during their senior year. These data were obtained from the students' permanent records, however, none of the results from the DAT or Ohio Psychological Test were presented. The athletes and nonathletes were then matched according to similar socioeconomic backgrounds. Edwards found the mean GPA of athletes was consistently higher than nonathletes each of the four years studied. In an examination of senior class rank, Edwards also found 18% more athletes than nonathletes in the upper half of the graduating

class. As in the Eidsmoe (1960, 1964) studies, Edwards (1967) failed to report the statistical procedure and significance levels of the results.

In a study on the scholarship of ninth grade junior high school athletes; Airoldi, Peterson, and Webb (1967) found athletes (participants in one or more interscholastic team sports, N = 82) to have higher School and College Ability Test (SCAT) scores and GPA's than nonathletes (N = 70). Athletes who participated in two or more interscholastic team sports involving both ninth grade semesters (N = 42) were matched on SCAT scores with 42 nonathletes. In a comparison of the GPA's of the matched groups, 67% of the athletes had higher GPA's than nonathletes while 28% of the nonathletes had GPA higher than athletes ($\chi^2 = 14.00$, $p < .001$). However, the matched athletes' GPA's (M = 2.89) did not differ statistically from the nonathletes' GPA (M = 2.64). Airoldi et al. (1967) also found that 66% of the athletes in their follow-up study (N = 70) improved or maintained similar GPA's in grade 10 compared to 46% of the nonathletes (N = 59). Airoldi et al. (1967) concluded that athletes at the junior high school level do as well or better in school than nonathletes.

Schafer and Armer (1968) studied the academic achievement of male athletes from two midwestern senior high schools. Athletes (those who completed at least one full season with an interscholastic team, N = 164) possessed higher GPA's (M = 2.35) than nonathletes (N = 421, M = 1.83). Athletes and nonathletes were later matched on intelligence test scores, father's occupation, curricula, and GPA's for the final junior high school semester. No data were presented with respect to these matching variables, and Schafer and Armer (1968) failed to mention what the measure of intelligence was. The comparison of GPA's of the matched groups

yielded only a slightly higher mean GPA for athletes (N = 152, M = 2.35) than nonathletes (N = 152, M = 2.24), however, these differences are much reduced. Schafer and Armer (1968) later compared athletes and matched nonathletes by Father's Occupation (White or Blue Collar), Intelligence-Test Scores (Upper Half or Lower Half of Class), Curriculum (College Preparatory of Non-college Preparatory), and GPA for Last Semester of Junior High School (Upper Half or Lower Half of Class). In each of the eight comparisons, Shafer and Armer (1968) report athletes obtaining higher GPA's than their matched nonathlete peers, however, they fail to report the statistical method of analyzing their data and level of significance of the results.

Horine (1968), in a study of attendance and scholarship of high school athletes from Balboa High School in the Canal Zone, found no differences in the absences or tardiness between 200 lettermen and 400 non-lettermen. However, the lettermen (M = 2.22) possessed significantly higher grade averages than non-lettermen (M = 2.07). Horine noted that only one student of the 400 in the control group would have been academically ineligible to participate in athletics, thus the eligibility rules prohibiting academically weak students from athletic participation did not influence the results.

Dowell, Badgett, and Hunkler (1972) utilized an interesting method in their study of the relationship between high school athletic achievement and variables of academic achievement and self-concept for 475 male college freshmen. Dowell et al. created an athletic achievement index which was derived by assigning points to a subject's level of athletic participation. A subject's athletic achievement index was computed by multiplying each year of participation by 1; each letter at a AAAA school

by 4, AAA school by 3, AA school by 2, and A or B schools by 1; team captain by 5; all-district honors by 10; all-state honors by 15; each regionally participated sport by 5; each state level sport by 10; and then summing all the categories (Dowell et al., 1972). This athletic achievement index was then used in a correlational study to determine its relationship to academic achievement (GPA) and self-concept (Self Rating Scale). Dowell et al. found a nonsignificant correlation between athletic achievement and academic achievement. High athletic achievers (top 20% on the athletic achievement index), however, were then shown to have significantly higher GPA's than the low athletic achievers (bottom 20% on the athletic achievement index). An interesting result of the Dowell et al (1972) study was that even though the high athletic achievers possessed higher GPA's, Physical self-concept, and Motivational self-concept scores, high athletic achievers had significantly lower Intellectual self-concept scores than low athletic achievers.

In a study of personality, attitudes, and academic achievement of 161 athletic and nonathletic junior high school boys, Martens (1974) found that athletes received higher grades than nonathletes in only one class; Physical Education. Marten's (1974) results support the Airoldi et al. (1967) study in that junior high school athletes seem to perform as well as nonathletes when grades are compared.

Laughlin (1978) studied the relationship between in-season and out-of-season behavior of 243 high school varsity and junior varsity athletes. The behaviors of Laughlin's interest were GPA's, number of days absent, number of class cuts, and number of referrals for disciplinary infractions. In a within subjects (athletes) design, Laughlin reports varsity athletes (N = 73) obtained significantly higher GPA's in-season

(M = 2.57) than out-of-season (M = 2.43). However, an examination of the degrees of freedom in the ANOVA suggests that these differences are of all 243 varsity and junior varsity athletes. Another comparison Laughlin (1978) found to be significant was that athletes who quit a sport (N = 50) received significantly lower in-season GPA's (M = 2.26) than athletes who did not quit (N = 193, M = 2.49). Other results of the Laughlin study suggest that junior varsity athletes cut classes fewer times out-of-season than did varsity athletes, received more referrals in-season than varsity athletes, and all athletes were absent less in-season.

Hauser and Lueptow (1978) examined the relationship betwen athletic participation and academic achievement (GPA) of 852 senior male high school students in a large midwestern city. Students' athletic participation (none, 1-3 semesters, and 4 or more semesters) was obtained from team rosters, yearbooks, and student activities cards and athletic status (none, some, and star) was based on the frequency of the local newspaper's mention of the athlete in the sports section over the academic year. The sophomore, junior, and senior year GPA's were compared by athletic participation and athletic status. Although the results indicate that the relationship between athletic participation and athletic status as related to GPA is nonlinear, these data seem to indicate that students with a great amount of athletic participation (4 or more semesters) do as well as students of moderate participation (1-3 semesters). Students of high athletic status, however, seem to do less well than students of moderate status when GPA was compared. The findings also indicate that both groups of athletes obtained higher GPA's than nonathletes in each high school year studied; however, the nonathletes improved their GPA's more than did the two groups of athletes over the three years. Hauser and

Lueptow (1978) suggest that the differences between high school athletes and nonathletes in academic achievement may be present before these students reach high school. This supports Stevenson's (1975) contention that the differences between high school athletes and nonathletes are due to their initial discrepancies before high school.

Summary

Of particular importance to the present study is Dowell et al. (1972) and Hauser and Lueptow's (1978) recognition of the relationship between athletic achievement (status) and academic achievement. These two studies differed somewhat in the outcome of their results. Dowell et al. (1972) found high athletic achievers (top 20%) had higher GPA's than low athletic achievers (bottom 20%). Hauser and Lueptow (1978) suggested that high athletic status students seem to do less well than students of moderate status. However, Hauser and Lueptow's (1978) data appear to indicate that students of high athletic status did better academically (GPA) than students of no athletic status. Hauser and Lueptow's (1978) method of assigning athletic status to a student must be questioned. The reliability of assigning athletic status by the number of times one's name is mentioned in a sports section of a local newspaper is questionable because it lacks objectivity and thus the validity of such a measure must be doubted.

Recent research suggests that when grades or GPA are the criteria for academic achievement, male high school athletes seem to do as well or better than nonathletes. Although recent research examined GPA's as the primary measure of achievement, two studies (Airoldi et al., 1967; Edwards, 1967) utilized standardized measures. While Edwards (1967) used

the DAT and the Ohio Psychological Test to match athletes and nonathletes in a study to examine GPA differences, performance on the DAT and the Ohio Psychological Test were not reported. Airoldi et al. (1967) found athletes score higher on the SCAT than nonathletes; however, the SCAT appeared to be used only as a matching variable.

The comparison of athletes' and nonathletes' curricula has not been included in the research of high school athletes' academic achievement. The study of high school athletes' curricula was, however, indirectly included in Schafer and Armer's (1968) study. Although Schafer and Armer (1968) did not specifically examine curricula differences between athletes and nonathletes, they did find college preparatory athletes and non-college preparatory athletes to obtain higher GPA's than their nonathlete matches.

The rationale for dichotomizing male high school athletes into two groups (average athletes and superior athletes [likely college athletes]) and the identification of these two groups is of primary importance to the present study. The present study avoids the methodological and measurement difficulties of the past research by utilizing objective standardized achievement measures (ACT) as well as GPA to assess athletes' academic achievement. An examination of athletes' curricula will also provide greater clarity to the questions of high school athletes academic achievement.

CHAPTER III

RESEARCH DESIGN

Selection of Subjects

Computer data tapes comprising information from The Student Profile Section and ACT test scores for each student in the state of Illinois who took the ACT from 1974 to 1981, inclusive, were purchased from The American College Testing Program, Inc., Iowa City, IA. A random selection of 1200 subjects per year was made by use of the RANUNI function (SAS, 1982). Of the 9600 randomly selected subjects, 4472 were male and served as the sample in the present study.

The 4472 male subjects were then placed into one of three athletic status catagories (nonathlete, average athlete, or superior athlete) based on their responses to two "Athletics" items from The Student Profile Section (1973, p. 10; 1974, 1975, 1976, 1977, 1978, 1979, 1980, p. 8). The first item "Participated in one or more varsity athletic team events (football, basketball, baseball, etc.) while attending high school" (The Student Profile Section, 1973, p. 10; 1974, 1975, 1976, 1977, 1978, 1979, 1980, p. 8) identified nonathletes (those responding "No") and athletes (those responding "Yes"). The second item "Received all city, league, or state award (including honorable mention)" (The Student Profile Section, 1973, p. 10; 1974, 1975, 1976, 1977, 1978, 1979, 1980, p. 8) distinguished between average athletes (those responding "No") and superior athletes (those responding "Yes").

Of the 4472 male subjects, 130 did not respond to the "Athletics" items in a manner which would place them in any of the three athletic

status catagories and were thus not included in the present study. Table 1 (p. 20) presents the number and percent of subjects in each of the three athletic status catagories.

TABLE 1

NUMBER AND PERCENT OF SUBJECTS IN EACH ATHLETIC STATUS CATAGORY

	Nonathlete	Average Athlete	Superior Athlete	Total
n	1693	2052	597	4342
%N	39%	47%	14%	

Description of Achievement Measures

The subjects' high school GPA's were provided by The American College Testing Program, Inc. on the purchased data tapes. The American College Testing Program, Inc. obtains the most recent grades in English, Mathematics, Social Science, and Natural Science from the subjects' self-report as a broad range of academic achievement and an indication of the students' current level of achievement (Technical Report for the ACT Assessment Program, 1973). The ACT Technical Report suggests that 78% of all students accurately report their grades, with 97.8% agreeing within one grade letter of school reported grades. Factors such as race, parental income, size of high school graduating class, and academic ability seem to have a relatively small effect on the accuracy of grade reporting (Technical Report for the ACT Assessment Program, 1973).

The ACT Assessment consists of four multiple choice tests and The Student Profile Section. The four tests cover (a) English Usage (ACT E),

(b) Mathematics Usage (ACT M), (c) Social Science Reading (ACT SS), and (d) Natural Science Reading (ACT NS). Included in the scoring of the ACT is the Composite (ACT C) or overall score. Several studies (Lenning, 1975; Lenning & Maxey, 1973; Munday, 1967; Passons, 1967) have found the ACT's predictive validity of college grades to be adequate and Lenning and Maxey (1973) found the ACT Battery to predict college GPA's as well as the SAT. The Student Profile Section provides additional information about student characteristics which are not assessed by the four academic ability tests. In this way, the ACT Program, Inc. may assess the broad spectrum of students' abilities (Technical Report for the ACT Assessment Program, 1973).

Content of the ACT Tests

ACT English Usage Test

The ACT English (ACT E) Usage Test "is a 75-item, 40-minute test which measures the student's understanding and use of the basic elements in correct and effective writing: usage, phraseology, style, and organization" (Technical Report for the ACT Assessment Program, 1973, p. 30). The content areas of the ACT E test are (a) Grammar and Punctuation, (b) Sentence Structure, (c) Diction, and (d) Logic and Organization.

ACT Mathematics Usage Test

The ACT Mathematics (ACT M) Usage Test "is a 40-item, 50-minute examination which measures the student's mathematical reasoning ability" (Technical Report for the ACT Assessment Program, 1973, p. 31). The

ACT M test covers areas of (a) Arithmetic and Algebraic Reasoning, (b) Arithmetic and Algebraic Operations, (c) Advanced Algebra, (d) Geometry, and (e) Miscellaneous (set theory, logic, probability, properties and bases of number systems).

ACT Social Science Reading Test

The ACT Social Science (ACT SS) Reading Test "is a 52-item, 35-minute test that measures the evaluative reasoning and problem solving skills required in the social studies" (Technical Report for the ACT Assessment Program, 1973, p. 33). The ACT SS test consists of two types of questions; those based on reading passages and those based on general background and information obtained in coursework. The content areas of the ACT SS test are (a) European and Ancient History, (b) Government and American History, and (c) Current Social Issues, Sociology, Economics, etc.

ACT Natural Sciences Reading Test

The ACT Natural Sciences (ACT NS) Reading Test "is a 52-item, 35-minute test that measures the critical reasoning and problem solving skills required in the natural sciences" (Technical Report for the ACT Assessment Program, 1973, p. 36). The ACT NS test also consists of questions based on reading passages and questions based on information. The ACT NS test covers areas of (a) Biology, (b) Chemistry, and (c) Physics, Geology, Astronomy, and General Science.

Description of The Student Profile Section Item: Years Certain Subjects Studied Grades 9-12

The Student Profile Section item "Years Certain Subjects Studied Grades 9-12" is a self-report item where subjects are asked to specify "how many years you have or will you have studied certain subjects by the time you graduate (graduated) from high school" (The Student Profile Section, 1973, p. 8; 1974, 1975, 1976, 1977, 1978, 1979, 1980, p. 7). The present study, concerned with basic education, examined the number of years the subjects' studied English, Mathematics, Social Science, and Natural Science. Subjects were able to respond at 1/2 year intervals, taking the subject 1/2 year to taking the subject 4 or more years or not taking any courses in the subject (The Student Profile Section, 1973, 1974, 1975, 1976, 1977, 1978, 1979, 1980).

A variable was created to augment the value of the curricula measures. The number of years a subject studied English, Mathematics, Social Science, and Natural Science was summed to arrive at a Total number of years the subject enrolled in basic education curricula.

Both GPA and Student Profile Section items are self-report variables to which subjects may refuse to respond. In the present study, subjects with missing data relative to GPA or the years English, Mathematics, Social Science, and Natural Science were studied, were excluded from the data analyses. Table 2 (p. 24) presents the number of subjects with complete and incomplete data relative to high school GPA and the years basic education courses (English, mathematics, social science, and natural science) were studied.

TABLE 2

NUMBER OF SUBJECTS WITH COMPLETE AND INCOMPLETE DATA AND THE PERCENT OF THE TOTAL SAMPLE DROPPED FOR EACH ATHLETIC STATUS CATAGORY

	Nonathlete	Average Athlete	Superior Athlete	Total
Complete	1585	1927	551	4063
Incomplete	108	125	46	279
% Dropped	6.4%	6.1%	7.7%	6.4%

Because subjects with missing data were excluded from the data analyses, it was necessary to determine if these subjects differed in ACT test performance from subjects with complete data. More importantly, it was necessary to determine if effects of the data reporting (complete vs. incomplete) differed between the three levels of athletic status. Differences in ACT test performance between subjects with complete and incomplete data which are not uniform across each athletic status catagory would severely limit the interpretability of the present study.

Analysis of ACT Test Performance of Subjects with Complete vs. Incomplete Data

To determine if subjects with incomplete data (N = 279) differed from subjects with complete data (N = 4063) and if subjects' data reporting (complete vs. incomplete) interacted with level of athletic status on ACT performance, a two-way (Data Reporting X Athletic Status) factorial analysis of variance (ANOVA) was performed by use of the GLM Procedure (SAS, 1982). The GLM Procedure which "uses the method of least squares to fit general linear models" was used here to analyze these

unbalanced data (SAS, 1982, p.140).

Analysis for Question One: Academic Achievement

The question answered by the academic achievement analysis was: Do male high school superior athletes, average athletes, and nonathletes differ significantly in their academic achievement as measured by ACT test scores and high school GPA?

A one-way analysis of variance (ANOVA) was performed on these data for each dependant variable according to the GLM Procedure (SAS, 1982). "The GLM procedure uses the method of least squares to fit general linear models" (SAS, 1982, p.140), and was used here to analyze these unbalanced data. In the analysis of variance between athletic status groups, effects were considered to be statistically significant when the obtained value of F equaled or surpassed the .05 level of significance. The capabilities of the computer and SAS (1982) allowed the exact probability levels to be reported.

Significant athletic status effects were then analyzed using Tukey's Studentized Range (HSD) test within the SAS analysis. Statistical significance of Tukey's Studentized Range (HSD) test is defined by SAS (1982) at the .05 level.

Analysis for Question Two: Curricula

The question answered by the curricula analysis was: Do male high school superior athletes, average athletes, and nonathletes differ significantly in their curricula measured by the number of years each basic education course of English, Mathematics, Social Science, and Natural Science was taken; and the Total (summation) number of years

these basic education courses were taken during high school (grades 9-12).

A one-way analysis of variance (ANOVA) was performed on these data for each curricula measure according to the GLM Procedure (SAS, 1982). Significant athletic status effects were analyzed using Tukey's Studentized Range (HSD) test within the SAS analysis.

CHAPTER IV

RESULTS

The following results were compiled from the analyses conducted to determine if academic achievement and curricula differences exist between high school nonathletes, average athletes, and superior athletes. The results are presented in the order in which the analyses were conducted; first, ACT test performance for subjects with complete and incomplete data; second, academic achievement differences (GPA and ACT) by athletic status level; and third, curricula differences (number of years basic education subjects were studied) by athletic status level. Also presented are tables summarizing the analyses of variance conducted and tables of group means for the academic achievement and curricula variables.

Results for Analysis of ACT Performance of Subjects with Complete vs. Incomplete Data

The exclusion of subjects with missing or incomplete data relative to the self-report variables high school GPA and years English, Mathematics, Social Science, and Natural Science were studied, prompted the analysis of ACT test performance differences between subjects with complete and incomplete data. A 2 X 3 (Complete/Incomplete Data Reporting X Athletic Status) factorial analysis of variance (ANOVA) was used to analyze the ACT test data from the original sample (N = 4342) to determine if differences in ACT test performance existed between subjects with complete (N = 4063) vs. incomplete (N = 279) data and if these differences occured uniformly across athletic status levels.

Table 3 (p. 29) summarizes the two-way factorial ANOVA's between

subjects' data reporting (complete vs. incomplete) and athletic status for each ACT measure. The results were considered to be significant when $p < .05$; however, the exact probability levels obtained from the SAS (1982) analyses are reported.

Examination of Table 3 (p. 29) indicates that for each of the ACT subtests and composite scores, significant main effects of data reporting and athletic status were found. The main effect of athletic status, although statistically significant for each ACT measure, is not germane to the present analysis because it does not provide information about the relationship between data reporting (complete vs. incomplete) and ACT test performance. The main effect of data reporting is, however, quite informative. As previously stated, the main effect of data reporting was found to be significant for each of the ACT measures. Table 4 (p. 30) presents mean ACT test scores for subjects with complete and incomplete data. As can be seen from Table 4, subjects with incomplete data scored significantly lower than subjects with complete data on every ACT measure. Of equal importance is the fact that each of the mean differences between complete and incomplete data reporters exceed the standard error of measurement (S_M) of the respective ACT measure (see Table 5, p. 30). None of the interactions between data reporting and athletic status were found to be significant; meaning that decreases in ACT performance associated with subjects' possessing incomplete data were uniform across the three athletic status catagories.

The results for the analysis of ACT test performance of subjects with complete vs. incomplete data suggest that subjects who do not report all requested data relative to high school GPA and years English, Mathematics, Social Science, and Natural Science were studied, tend to score lower on

the ACT. The results suggest that two populations were present in the original sample (N = 4342), subjects with complete data and subjects with incomplete data.

TABLE 3

ANALYSIS OF VARIANCE BETWEEN SUBJECTS' DATA REPORTING RELATIVE TO GPA AND YEARS BASIC EDUCATION COURSES WERE STUDIED (COMPLETE OR INCOMPLETE DATA) BY ATHLETIC STATUS FOR ACT MEASURES

Source	df	MS	F	p
ACT English				
Data Reporting	1	816.138	28.21	.0001
Athletic Status	2	246.103	8.51	.0002
A X B	2	23.275	.80	.4474
Error	4336	28.931		
ACT Mathematics				
Data Reporting	1	3281.121	51.95	.0001
Athletic Status	2	217.327	3.44	.0321
A X B	2	48.506	.77	.4640
Error	4336	63.156		
ACT Social Science				
Data Reporting	1	1873.532	34.33	.0001
Athletic Status	2	280.582	5.14	.0059
A X B	2	34.529	.63	.5308
Error	4336	54.581		
ACT Natural Science				
Data Reporting	1	1365.660	33.15	.0001
Athletic Status	2	436.204	10.59	.0001
A X B	2	14.924	.36	.6961
Error	4336	41.199		
ACT Composite				
Data Reporting	1	1718.165	48.84	.0001
Athletic Status	2	270.013	7.68	.0005
A X B	2	23.763	.68	.5090
Error	4336	35.179		

TABLE 4

MEAN ACT TEST SCORES FOR SUBJECTS WITH COMPLETE AND INCOMPLETE DATA FROM THE ORIGINAL SAMPLE (N = 4342)

	Complete	Incomplete
ACT English	17.315 [a]	15.523 [b]
ACT Mathematics	19.615 [a]	16.043 [b]
ACT Social Science	18.484 [a]	15.774 [b]
ACT Natural Science	22.185 [a]	19.864 [b]
ACT Composite	19.526 [a]	16.932 [b]

Note. Means with different superscripts differ significantly at the $p < .0001$ level.

TABLE 5

MEAN DIFFERENCES (M_d) BETWEEN SUBJECTS WITH COMPLETE AND INCOMPLETE DATA AND MEDIAN STANDARD ERRORS OF MEASUREMENT (S_M) FOR ACT ASSESSMENT

ACT test	M_d	S_M[a]
ACT English	1.792	1.74
ACT Mathematics	3.602	2.14
ACT Social Science	2.710	2.56
ACT Natural Science	2.421	2.37
ACT Composite	2.594	1.44

[a] Median standard errors of measurement (S_M) were obtained from the Technical Report for the ACT Assessment Program (1973).

Results for Analyses of Question One: Academic Achievement

The question of whether or not male high school superior athletes, average athletes, and nonathletes differ significantly in their academic achievement (as measured by high school GPA and ACT test performance) was examined in the present analyses. One-way analyses of variance (ANOVA's) were used to analyze the high school GPA and ACT test data from the sample of subjects who possessed complete data (N = 4063) to determine if differences in academic achievement existed between nonathletes, average athletes, and superior athletes.

Table 6 (p. 35) summarizes the one-way ANOVA's of athletic status for the six academic achievement measures (GPA and ACT tests). As can be seen in Table 6, each main effect of athletic status was found to be statistically significant for the respective academic achievement measure. Each of these significant athletic status effects was analyzed by Tukey's Studentized Range (HSD) test in post hoc analyses to determine where differences existed between the three levels of athletic status. Table 7 (p. 36) presents the mean high school GPA's and ACT test scores by athletic status and illustrates which means differed significantly in the post hoc analyses.

High School GPA

Tukey's post hoc analysis of the significant differences between athletic status catagories for high school GPA, $F(2,4060) = 5.29$, $p = .0051$, identified a significant mean difference between nonathletes and average athletes. Average athletes ($M = 2.75$) obtained higher GPA's than nonathletes ($M = 2.68$), $p < .05$. Although this mean difference

(M_d = .07) is statistically significant, it is difficult to attribute meaning to such a small difference. Thus, nonathletes, average athletes, and superior athletes seem to obtain similar high school GPA's.

ACT English Usage

Tukey's post hoc analysis of the significant differences between athletic status catagories for the ACT English Usage test, $F(2,4060) = 8.81$, $p = .0002$, found two significant mean differences. Both nonathletes ($M = 17.61$) and average athletes ($M = 17.31$) scored significantly higher than superior athletes ($M = 16.49$), $p < .05$. Both mean differences ($M_d = 1.02$ and $M_d = .82$, respectively), although statistically significant, are not meaningfully interpreted as neither mean difference exceeds the standard error of measurement for the ACT English Usage test ($S_M = 1.74$). The results of the English Usage test analysis indicate that nonathletes, average athletes, and superior athletes score comparably well.

ACT Mathematics Usage

Tukey's post hoc analysis of the significant differences between athletic status catagories for the ACT Mathematics Usage test, $F(2,4060) = 3.59$, $p = .0277$, found average athletes ($M = 19.80$) to score significantly higher than superior athletes ($M = 18.78$), $p < .05$. Again, this mean difference ($M_d = 1.02$) is not meaningfully interpreted in light of the standard error of measurement for the ACT Mathematics Usage test ($S_M = 2.14$). Nonathletes, average athletes, and superior athletes also score comparably well on the ACT Mathematics test.

ACT Social Science Reading

Tukey's post hoc analysis of the significant differences between athletic status catagories on the ACT Social Science Reading test, $F(2,4060) = 5.30$, $p = .005$, found two significant mean differences. Both nonathletes ($M = 18.55$) and average athletes ($M = 18.70$) scored significantly higher on the ACT Social Science Reading test than superior athletes ($M = 17.55$), $p < .05$. Both mean differences ($M_d = 1.00$ and $M_d = 1.15$, respectively) are less than the standard error of measurement for the ACT Social Science Reading test ($S_M = 2.56$), and are thus not meaningful. Nonathletes, average athletes, and superior athletes scores on the ACT Social Science Reading test are essentially equivalent considering the standard error of measurement.

ACT Natural Science Reading

Tukey's post hoc analysis of the significant differences between athletic status groups for the ACT Natural Science Reading test, $F(2,4060) = 10.33$, $p = .0001$, yielded two significant mean differences. Nonathletes ($M = 22.50$) and average athletes ($M = 22.25$) scored significantly higher on the ACT Natural Science Reading test than superior athletes ($M = 21.07$), $p < .05$. Neither mean difference ($M_d = 1.43$ and $M_d = 1.18$, respectively) exceeded the standard error of measurement for the ACT Natural Science Reading test ($S_M = 2.37$). No meaningful differences existed between nonathletes', average athletes', and superior athletes' scores on the ACT Natural Science Reading test considering the standard error of measurement. Performance on the ACT Natural Science

Reading test was similar for nonathletes, average athletes, and superior athletes.

ACT Composite

Tukey's post hoc analysis of the significant differences between athletic status catagories for the ACT Composite score, $F(2,4060) = 7.76$, $p = .0004$, identified two significant mean differences. Both nonathletes ($M = 19.70$) and average athletes ($M = 19.65$) obtained higher ACT Composite scores than superior athletes ($M = 18.60$), $p < .05$. Again, in light of the standard error of measurement for the ACT Composite score ($S_M = 1.44$), the mean differences ($M_d = 1.10$ and $M_d = 1.05$, respectively) are not meaningfully interpreted. Nonathletes, average athletes, and superior athletes demonstrated comparable performance on the ACT, overall, as reflected by the ACT Composite scores which were not meaningfully different.

TABLE 6

ANALYSES OF VARIANCE BETWEEN ATHLETIC STATUS LEVELS ON MEASURES OF ACADEMIC ACHIEVEMENT (N = 4063)

Source	df	MS	F	p
High School GPA				
Athletic Status	2	25613.637	5.29	.0051
Error	4060	4839.081		
ACT English				
Athletic Status	2	256.258	8.81	.0002
Error	4060	29.014		
ACT Mathematics				
Athletic Status	2	228.075	3.59	.0277
Error	4060	63.540		
ACT Social Science				
Athletic Status	2	289.373	5.30	.0050
Error	4060	54.628		
ACT Natural Science				
Athletic Status	2	426.685	10.33	.0001
Error	4060	41.286		
ACT Composite				
Athletic Status	2	274.149	7.76	.0004
Error	4060	35.308		

TABLE 7

MEAN HIGH SCHOOL GPA AND ACT TEST SCORES BY ATHLETIC STATUS

	Nonathlete	Average Athlete	Superior Athlete
High School GPA	2.68 [a]	2.75 [b]	2.69 [ab]
ACT English	17.61 [a]	17.31 [a]	16.49 [b]
ACT Mathematics	19.68 [ab]	19.80 [a]	18.78 [b]
ACT Social Science	18.55 [a]	18.70 [a]	17.55 [b]
ACT Natural Science	22.50 [a]	22.25 [a]	21.07 [b]
ACT Composite	19.70 [a]	19.65 [a]	18.60 [b]

Note. Means with different superscripts differ significantly at $p < .05$ as tested by Tukey's Studentized Range (HSD) test.

Results for Analyses of Question Two: Curricula

The present analyses examined the number of years subjects' enrolled in basic education subjects of English, Mathematics, Social Science, Natural Science and the summation of these (Total number of years basic education courses were taken). One-way analyses of variance (ANOVA's) were used to analyze these curricula data of the subjects who possessed complete data (N = 4063) to determine if differences existed between nonathletes, average athletes, and superior athletes.

Table 8 (p. 38) summarizes the one-way ANOVA's of athletic status for the five curricula measures used in the present study. Table 8 reveals that main effects of athletic status were found to be statistically significant only for the number of years mathematics was studied and the total number of years basic education subjects were studied. These two

athletic status effects were analyzed using Tukey's Studentized Range (HSD) test in post hoc analyses to determine where differences existed between the athletic status levels.

Table 9 (p. 39) presents the mean number of years subjects' studied basic education courses (English, mathematics, social science, natural science, and total) for each athletic status catagory and illustrates which means differed significantly in the post hoc analyses.

Years Mathematics Were Studied

Tukey's post hoc analysis of the significant differences between athletic status catagories for the number of years subjects' studied mathematics, $F(2,4060) = 6.03$, $p = .0024$, found two significant mean differences. Average athletes ($M = 3.12$) studied mathematics significantly longer than nonathletes ($M = 3.02$) and superior athletes ($M = 3.00$), $p < .05$. However, these mean differences ($M_d = .10$ years and $M_d = .12$ years, respectively) are too small to be meaningfully interpreted. Thus, there appears to be no real differences in the number of years nonathletes, average athletes, and superior athletes study mathematics.

Total Years Basic Education Courses Were Studied

Tukey's post hoc analysis of the significant differences between athletic status catagories for the total number of years subjects' studied all four basic education courses (English, mathematics, social science, and natural science), $F(2,4060) = 5.13$, $p = .0059$, found a significant mean difference between average athletes and nonathletes. Average athletes ($M = 11.84$) studied basic education courses significantly longer

than nonathletes (M = 11.61), $p < .05$. This mean difference (M_d = .23 years) is also too low to meaningfully interpret, thus, it appears that there were no discernible differences in the number of years nonathletes', average athletes', and superior athletes' study basic education courses during high school.

TABLE 8

ANALYSES OF VARIANCE BETWEEN ATHLETIC STATUS LEVELS FOR YEARS BASIC EDUCATION COURSES WERE STUDIED (N = 4063)

Source	df	MS	F	p
Years Studied				
English				
Athletic Status	2	.270	.90	.4056
Error	4060	.299		
Mathematics				
Athletic Status	2	5.603	6.03	.0024
Error	4060	.929		
Social Science				
Athletic Status	2	1.340	1.80	.1660
Error	4060	.74		
Natural Science				
Athletic Status	2	3.201	2.63	.0725
Error	4060	1.219		
Total				
Athletic Status	2	26.182	5.13	.0059
Error	4060	5.100		

TABLE 9

MEAN NUMBER OF YEARS BASIC EDUCATION COURSES WERE STUDIED BY ATHLETIC STATUS

	Nonathlete	Average Athlete	Superior Athlete
Years Studied			
English	3.73 [a]	3.73 [a]	3.70 [a]
Mathematics	3.02 [a]	3.12 [b]	3.00 [a]
Social Science	2.49 [a]	2.54 [a]	2.56 [a]
Natural Science	2.37 [a]	2.45 [a]	2.39 [a]
Total	11.61 [a]	11.84 [b]	11.65 [ab]

Note. Means with different superscripts differ significantly at $p < .05$ as tested by Tukey's Studentized Range (HSD) test.

Summary

The first analysis of the present study found subjects, who possessed incomplete or missing data relative to high school GPA and years English, Mathematics, Social Science, and Natural Science were studied, scored lower than subjects with complete data on all ACT subtests and composite scores. Moreover, these differences were consistant across all three athletic status catagories. These results suggest that two populations were present in the original sample, subjects with complete data and subjects with incomplete data. The present study examined differences between athletic status groups for subjects with complete data and excluded subjects with incomplete data from the analyses.

The results for the analyses of question one; do nonathletes, average athletes, and superior athletes differ in academic achievement as measured

by high school GPA and ACT test scores; yielded significant differences between athletic status catagories for both high school GPA and all ACT measures of academic achievement. Post hoc analyses identified differences in high school GPA and ACT test scores between athletic status catagories. Average athletes possessed higher GPA's than nonathletes while no differences were found between average athletes and superior athletes or between superior athletes and nonathletes. Superior athletes scored significantly lower than average athletes on every ACT subtest and composite score. Superior athletes also scored significantly lower than nonathletes on every ACT subtest (except ACT Mathematics) and composite score. No differences were found between average athletes' and nonathletes' ACT test performance.

In determining the importance or meaningfulness of these results, the magnitude of each mean difference was examined. Mean differences between average athletes' and nonathletes' GPA's, although statistically significant, were not substantial or meaningful. Nonathletes, average athletes, and superior athletes seem to obtain similar high school GPA's. Mean differences between superior athletes', average athletes', and nonathletes' ACT test performance were compared with the standard error of measurement for the respective ACT subtest and composite scores. None of the mean differences exceeded the respective standard error of measurement. Thus, nonathletes, average athletes, and superior athletes appear to score comparably well on the ACT test.

The results for the analysis of question two; do nonathletes, average athletes, and superior athletes differ in high school curricula as measured by the number of years English, Mathematics, Social Science, Natural Science, and the Total number of years these subjects were

studied; yielded only two significant differences between athletic status catagories. Significant athletic status differences were found for the number of years mathematics was studied and the total number of years basic education courses were studied. Post hoc analyses found average athletes to study mathematics significantly longer than superior athletes and nonathletes. Average athletes were also found to study all basic education subjects (Total) longer than nonathletes.

The magnitude of the mean differences between athletic status catagories for the curricula differences was also examined to attribute meaning to the results. The mean differences between average athletes', superior athletes', and nonathletes' study of mathematics and the total number of years basic education courses were studied were not substantial or meaningful. Nonathletes, average athletes, and superior athletes appear to possess comparable curricula as measured by the number of years basic education courses were studied.

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

Previous research on the academic achievement of male high school athletes has indicated that they compare favorably with nonathletes. Researchers have found that when grades or GPA's have been compared, male high school athletes seem to do as well or better than nonathletes. Male college student athletes, however, have not demonstrated the academic optimism of research on high school athletes. Research suggests that college student athletes possess minimal academic skills and actually possess lower GPA's than college students in general. Because male high school athletes and college student athletes are different populations, comparisons of studies are a risky endeavor.

The purpose of the present study was to clarify the disparity between the research of male high school athletes and college student athletes. By dichotomizing high school athletes into average athletes and superior athletes (those likely to participate in college athletics), the present study approximated the proportion of high school athletes who participate in college athletics in an attempt to provide a link to the academic problems of college student athletes. Previous research of high school athletes' academic achievement has utilized high school grades and GPA's as the measures of academic achievement and have not examined the curricula differences between athletes and nonathletes. The present study utilized objective academic achievement measures (ACT test scores) as well as GPA's and examined the differences between nonathletes', average

athletes', and superior athletes' basic education curricula (English, mathematics, social science, and natural science courses). Differences in academic achievement and curricula between average and superior high school athletes could have established a link to the research on college student athletes' academic difficulties.

ACT test scores and Student Profile Section data for each student taking the ACT in the state of Illinois, 1974 to 1981, inclusive, were obtained and a random selection of 1200 subjects per year was made. Of the 9600 subjects, 4472 male subjects served as the sample in the present study. These subjects were placed into one of three athletic status catagories (nonathlete, average athlete, or superior athlete) based on their responses to questions about their athletic participation during high school. Superior athletes (N = 597) were high school athletes who earned all city, league, or state awards for athletic participation in high school. Average athletes (N = 2052) were high school students who participated in one or more varsity athletic team events, while nonathletes (N = 1693) did not participate in any varsity athletic team events during high school.

The academic achievement measures utilized in the present study were high school GPA, ACT English, ACT Mathematics, ACT Social Science, ACT Natural Science, and ACT Composite test scores. The curricula measures in the present study were obtained from the subjects responses to a Student Profile Section item which asked them to specify the number of years they studied basic education courses; English, Mathematics, Social Science, and Natural Science, during high school. A variable (Total) was created to augment the curricula measures by summing the number of years basic education courses were taken.

Both GPA and curricula measures are self-report variables to which some subjects refused to respond. These subjects with missing data relative to GPA or curricula measures were excluded from the data analyses. Because subjects with missing data were excluded from the data analyses, an analysis was conducted to determine if these subjects differed in ACT test performance from subjects with complete data. The results of the analysis suggested that subjects with missing data scored significantly lower on every ACT measure than subjects with complete data, however, this was consistent across the three athletic status catagories. These results suggest that subjects with complete data and subjects with incomplete data constitute two populations within the original sample.

One-way analyses of variance (ANOVA's) were used to analyze the high school GPA's and ACT test data for subjects with complete data (N = 4063) to determine if differences existed between nonathletes, average athletes, and superior athletes. Significant athletic status differences were analyzed by Tukey's Studentized Range (HSD) test in post hoc analyses to identify where the differences existed between the three levels of athletic status.

One-way ANOVA's were also used to analyze the curricucla data of subjects with complete data (N = 4063) to determine if differences existed between nonathletes, average athletes, and superior athletes in the number of years basic education courses were taken. Significant differences between athletic status groups were analyzed by Tukey's Studentized Range (HSD) test in post hoc analyses to determine where the differences existed between the athletic status levels.

Findings and Conclusions

All academic achievement variables (GPA, ACT English, ACT Mathematics, ACT Social Science, ACT Natural Science, and ACT Composite) yielded significant differences between athletic status groups, however, when the mean differences were compared, the differences were either too small to interpret, as with high school GPA, or did not exceed the standard error of measurement for the respective ACT subtest or composite score. Thus, it was concluded that there were no substantial differences between nonathletes, average athletes, and superior athletes in high school academic achievement as measured by high school GPA or ACT test scores.

Only two curricula variables were found to be significant with respect to athletic status; the number of years mathematics were studied and the total number of years basic education courses were taken. Again, these differences were too small to meaningfully interpret. It was concluded that nonathletes, average athletes and superior athletes did not seem to differ in the number of years basic education courses (English, mathematics, social science, and natural science) are taken.

Limitations

The present study attempted to clarify and establish a link between the research of male high school athletes and research of male college student athletes. By dichotomizing high school athletes on the basis of outstanding athletic achievement (viz., all city, league, or state award), the present study approximated the proportion of male high school athletes who participate in college athletics (superior athletes).

The results of the present study show that superior high school athletes scored significantly lower than average athletes on every ACT subtest and composite scores. Furthermore, superior athletes scored significantly lower than nonathletes on every ACT subtest and composite score (except ACT Mathematics). This appears to be the first study to find a group of male high school athletes to demonstrate significantly lower academic achievement than nonathletes. These results, however, were not substantial because none of the mean differences exceeded the standard error of measurement for the respective subtest. These results are, however, in the expected direction, given the previous research on the academic achievement of high school and college student athletes.

The present study's dichotomization of high school athletes placed 21% of the athletes into the superior athlete catagory (likely college athletes). Remer et al. (1978) suggest that only 3% of high school athletes actually participate in college athletics. The present study is thus limited in its attempt to establish a link between the research of high school and college student athletes. Finer discriminating variables which would better approximate the proportion of high school athletes likely to participate in college athletics may yield more accurate results regarding the academic achievement of male high school average athletes and superior athletes (likely college athletes).

The present study yielded similar results to those of Purdy et al. (1982) who found male college athletes obtain lower ACT Composite scores ($M = 20.8$) than male college nonathletes ($M = 22.8$). The ACT Composite scores of nonathletes, average athletes, and superior athletes in the present study are lower than those reported in the Purdy et al. (1982) study for both male college athletes and nonathletes. These differences

may be illustrative of the university admission policies of the Purdy et al. study and that not all students who take the ACT attend college. Another limitation of the present study is that the number and proportion of subjects in the present study who attended college is not known. The elimination of subjects who did not attend college would likely increase the group means relative to the ACT tests. Differences in ACT test performance between the groups of athletes (average and superior) may also increase with the elimination of non-college bound students. Research examining the educational aspirations and expectations between average and superior athletes or between college athletes and nonathletes could also help clarify the relationship between varying levels of athletic participation and academic achievement.

Recommendations

The results of the present study only allow for the recommendation that further research should be conducted to more fully understand the academic achievement of high school athletes. The results of the present study suggest that future research may prove fruitful in the following respects:

1. The identification of variables which more accurately identify high school athletes likely to participate in college athletics need to be made. This will allow for a more appropriate comparison of the academic achievement between "average" and "superior" high school athletes in the attempt to link the academic achievement research of high school and college athletes.
2. Examining college students' high school academic achievement (viz., ACT scores) as a function of their athletic participation (i.e., college

student athlete, previous high school varsity athlete, or nonathlete) may also clarify the relationship between athletic participation and high school academic achievement.

3. Longitudinal studies which examine a population of athletes and nonathletes from junior high school through college, although time consuming and costly, would be extremely beneficial in identifying the process by which athletes' academic achievement decreases at the college level.

4. The use of standardized academic achievement measures is also recommended so that the results of independent studies may be appropriately compared.

REFERENCES

Airoldi, N., Peterson, B., & Webb, D. (1967). Junior high school athletes excell in scholarship. Personnel and Guidance Journal, 45, 1021-1024.

Birrell, S. (1977). An analysis of the inter-relationships among achievement motivation, athletic participation, academic achievement, and educational aspirations. International Journal of Sport Psychology, 8, 178-191.

Braddock, J. H. (1981). Race, athletics, and educational attainment: Dispelling the myths. Youth and Society, 12, 335-350.

Coleman, J. S. (1960a). The adolescent society. New York: Free Press of Glencoe.

Coleman, J. S. (1960b). Athletics in high school. Annals of the American Academy of Political and Social Science, 338, 33-43.

Cook, W.A., & Thompson, M. (1928). A comparison of letter-boys and non-letter boys in a city high school. School Review, 36, 350-358.

Dowell, L., Badgett, J., & Hunkler, R. (1972). The relationship between high school athletic achievement and variables of self-concept and academic achievement. Psychology, 9, 48-52.

Edwards, T. L. (1967). Scholarship and athletics. Journal of Health, Physical Education, and Recreation, 38, 75.

Eidsmoe, R. M. (1960). The academic performance of high school athletes. Journal of Health, Physical Education, and Recreation, 32, 20.

Eidsmoe, R. M. (1964). High school athletes are brighter. Journal of Health, Physical Education, and Recreation, 35, 53-54.

Eitzen, D. S. (1975). Athletics in the status system of male

adolescents: A replication of Coleman's The adolescent society. Adolescence, 10, 267-276.

Hall, R. T. (1928). How athletes and non-athletes compare in mental ability and educational achievement. American Physical Education Review, 33, 388-389.

Hanks, M. (1979). Race, sexual status, and athletics in the process of educational achievement. Social Science Quarterly, 60, 482-496.

Hanks, M. P. & Eckland, B. K. (1976). Athletics and social participation in the educational attainment process. Sociology of Education, 49, 271-294.

Harrison, R. E. (1981). Psychosocial dimensions of student athletes: Implications for developmental studies. Personnel and Guidance Journal, 60, 113-115.

Hauser, W. J. & Lueptow, L. B. (1978). Participation in athletics and academic achievement: A replication and extension. Sociological Quarterly, 19, 304-309.

Horine, L. E. (1968). Attendance and scholarship of high school athletes. Athletic Journal, 48, 52, 95.

Jacobsen, J. M. (1931). Athletics and scholarship in the high school. School Review, 39, 280-287.

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

Lanning, W. (1982). The privileged few: Special counseling needs of athletes. Journal of Sport Psychology, 4, 19-23.

Laughlin, N. T. (1978). Athletic participation and the grade point average, absences, cuts, and disciplinary referrals of high school

athletes. International Journal of Sport Psychology, 9, 79-89.

Lenning, O. T. (1975). Predictive validity of the ACT tests at selective colleges (ACT Research Report 69 I-II). Iowa City, IA: The American College Testing Program.

Lenning, O. T. & Maxey, E. H. (1973). ACT versus SAT prediction for present-day colleges and students. Educational and Psychological Measurement, 33, 397-406.

Martens, F. L. (1974). Personality, attitudes, and academic achievement of athletic and non-athletic junior high school boys. Perceptual and Motor Skills, 39, 538.

McDill, E. L. & Coleman, J. S. (1963). High school social status, college plans and interest in academic achievement: A panel analysis. American Sociological Review, 28, 905-918.

Munday, L. A. (1967). Predicting college grades using ACT data. Educational and Psychological Measurement, 27, 401-406.

Otto, L. B. & Alwin, D. F. (1977). Athletics and social participation in the educational attainment process. Sociology of Education, 50, 102-113.

Pangle, R. (1956). Scholastic attainment and the high school athlete. Peabody Journal of Education, 33, 360-364.

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

Picou, J. S. & Curry, E. W. (1974). Residence and the athletic participation--educational aspiration hypothesis. Social Science Quarterly, 55, 768-776.

Purdy, D. A., Eitzen, D. S. & Hufnagle, R. (1982). Are athletes also

students? The educational attainment of college athletes. Social Problems, 29, 439-448.

Rehberg, R. A. & Schafer, W. E. (1968). Participation in interscholastic athletics and college expectations. American Journal of Sociology, 73, 732-740.

Remer, R., Tongate, F. A., & Watson, J. (1978). Athletes: Counseling the overprivileged minority. Personnel and Guidance Journal, 56, 626-629.

SAS Institute, Inc. (1982) SAS users guide: Statistics, 1982 ed. Cary, NC: Author.

Schafer, W. E. & Armer, J. M. (1968). Athletes are not inferior students. Transaction, 6, 21-26, 61-62.

Schafer, W. E. & Rehberg, R. A. (1970). Athletic participation, college aspirations, and college encouragement. Pacific Sociological Review, 13, 182-186.

Shaw, J. H. & Cordts, H. J. (1960). Athletic participation and academic performance. In W. R. Johnson (Ed.) Science and Medicine of Exercise and Sports. New York: Harper and Row.

Stevenson, G. L. (1975). Socialization effects of participation in sport: A critical review of the research. Research Quarterly, 46, 267-273.

Technical manual for the ACT assessment. (1973). Iowa City, IA: The American College Testing Program, Inc.

The student profile section, 1973/74 ed. (1973). Iowa City, IA: The American College Testing Program, Inc.

The student profile section, 1974/75 ed. (1974). Iowa City, IA: The American College Testing Program, Inc.

The student profile section, 1975/76 ed. (1975). Iowa City, IA: The American College Testing Program, Inc.

The student profile section, 1976/77 ed. (1976). Iowa City, IA: The American College Testing Program, Inc.

The student profile section, 1977/78 ed. (1977). Iowa City, IA: The American College Testing Program, Inc.

The student profile section, 1978/79 ed. (1978). Iowa City, IA: The American College Testing Program, Inc.

The student profile section, 1979/80 ed. (1979). Iowa City, IA: The American College Testing Program, Inc.

The student profile section, 1980/81 ed. (1980). Iowa City, IA: The American College Testing Program, Inc.

Underwood, J. (1980). The writing is on the wall. Sports Illustrated, 52, May 19, 36-71.

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

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