1984

Academic performance athletics and attrition among Black freshmen at the University of Montana

James M. Jones
The University of Montana

ACADEMIC PERFORMANCE, ATHLETICS AND ATTRITION AMONG BLACK FRESHMEN AT THE UNIVERSITY OF MONTANA

By

James M. Jones

B.A., University of Montana, 1978

Presented in partial fulfillment for the degree of

Master of Arts

UNIVERSITY OF MONTANA

1984

Approved by:

Rodney L. Bird

Chairman, Board of Examiners

Dean, Graduate School

March 13, 1984

Date

ProQuest LLC.
789 East Eisenhower Parkway
P.O. Box 1346
Ann Arbor, MI 48106 - 1346

ACKNOWLEDGEMENTS

I would first like to give special thanks to my wife, June, for the years of patience and assistance, particularly in typing and retyping a number of drafts and finally, the finished copy of my thesis. A very special thanks to my chair, Dr. Rodney Brod, for answering the late night telephone calls and weekend interruptions with continual support and assistance. I would also like to thank my committee, Dr. Ulysses Doss, whose years of friendship and sharing were invaluable in completing my education, Dr. Paul Miller, who continued to support my efforts as a graduate student, and Alan Thompson, with fishing pole in hand, was my therapist when I needed to relax and take a break from my work. A special thanks is given to Mick Hansen, Walt Briggs, the Athletic Department, and the Registrar's Office for their part in making available the data necessary to do this study.

Jones, James M., M.A., Winter 1984 Sociology

Academic Performance, Athletics and
Attrition Among Black Freshmen
at the University of Montana (102 pp.)

Director: Rodney L. Brod R.L.B.

This study examines whether black freshmen at the University of Montana from fall 1975 to fall 1981 perform equally with their white peers when comparing their overall academic performance related profiles, specifically cumulative grade point average, cumulative credits earned and attrition rates. Various theories utilizing intellective and non-intellective measures to predict student academic performance provided the guidelines (when applicable) by which this study examines relevant indicators both common and unique to black and white freshman students' academic performance and attrition.

A random sample of white students (approximately 1/50th of the total white population) resulted in 184 freshman cases. Due to the small number of black students, the total black population during this six year period resulted in 46 black freshman cases.

Results from multiple regression analysis indicated that black and white freshmen do not differ significantly in cumulative GPA, cumulative credits earned and attrition rates, holding constant relevant demographic, high school and college data. Although, no significant ethnic differences were found in the main dependent variables of academic performance and attrition rates, some empirical differences among independent demographic, high school and college variables exist between the two ethnic groups. That is, variables most likely to predict academic performance and attrition for black freshmen differ from those of the white sample. Structural differences in terms of strength and direction of some independent variables were found when the prediction models were run separately for each ethnic group. In addition, the analysis of black freshmen indicates that black freshman athletes attain higher cumulative GPA's and cumulate more credits than do other black freshmen. That is, black freshman athletes tend to directly improve the overall performance and indirectly, the retention rate of black freshmen attending the University of Montana from fall 1975 to fall 1981.

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OVERVIEW OF THE STUDY

Introduction

While previous concern in measuring student achievement generates data evaluating student motivation, self-confidence, and social and academic values, this study analyzes institutional, demographic and behavioral factors. Investigating only actual high school and college performance de-emphasizes attitudinal factors as criteria for performance in determining student achievement.

For the purpose of this study, attention is directed at actual college performance focusing on whether black freshmen students perform equally with their white peers, holding constant background and high school rank. College performance will be measured using Cumulative GPA, Cumulative Credits, and Registration Second Fall Term. If there is a difference between black and white freshmen college performance, demographic or behavioral variables may help explain or predict these differences.

This thesis is divided into three chapters: (1) a discussion of the theoretical perspectives, methodological procedures, and sampling techniques; (2) descriptive and comparative analyses of results; (3) a summary of results; and (4) a summary and practical implications of the study.

Following a brief summary of the previous research relevant to this study, specific areas examined in this chapter include: (1) the importance of GPA and cumulative credits as measures of college performance; (2) the functions of GPA and cumulative credits as they relate to ethnicity; (3) the significance of attrition rates (Second Fall Registration) as they relate to ethnicity and performance. Based on the review of literature,

this study also will treat admissions criteria as initial scope conditions in predicting college performance.

THEORETICAL PERSPECTIVES

There is no single approach in studying college performance. A variety of characteristics associated with performance in the literature provides a number of potential avenues available for attaining reliable information about college students and in particular black college students.

In this review, the intent is to show some of those varying approaches and establish a bridge between previous research findings and their related analyses to this study. Previous research evaluation and interpretation identifies factors such as nonintellective, (attitudinal, emotional) and intellective measures (with particular attendant focus on ethnic differences) can be correlated with actual student achievement and performance. These types of research measurements have provided some reliable and descriptive information about college performance with ethnic profiles of black and white students. As stated earlier, the purpose of the study is to examine black freshman student college performance compared with that of their white peers by using selected variables from demographic, high school, and college records to predict and explain existing trends at the University of Montana.

Nonintellective Variables: Psychological/Emotional

One of the most successful studies in predicting black students performance using nonintellectual measures was done at the University of Maryland starting in 1968. Black freshmen entering the University of

Maryland in that year were used in this study. Three instruments were used to test and identify non-academic variable correlates predicting black student academic success. The measure of success was determined by GPA at the end of the freshman year. The California Psychological Inventory (CPI) and the Holland Vocational Preference Inventory (HVPI) were the two personality measures used. The University Student Census (USU) a questionnaire was also administered showing attitude and activities information (Gough, 1964, Holland, 1965).

The results of this study showed black freshmen students to have a relationship between various personality measures and grades. However, social and cultural variables were not significantly related to GPA. These relationships were also found to apply to the white students although several of the variables seemed to operate differently for black and white student, the most significant of these being blacks' higher aspirations and interest in the social service occupations (Pfeifer and Sedlucek, 1974) as the literature suggests.

Attitudinal Variables

Further investigation by Braddock and Dawkins in the National Longitudinal Survey of high school graduates of 1972 reflect these findings:

> (1) both intellective and nonintellective factors may influence academic success in college; (2) the relative importance of specific predictors (intellective or non-intellective) varies across type of college setting; and (3) predicting black academic achievement is more problematic in traditionally white than traditionally black colleges and universities (Braddock and Dawkins, 1981).

The importance of this national survey is characterized by the use of both intellective (as this study investigates) and nonintellective variables. For example, the variables in the 1972 survey included sex, social class background, high school racial composition, curriculum enrollment, study habits, academic aptitudes, high school grades, and colleges grades in predicting academic performance at the college level for black students.

In the same tradition in an article published in "Science," blacks and other minority groups are recognized as the educationally disadvantaged. Educationally disadvantaged is defined from two separate views by the author:

> From the standpoint of an admissions officer, the educationally disadvantaged applicants to his college could be simply those who, on the basis of all available information, including high school grades, test scores, socioeconomic status, race, ethnic origin, and available financial support, are likely to have appreciably more academic difficulty than the typical minimally admissible student (Stanley, February, 1971).

The importance of this statement is found in the indicators that Stanley refers to (i.e., standardized ability and achievement tests). The intercorrelations of intellective and nonintellective indicators are used not only to predict academic performance, but also as predictors in admissions considerations for college entrance.

In the second definition the author suggests:

> Defining disadvantagement in terms of low predicted grade-point average or low persistence within a specified college, based on all available antecedent information, makes the expression educationally disadvantaged or high risk applicant more than a euphemism for a member of a minority group. It involves assessing the educational assets and handicaps of the applicant and estimating his achievement if some of the handicaps can be lessoned or removed. . . . in many studies, however, black students of variously developed

> abilities were lumped together, as though having black skin caused college applicants to be poor academic risks (Stanley, February, 1971).

The importance of this statement deals directly with nonintellective measures used to define academic performance by ethnicity rather than actual performance records. Following this reasoning, this study profiles actual academic performance without using nonintellective measures (attitudinal, emotional) in predicting black freshmen academic performance at the University of Montana.

Intellective Measures

Previous research has investigated the relationships between performance and variables predicting academic performance. At the University of Georgia, 434 black and 373 white students were examined to determine difference between actual and predicted grade point averages during fall quarter of 1973 and 1974, 1975, and 1976. Using GPA controlled by race the study concluded:

> No reliable differences were found in combined GPA's by race and by sex . . . We can conclude that comparable black and white students for the years 1973, 1974, 1975, and 1976 were statistically similar in predicted and actual first quarter averages. When the criteria of grades and test scores were held constant, black students performed as well as white students at a large predominantly white southern university (Brown and White, 1979).

Various studies have used separate indicators for predicting college performance. High school variables for example may be used as the only indicator to determine academic performance on the college level. Studies have shown high school grades and rank to be low predictors of black student academic performance while in college (Cleary, 1968). The low predictive validity has been tied to students who attended integrated

colleges (Hills and Stanley, 1968; Olsen, 1957; Roberts, 1951; Stanley and Porter, 1967). However, standardized tests scores such as SAT, ACT, and CTAA (Control Test for Academic Aptitude, Peterson, 1968) were often found to be more valid predictors of black freshman students GPA (Cleary, 1968; Munday, 1965; Baney, 1966, Hills, Klock, and Lewis, 1965).

There are no conclusive predictors of college performance as various researchers disagree as to which variables reflect characteristics which would appear to be linked to academic performance.

An indication of this disagreement is exemplied by the following statement:

> Research which attempts to predict the college grade performance of black students has produced inconclusive results. There is empirical evidence that academic aptitude tests predict college grades for students in predominantly black colleges as well as they do for white students. On the other hand, however, this literature also reflects some ambiguity about the validity of aptitude tests for predicting grades of black students in predominantly white colleges. In general, some researchers have found that conventional admissions criteria (e.g., aptitude tests and high school grades) are poor predictors for blacks while others have found these measures of intellectual ability to be valid predictors. Still others indicate that the validity of conventional criteria in predicting the academic performance of black students tend to vary across a range of factors, including sex, type of institution, and situation in which the data were obtained and the prediction technique employed (Braddock and Dawkins, 1981).

For this reason this study includes demographic (nonintellective) factors in predicting academic performance. However the study also includes intellective measures as Braddock and Dawkins suggest that precollege and post secondary academic success are often characteristics associated with college academic performance; colleges typically do not base admissions on the basis of gender or socioeconomic status.

Summary

This review summarizes factors important to intellective and non-intellective correlates of black and white student academic performance.

Although no conclusive evidence suggests which specific predictors explain academic performance, this review has explored previous research efforts that have attempted to isolate factors that predict college performance, particularly among black students. With the use of a variety of theoretical perspectives, characteristics which help explain by use of intellective as well as nonintellective factors form the basis for which this study can compare black freshmen academic performance with that of their white peers at the University of Montana.

RELEVANT SCOPE CONDITIONS

In order to address the issue of student academic performance at the University of Montana (UM), the process by which the university operates must be understood. It is important to note, that the UM is a predominately white institution. Various reasons for this exist, first the geographic area in which the university is located is not close to a large population or urban area where a high concentration of blacks are located. Other reasons involve a lack of black faculty, environment, and cultural differences that are found in the large urban areas.

As the UM does not have selective admissions criteria for in-state students, and has somewhat lenient yet flexible out-of-state criteria, one could expect a relationship between race and performance since blacks are more likely to enroll from outside the State of Montana. The following

figure (see Figure 1) notes the admissions criteria for entering the UM.

The geographic location of the UM makes recruitment of black students a problem when availbility of interrelationships are not widely available to entering black freshman students due to the lack of blacks attending the university.

As the literature shows, institutions with less stringent admissions criteria have found race to be an important variable when tied to GPA and withdrawal. The implications for this study acknowledging the importance of generalizing to central assumptions about college performance, argue for a theoretical framework balanced between sociological implications and practical outcomes.

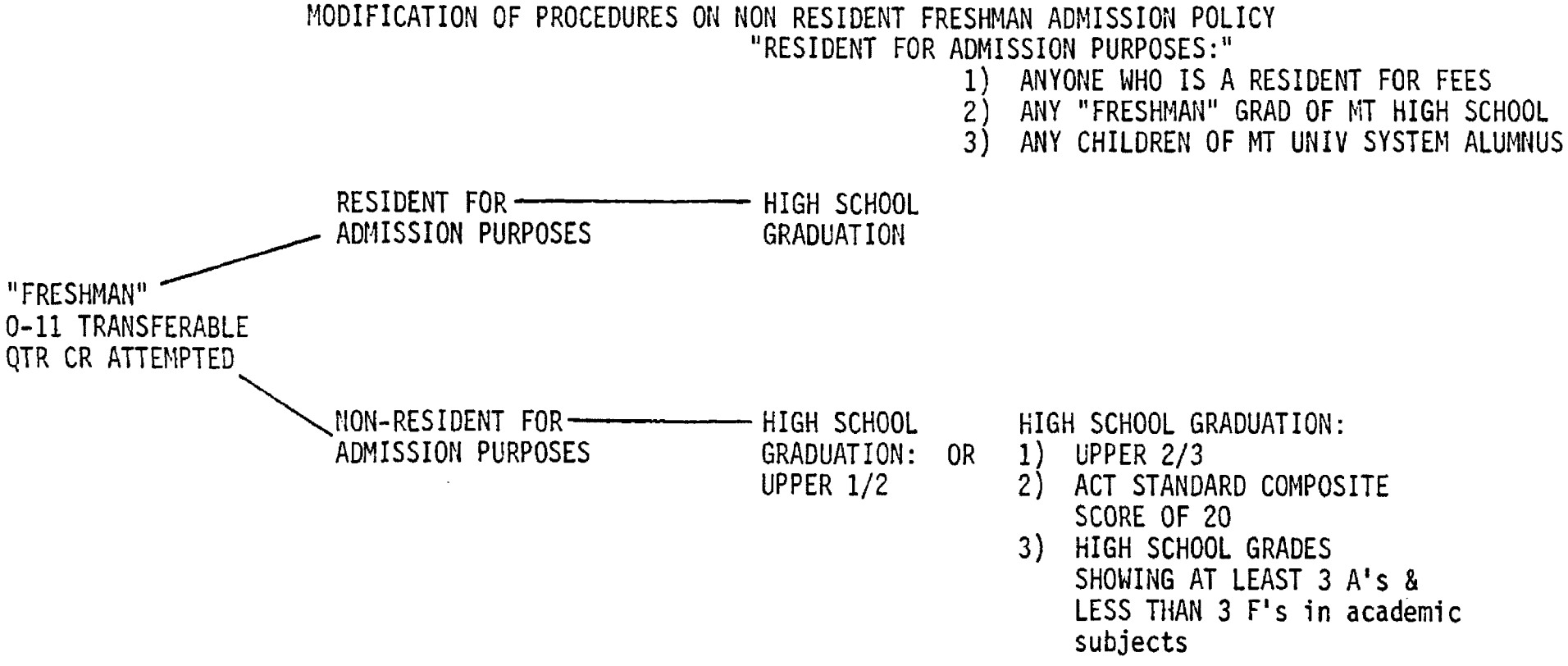
CUMULATIVE GPA AND CUMULATIVE CREDITS AS DEPENDENT MEASURES OF COLLEGE PERFORMANCE

The amount of success in educational institutions is grounded in a student's abilities as measured by the level of performance within a specified curriculum. That performance level is measured by GPA as pointed out in the following statement. Wallace notes:

> . . . grades are, for good or ill, an administrative index of the extent of which the organization's formal purpose (i.e., education) is being accomplished, and that organizational demands for student compliance with the pursuit of this purpose result (Wallace, 68, 1966).

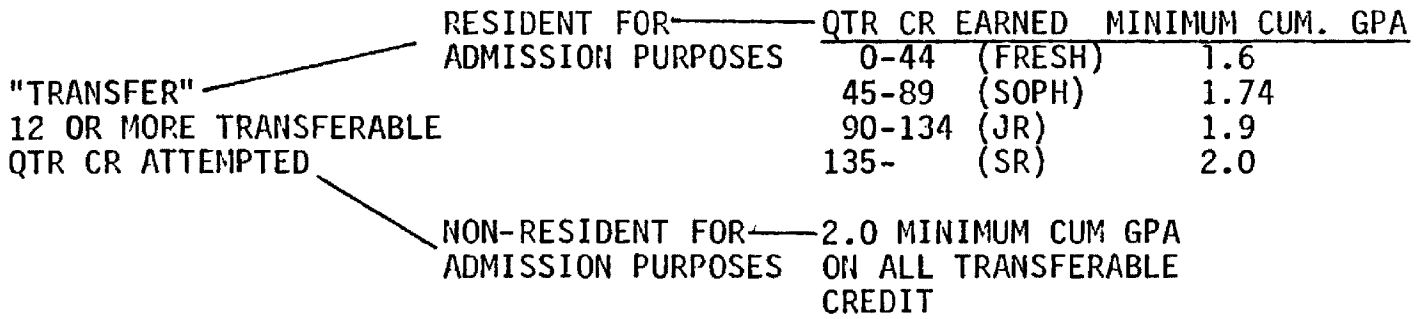
In connections with grade point averages, educational institutions also maintain status categories (i.e., freshman, sophomore, junior, senior) directly related to cumulative credits. Students are rewarded not only by complying with the institution's maintenance of GPA (i.e., minimum GPA

FIGURE 1.



allowed), but also by increasing status with the number of credits cumulated. The following figure shows the breakdown of credits earned to increase status and minimum cumulated GPA at the University of Montana.

Figure 2.



A student's resulting performance is likely to be initially tied to external influences. Expectations induced by parental, career, and societal pressures generate traditional views of success in the real world. A student's motivation to increase status is an indication of his or her ambition to achieve, which is a familiar phenomenon in a competitive society. Thus academically, GPA is a measure by which that success can be judged, by what is expected to actual abilities determined by grade performance.

A person's GPA is not only a reflection of the student's own abilities and motivations, it is also a judgement of outside perceptions of his/her abilities. The emphasis of faculty evaluation of a student's ability reflects a dependence which for various reasons may be contrary to actual abilities under such conditions.

A second condition which influences performance assumes a student's self-image of his or her own abilities. As Wallace suggests:

> . . . in evaluating their grade averages, freshmen may have been more inner directed in the sense that they may

> have compared their grades with some internalized standard of what they expected of themselves. In other words, it is certain that freshmen have images of themselves, based largely on their previous experience in high school, as being generally excellent, good, or fair students. (Wallace, 37-38, 1966).

Institutions of higher education use high school rank in their decision making process for admissions purposes. Under these circumstances the assumption is that high school rank has a direct relationship with the ability to perform at the college level. Since UM utilizes such criteria for admitting non-resident students, this study uses high school rank as a variable in predicting college performance.

CUMULATIVE GPA AT SECOND FALL REGISTRATION

One of the major factors in determining actual college performance for freshmen is their cumulative grade point averages. This study measures that as GPA cumulated by second fall registration. For example, if a student matriculates in the Fall of 1980, then registers again in Fall of 1981, the fall 1981 cumulative GPA is used to determine how well that student performed during his or her freshman year.

Some previous research suggests high school GPA may not always be the best predictor of college performance (Thomas and Stanley, 1969: Pfeifer and Sedlacek, 1971). That is, the social and academic adjustment to a college environment also reflects nonconventional correlates of academic performance and may represent a more valid predictor of success (Bayer and Boruch, 1969; Lenning, 1974). To limit the amount of ambiguity reflecting high school achievement with college performance, the impact of high school rank particularly for freshmen may exhibit factors

consistent with previous studies (Brown & Ervin, 1979; Clark & Plotkin, 1964; Cleary, 1968; Green & Fauguhar, 1965; Thomas & Stanley, 1969) in which high school GPA is found to predict college performance.

CUMULATIVE CREDITS EARNED BY SECOND FALL REGISTRATION

With the use of cumulative credits as a dependent variable, the rate of achievement becomes directly testable. Assuming that students are maintaining the minimum GPA required (i.e., by holding constant GPA), data examining motivation to achieve thus would be expected to relate to increased status or goal attainment which in this case is the social promotion to a rank of sophmore and, eventually the achievement of a formal degree.

Cumulative credits may also involve various factors unrelated to status achievement. In this study both demographic and high school related variables are tested to explain factors that may cause differences in credit attainment. At the same time, other college related variables are tested thus indicating any factors while the students are in attendance that may decide credit attainment.

As with cumulative GPA, cumulative credits are determined by the amount of credits attained by second fall registration. Cumulative credit has not traditionally been used as an indicator of college performance. However, this study uses cumulative credit as an additional indicator which may help depict ethnic differences in achievement of freshman students.

CUMULATIVE GPA AND CUMULATIVE CREDITS AS RELATED TO ETHNICITY

The University of Montana is a predominantly white institution with a small variety of ethnic groupings. Also, it is not uncommon for administrators, faculty, and staff to be representative of the overall white population.

The significance of this type of setting may be related to academic counseling and advising. Assuming that cumulative GPA is initially dependent upon credit hours, an overabundance of credit hours may cause a drop in GPA, making effective counseling important should ethnicity prove to be a relevant factor in overall performance. It should also be noted that credit hours may become dependent upon GPA by the student's second or third quarter if in fact GPA is suffering from an overload of credit hours.

The following sections will examine cumulative GPA and cumulative credit, presenting a separate profile for white freshman and black freshman students, thus indicating trends that may exist to help to predict academic performance.

Cumulative GPA and Cumulative Credits: A Profile of White Freshman Students

Approximately three quarters of the white students in this study are registered from within the State of Montana. It seems likely that a cohesive relationship will exist based on what the University of Montana has to offer both academically and socially toward student participation within a familiar environment. This would imply less need for orienta-

tion into that system of education where cultural difficulties are not encountered.

Demographically, white more than black freshman students attended high school in the state of Montana. From the standpoint of college performance, it is likely that white instate students will adjust to the system more rapidly than out-of-state black students. It is also likely that other demographic variables in this study that significantly correlate with ethnicity may also impact relationships with cumulative GPA and credits earned.

High school related variables offer an explanatory look at pre-college preparation. Do in fact, Montana high schools prepare their students any better for college level work than out-of-state high schools? In attempting to answer this question regarding high school performance and college GPA, data will be examined for ethnic differences holding constant the instate/out-of-state indicator in the primary association. Thus, white freshmen would not be expected to rank as high coming out of Montana high schools because rank is not a requirement for instate entry. Under this assumption, white freshman students' overall mean college GPA should not be as high when compared to out-of-state students (i.e., black freshmen), assuming there is a positive relationship between high school rank and GPA.

A positive relationship between GPA and credits earned would indicate that out-of-state students may also indicate that such students are achievement oriented as to status increase, thus a factor in determining academic performance. It would be expected that white freshmen

earn less credits during the course of their freshman year. These assumptions are based on admissions criteria and the emphasis placed on rank in high school class for out-of-state students.

The perspectives that have been stated are also supported by Wallace in the following statements: (Wallace, 1966, 30)

> High school rank is the major standard of admission to colleges across the country. It also forms the base-line for most analyses of college student achievement, in which it has proven to be the best single predictor of such achievement (Fishman, 1962, pp. 666-89).

Wallace goes on further to suggest that:

> Of additional significance is the finding that freshmen and nonfreshmen of relatively high rank in their high school graduaitng classes were consistantly more likely to have strong motivation to do well in college. This suggests that part of the recognized likelihood that students who do well in high school will also do well in college may be explained by tendency to have and retain strong academic motivation. (Wallace, 1966, 30-31).

The perspectives discussed so far are not to suggest a significant relationship of demographic and high school related variables to white and black freshmen performance but to profile the likelihood of existing relationships that may occur based on admissions criteria. As mentioned earlier, if no significant direct relationship exists between ethnicity and admissions criteria, then ethnicity will not likely be a factor when correlating high school variables to college performance.

Cumulative GPA and Cumulative Credits;
A profile of Black Freshman Students.

In preparation for this section, it seems appropriate to portray for the reader a brief profile of black students and implications of minority academic achievement as viewed generally.

Until two decades ago, black youths attending white institutions higher education were virtually non-existent. It was not until the mid-1960's that universities around the country implemented recruiting policies directed at increasing their minority populations, resulting in birth of black study programs.

As described by O. D. Froe in 1964, only 21 percent of black students' parents had any college experience, while 52 percent of white parents had college backgrounds. For black families 51 percent had incomes of $6,000 or less, and 52 percent of black fathers had unskilled jobs. Black students were also unlikely to score any higher than the 25th percentile on various achievement tests.

On entering college institutions, black students bring with them culture differences not only from a black perspective, but differing demographic characteristics as well as regional differences. Louis Nieves lists six problems that effect minority performance; "(1) Feeling unentitled to college, (2) Loneliness and isolation, (3) Undeveloped career goals, (4) Fear of performance evaluation, (5) Alienation from dominant campus culture and style, and (6) Internal vs. external attribution of control" (Louis Nieves, Office for Minority Education and Educational Testing Service, 1978, Page 12). It seems reasonable to assume that black students at the University of Montana in some way are subjected to a number of these problems.

Demographic Profile

Unlike the white student population, approximately 76 percent of black students attending the UM are from other states. Adjustment

to academic and social environments is likely to be a disadvantage for black freshmen. Predicting their first year performance may not be valid from a cultural and adjustment perspective. However, based on admissions criteria mentioned earlier, black student performance prior to college suggest they are entering the UM in the top two-thirds of their high school graduating class. This would suggest that academically black students are qualified to perform well at the college level despite cultural differences.

Historically, black students typically have been male rather than female. This study does not expect any variation from this pattern for blacks entering the UM. This would indicate a relationship between ethnicity and sex in statistical language where there would be a predictable lack of black female students.

Noting environmental, cultural, and academic credential contrasts, factors relating to parental support should show no significant differences between black and white students. Literature suggests that both black and whtie parents are supportive of academic attainment, although difference may exist economically, socially, and culturally. Keeping in mind the various factors noted thus far, academic performance (GPA, Cumulative Credits) of black freshman students should not differ significantly from white freshmen. That is, rather than ethnic differences per se, culture and environmental factors may be causing performance differences.

High School Profile

As noted earlier, admissions criteria at the University of Montana would preclude black freshmen from having poor academic credentials. If

in fact students who rank high in high school also perform well in college holds true, we would expect black freshmen to have higher GPA's overall than white freshmen. However, adjustment factors once again may hamper performance in college thus indicating no significant ethnic difference in performance.

Regarding the issue of intellective versus nonintellective outcomes, this study only concerns itself with data clearly consistent with actual academic performance. The nonintellective factors have been used specifically for the purpose of explaining demographic differences related to ethnic issues that suggest the existence of significant cultural differences. The primary purpose of this study is to more clearly specify the correlates of black student academic success in college, and profile the underlying casual processes among the correlates of black student academic performance at the UM.

High School Profile and ACT

Besides the three dependent variables measuring academic performance and other college, demographic and high school variables used to profile students in this study, variables attempting to explain performance based on ACT scores present particular validity problems.

Utilizing ACT scores presents a problem for this study since the total number of students taking ACT examinations is limited, particularly for black freshmen. While 115 cases out of 184 were documented for white students, only 15 cases out of 46 could be found for black students taking ACT tests. With this in mind, and the fact that ACT scores may not alwyas be good predictors of performance, ACT scores in general may give

some indication as to the possible relevant differences between black and white freshmen students at the UM.

With the help of college related variables, black student performance can be predicted while the students are attending college. Along with relevant factors drawn from demographic and high school related variables, a profile of black freshmen student performance at the UM can be reviewed in its totality.

Registration Second Fall Term (Reg2)

In measuring the dropout rate in this study, Reg2 was chosen as the best indicator available. By using Reg2 records, demographic, high school, and college related variables can be tested to see which variables best explain the dropout rate.

The University of Montana Retention Research Committee was addressed by the Associate Dean in the College of Arts and Sciences in April of 1982 on the retention and attrition rates of the freshman class of 1980. After tracking students for their first year, it was reported that, 37 percent of the freshman population did not return for second fall registration. Further, it was stated that the approximate national average at this time was 33 percent, indicating a higher dropout rate at the University of Montana. It was further stated that 49 percent of this freshman class did not register for their 6th term and would not complete their sophmore year.

Based on these findings at the University of Montana, this study should parallel the 1980 results and show a higher dropout rate than the national average among both black and white freshman students.

Interrelationships Between Ethnicity, Academic Performance and Second Fall Registration

In 1974 at the University of Georgia a study involving black and white students compared attrition rates and mean GPA over a five-year period. The results showed that GPA not race was a factor in the drop-out rate for their students. The study also concluded that the academic performances of those students who drop out were similar by ethnicity. (White, Suddick, and Grimsley).

With similarities in performance as to GPA, it would be expected that black and white freshmen attending the University of Montana will show similar dropout rates. Those variables which most strongly correlate with second fall registration should indicate a comparative profile for both freshman groups, the same variables that are most likely to cause dropout rates for white freshmen.

Thus for this study, no significant differences are expected to exist between black and white freshman students as to GPA, credits earned, and second fall registration when holding constant demographic, high school, and college related variables.

METHODOLOGY

The data for this research was obtained from University of Montana student files. While the availability of data created little problem, missing data problems were encountered in the early stages of this study.

The first task was to prepare the data for computer analysis, specifically SPSS (Statistical Package for the Social Sciences). The next step involved finding missing data and determining which data were

useable when all avenues were covered to record these items into computer files. The central items for this study were retrieved and entered into the data files. However, expectations of using ACT scores could not be attained because of the lack of students required to take ACT tests before entering the University during 1975 to 1981.

In order to determine what data were relevant to this study, this project began with a basis research statement, do black students at the University of Montana perform as well academically as their white peers. From this statement the hypothesis for this study was formed; the hypothesis states:

> Black freshmen will perform equally with their white peers when comparing their overall performance related profiles.

Based on the preceding theoretical section, previous research suggests that various factors do predict and explain academic performance; hypotheses utilizing similar data are tested in this study specifically about University of Montana students. Previous theory and research in this area serve to validate this particular research and to provide a basis for continued interest in this area of study as applied to a particular setting.

This section will cover four additional topics: (1) A discussion of the sampling procedures; (2) a description of variable selection procedures; (3) the methods of analysis; and (4) sub-hypotheses to be tested.

Variable Selection

The methodological design required the selection of variables most likely to effect or relate to student academic performance at the UM.

Such variables contain information on students enrolled at UM during a six-year period from Fall quarter 1975 until Fall quarter 1981. That is, if a student was enrolled any fall quarter between 1975 through 1980, information is potentially available on that individual back to the fall of 1975. Thus, the information consists of longitudinal data covering a six-year period (1975-1981) using only fall quarter data from each academic year.

Selecting the appropriate data from student files involved reducing a large amount of institutional data to those variables most likely to effect academic performance. These variables were selected from a student enrollment dictionary prepared by the UM Administrative Data Processing Service. The selected variables, and their operational definition based upon their consistency with the goals of this research can be found throughout Chapter 2.

Sample Design

Two groups are compared in this study generating data explaining and predicting their academic performance at the UM. The first group consists of all freshmen chosen from the total black population (i.e., the black freshman student population consists of 46 cases) at the UM covering a six-year period (1975-1981). The second group consists of approximately 1/50th of the random sample taken from the total population of non-minority freshman students at the UM over the same period of time. An accurate sample of blacks and all other students registered during any of the fall quarters during the years 1975 through 1981 was

provided by the UM Registrar's Office and prepared by the Administrative Data Processing Service.

By defining this sample design as consisting of random subsets or portions or all (in the case of blacks), of the total populations, the samples are assumed to be consistent with the groups being tested. The first sample contains the total population of black freshman students falling within the pre-determined sampling frame. The choice of measuring the total freshman population was determined by the small number of cases (46) within the total black population enrolled. The comparative group consists of a sample of white freshmen taken from the total population (excluding blacks and other minority freshmen) at the UM from 1975-1981. Because of the enormous size of this particular population, students were selected by a process of randomly sampling members of that same universe. In particular, every fifth social security number ending in 3, approximately one fiftieth of the white freshman student population were selected.

The final comparison groups consist of all 46 black freshmen, and 184 white freshmen in the autumn quarters of 1975-1981. This sampling design allows for a large enough sample population for statistically testing of the study hypotheses through the use of various analytical techniques without decreasing the validity of this study.

Multivariate Analysis and Statistical Procedures

The advantages of multivariate analysis for dealing with this type of research includes: (1) an increase in precision to prediction problems; (2) holding more independent variables constant; and (3) ease of summarizing the multiple dimensions of behavior. The following statement provides

a useful explanation of multivariate analysis techniques (Mueller, Schuessler, and Costner, 1977, Page 276):

> Multivariate analysis techniques may be viewed as a statistical adaptation to meet the impracticality of conducting large scale social experiments on certain topics. In an experiment the investigator systematically varies an independent variable and observes the effect of that variation on a dependent variable, while literally holding constant or equalizing the effects of other variables that might otherwise confound the conclusions from the experiment.

Multivariate techniques are not just limited to checking casual structure of events, but are also useful in predicting events as in the case of college academic performance.

METHOD OF ANALYSIS

This section will discuss the three methods of analysis used to analyze the data for this study, they include: (1) Chi-square; (2) Pearson's Correlation Coefficient (R); and (3) Dummy variable regression and regression analysis.

Chi-Square

The Chi-square test is used to interrelate nominal scales with sets of categories evaluating whether or not frequencies which are empirically obtained will significantly differ from frequencies which would be expected with a particular set of theoretical assumptions. This study evaluates three sets of categories, demographic, high school, and college data. Within each category, selected variables are tested in regard to their relationship to ethnicity.

Dummy Variable Regression and Regression Analysis

Regression analysis allows a dependent variable to regress on two or more independent variables simultaneously. A partial regression coefficient is produced which shows how the dependent variable would regress on an independent variable after the effects of all other independent variables included in the analysis have been statistically eliminted. The weight of each independent variable is then known as the partial regression coefficient. In the case of stepwise regression predictors are entered sequentially rather than simultaneously thus, finding the best set of predictors from the larger pool of potential predictors. The highest zero-order correlation with the dependent variable comes first, then additional predictors are added that significantly contribute to the explained variance until an added predictor fails to explain any more variance.

The use of dummy variables in regression analysis allows the researcher to include nominal variables with two or more classes. This permits greater flexibility in regression analysis, since including only quantitative variables could limit unnecessarily the number and type of available predictors.

Within the three categories of this study, demographic data are represented by four dummy variables: (A) Sex, coded (0) Male (1) Female; (B) State, coded (0) Out-of-State (1) In-State: (C) Parent/ Spouse Indicator, coded (0) Parent (1) Spouse; and (D) Transfer Code, coded (0) Transfer (1) Non-Transfer. The high school category contains no nominal variables thus no dummy variables. The final data set

containing the dependent variables has one dummy variable that of Second Fall Registration which is coded; (0) Non-Returning Students and (1) Returning Students.

Pearson's and Multiple Correlation Coefficients

This type of analysis allows for correlations between the actual scores on a single dependent variable and the scores derived from any linear combination of one or more independent variables. On a scale from 0 to +1 multiple correlation (R) varies, the smaller the coefficient, the poorer the correlation, and the larger the coefficient, the stronger the correlation. Multiple R^2 indicates the amount of variance in the dependent variable explained by a particular linear combination of independent variables.

MAJOR HYPOTHESES TO BE TESTED

The major hypotheses presented in this section compare black and white freshman students at UM in their overall performance related profiles at the end of their first academic year. With the addition of three sub-hypotheses, a profile characterizing both ethnic groups helps determine whether significant differences exist in their pre-college experiences, and demographic characteristics upon entering college, and if so, whether or not ethnicity helps to explain these differences.

If no significant ethnic differences are found among demographic and high school variables, this study expects to find no differences in college academic performance and attrition rates among black and white freshman students at the end of their first year at UM. If significant

ethnic differences are found among demographic characteristics of entering freshmen but not among their high school variables, this study expects to find no significant differences among black and white freshman students' college performance and attrition rates as the weight of previous literature suggests that high school performance, more than demographic characteristics, relates to academic performance and attrition rates among college students.

On the other hand, if significant ethnic differences do exist in high school performance, but none exist among demographic variables, this study would expect to find some differences in college academic performance. In that event, however, holding constant relevant high school variables, this study expects to find no significant ethnic differences in college performance and attrition rates among black and white freshman students at UM.

Finally, if ethnic differences are found among both demographic and high school variables, this study would expect to find significant differences among college performance and attrition rates of black and white freshman students at UM. Again, however, holding constant relevant demographic and high school variables, no significant ethnic differences are expected. This indicates that factors other than ethnicity are causing differences in academic performance and attrition rates among black and white freshman students at UM, assuming such differences are found to exist.

The following presents the major hypothesis and three related sub-hypotheses to be tested in this study:

H1: There will be no significant relationships between ethnicity and college performance and attrition rates holding constant relevant entering freshman characteristics and high school variables.

Sub-Hypotheses to be tested:

H2: There will be no significant relationship between ethnicity and cumulative GPA holding constant relevant demographic and high school variables.

H3: There will be no significant relationship between ethnicity and cumulative credits earned holding constant relevant demographic and high school variables.

H4: There will be no significant relationship between ethnicity and attrition rates holding constant relevant demographic and high school variables.

This study expects to find no significant differences between black and white freshman students in all four hypotheses. That is, the final results should show if significant ethnic differences exist among demographic and high school variables and, holding these constant, final college academic performance will not vary according to ethnicity; that is, black and white college freshmen at UM will perform equally.

A number of sub-hypotheses testing important information about demographic and high school backgrounds of both ethnic groups help to explain any differences that may exist in academic performance at UM. By testing these sub-hypotheses, this study can indicate if any differences existed prior to the students' college experience. If significant ethnic differences in college performance and attrition rates are not indicated, yet, significant ethnic differences are found among demographic and high school variables, then this study can assume that the demographic and high school variables measured are not necessarily the only explanations

of college performance and attrition rates at UM. The following constitute the sub-hypotheses to be tested.

H5: There will be no significant ethnic differences in the demographic profiles of entering UM black and white freshman students.

H6: There will be no significant ethnic differences in relevant high school variables of entering UM black and white freshman students.

If, in fact, differences in demographic profiles of black and white freshman students are indicated, the final results, holding constant relevant demographic variables, will not show significant ethnic differences in college performance and attrition rates. However, based upon the weight of previous literature, if ethnic differences are found among high school variables, this study would expect these differences rather than ethnicity per se to effect college performance and attrition rates at UM.

SUMMARY

It is the basic thesis of this research that any differences that may exist in academic performance and attrition rates, may be explained by factors other than ethnicity. The theoretical section of this study also refers to the possibility that differences between resident and non-resident students may influence the final results. By looking at possible differences that exist between resident and non-resident freshman students, a sub-profile offering an alternative explanation of differences in college academic performance and attrition rates consistitues another research possibility. That is, based upon UM admissions criteria (See

Figure 1), this study would expect to find differences in college performance and attrition rates between resident and non-resident students as resident students are only required to be residents of the State of Montana and non-residents must meet certain academic criteria for admission into UM.

Another intent of this study is to show whether or not the residency status of freshman students is a significant factor in explaining academic performance and attrition rates at UM.

Finally, since this study expects no ethnic differences per se in college performance, it will also address Julian C. Stanley's statement referred to earlier. In reference to previous research, Stanley argues that black students with variously developed abilities have tended to be lumped together as though having black skin caused black students to be poor academic risks (See Stanley, 1971, 640). Two major categories characterizing black freshmen students' reasons for attending college involve athletic participation and students attending for purely academic reasons.

Based upon two UM athletic department participation records, 37 percent of all black freshman students from the fall of 1975 to the fall of 1981 have been athletes. Thus, this study also examines whether any significant differences in academic performance and attrition rates exist between black freshman athletes and non-athletes. That is, the study examines whether or not differences in reasons for attending college have any bearing upon academic performance and related attrition rates among the UM Black freshman population.

Chapter 2

CROSS-CLASSIFICATION RESULTS

The following research presents a descriptive and comparative analysis of results. These analyses are focused on predicting academic performance by statistically analyzing variables related to college performance.

Two ethnic groups (black and white) are compared in this study. Both groups consist of first-time freshman students registered at the University of Montana during the years 1975 through 1981 during fall quarters. The total black population of freshman students was determined to be 46 cases. The comparative group (i.e., white population) consists of a random sample of white freshmen. Because of the enormous size of this particular population, persons were selected by randomly sampling members of that same universe. In particular, every fifth student with a social security number ending in 3 (approximately one fiftieth of the white student population) was selected resulting in a sample consisting of 184 freshman cases.

Analysis of the data from these two groups will examine three major research issues predicting college performance, using demographic variables, high school variables, and college experience. By describing students' academic and demographic characteristics and using multivariate types of data analysis, the goals of explanation and prediction of this research addresses both theoretical as well as practical issues in describing and predicting college academic performance.

DESCRIPTIVE AND COMPARATIVE ANALYSES

The major research variables and questions involved in this analysis serve in developing a profile of the students' strengths, weaknesses, and differences based on ethnicity as well as their comparative performances. Those issues are as stated in the previous chapter outlining the sub-hypotheses.

Demographic Variables

Selecting the appropriate variables involved reducing a large number of potential institutional variables to those most likely to predict and explain academic performance. The most relevant and reliable variables were selected from the student enrollment dictionary prepared by the UM Administrative Data Processing Service.

The demographic data analysis provides a comparative yet descriptive profile of black and white freshman students. In the following tables, a visual breakdown where the statistical values of chi-square and t-test (t-test is appropriate where interval/ratio data exist) provide some basic assumptions about black and white freshman students. Significance will be determined to occur when ethnic differences are greater than would be expected by chance at the .05 level of probability.

This section provides a comparative and descriptive view of demographic data for both ethnic groups. The variables discussed in this section are as follows, (1) Sex; indicating whether a student is male or female; (2) Parent/Spouse Indicator, indicating whether a student is married or single (where single students are viewed as more dependent upon parental support); (3) Matriculation Age, defined as the age of each student at the time of

their enrollment into the UM; (4) State of Residence, indicating whether a student is a resident or non-resident of the state of Montana; (5) Quarter of First Registration, indicates whether a student registered at the UM fall, winter, spring or summer quarter; and (6) Transfer Code, defined as students who have transferred into the UM as freshmen, combining in-state and out-of-state transfers.

Table 1: Chi Square Relationships of Sex and Parent and Spouse Indicator as Related to Ethnicity.

Ethnicity

		White	Black	
Sex	Male	79 (42.9%)	29 (63.0%)	108 (47.0%)
	Female	105 (57.1%)	17 (37.0%)	122 (53.0%)
		184	46	230

Chi-Square = 5.19 p = .02

Ethnicity

		White	Black	
Parent/Spouse Indicator	Parent	84 (45.7%)	27 (58.7%)	111 (48.3%)
	Spouse	160 (54.3%)	19 (41.3%)	119 (51.7%)
		184	46	230

Chi-Square = 2.01 p ≥ .1

As shown in Table 1, the UM freshman student population in this study is mostly white and female representing 57.1 percent of the white population. In contrast, black females represent only 37 percent of the total population of black freshman students, while 63 percent of the black freshman population is male. Where sex is measured, the results could occur by chance only 2 times out of 100, thus it can be concluded that these frequencies are not equally distributed across ethnicity.

Parent/spouse indicator showed no significant relationship with ethnicity. As Table 1 shows, the results could occur by change 1 time out of 10 suggesting that parental support is not a statistically significant factor indicating black students depend more on their parents during their freshman year. While 58.7 percent of black freshmen show parental support 45.7 percent of their white peers indicates about the same support. Yet, the reason for this difference is indicated by marital status; while 54.3 percent of the white freshman population shows a spouse relationship only 41.2 percent of the black population indicates that type of status. It is important to note that spouse indicates whether or not a student is married or whether a student has indicated his parents as a source of support in their files. The results also suggest that parents of black students are highly interested in their children's education, however, this does not suggest that parents of white students are not supportive of their childrens education, but white freshman students seem to be somewhat more independent from parental supports. However, the difference is not statistically significant.

Table 2: A Comparison of Students' Matriculation Age at the University of Montana as Related to Ethnicity.

Matriculation Age	Ethnicity: White	Ethnicity: Black	
10-19	146 (79.3%)	30 (65.2%)	176 (76.6%)
20-29	31 (16.8%)	15 (32.6%)	46 (20.0%)
30-39	5 (2.7%)	1 (2.2%)	6 (2.6%)
40-49	1 (0.5%)	0 (0.0%)	1 (0.4%)
50-59	1 (0.5%)	0 (0.0%)	1 (0.4%)
	184	46	230

$*\bar{x}$ = 19.8 $*\bar{x}$ = 20.2

*t = 0.57, p = .57, df = 228

As the means in Table 2 indicate, both ethnic groups are approximately the same age when they first enter the UM, although some categorical differences in age are indicated. In the 10 to 19 age range, 79.3 percent of all white students are between the ages of 10 and 19 while 65.2 percent of all black students comprise the same age category. Yet, the 20 to 29 age range shows 32.6 percent of black students falling into that category while their white peers show only 16.8 percent suggesting black freshman students are generally older when they enter the UM. Students ranging from 30 to 59 years of age constitute a mutual low percentage of both freshman groups suggesting the most freshmen entering the UM range between the ages of 10 to 29 (The actual age range in Table 5 is from the ages of 17 to 50 years).

In summary, while some categorical differences show that black freshmen tend to be somewhat older than their white peers, mean differences

are not statistically significant at the .05 level. Thus, there is no significant difference between black and white freshman students' matriculation age.

Table 3: Chi-square Relationships of State of Residence, Quarter of First Registration, and Transfer and Non-Transfer Students at the University of Montana as Related to Ethnicity.

Ethnicity

		White	Black	
State of Residence	Non-Resident	49 (24.5%)	36 (76.1%)	80 (34.8%)
	Resident	139 (75.5%)	11 (23.9%)	150 (65.2%)
		184	46	230

Chi-square - 40.10 p <.001

Ethnicity

		White	Black	
Quarter	Non-Fall	20 (10.9%)	4 (8.7%)	24 (10.4%)
	Fall	164 (89.1%)	42 (91.3%)	206 (89.6%)
		184	46	230

$*\bar{x}$ = .89 $*\bar{x}$ = .91

*Chi-square = .026, p = .87, df = 1

Ethnicity

		White	Black	
Code	Transfer	6 (3.3%)	6 (13.0%)	12 (5.2%)
	Non-Transfer	178 (96.7%)	40 (87.0%)	218 (94.8%)
		184	46	230

Chi-square = 5.3, p = .02, df = 1

Table 3 indicates a significant relationship between black and white freshman transfer students. The results could occur by chance only 2 times out of 100, thus it can be concluded that black freshman students (13.0%) tend to transfer to the UM at a much higher rate than do their white peers (3.3%).

If black freshmen cumulate more credit hours, this study would still expect to find no significant ethnic differences in cumulative credits, since time of registration may explain any difference in credit hour production. However, the selected quarter of first registration between black and white freshmen shows no significant ethnic differences. Clearly fall quarter is the most frequent quarter of registration among black and white freshmen. However, the slight percentage difference in non-fall registration may result in lower cumulative credits for white freshmen when comparing their overall credit hours with black freshmen over a one year period.

Also in Table 3, when comparing cell frequencies of resident and non-resident students, only 24 percent of the black population are resident students, while the white sample of resident students represents 75.5 percent of the white freshman population. However, this is not an unusual occurrence and black freshmen can be expected to be non-residents of Montana.

In summary, the UM freshman student population can be described as white and generally female, having a majority of black freshmen from outside the state of Montana while white freshman students are Montana residents, and black freshman students being slightly more dependent upon parental supports during their freshman year than their white peers.

Significant ethnic differences occur in regard to sex and residence; while no significant ethnic differences are indicated as to parental support, black freshmen are more often single and dependent on parent support.

As the demographic data point out, black freshmen tend to be non-residents and this may help explain the difference in transfers among black and white students. As black freshmen enter the UM from out-of-state, and are typically non-residents, black freshman transfer students can also be exptected to enter the UM from out-of-state resulting in a higher percentage of transfer students. Whereas white freshmen tend to be residents and tend to not transfer into the UM as residents or non-residents as often as black freshmen, the demographic data and transfer code support this assumption as the probabilities indicate significant ethnic differences between black and white freshmen as to state residence and transfer status.

The remaining college variables, however, (Quarter and Matriculation Age) show no significant ethnic differences.

High School Variables

This section examines high school experience in regard to class size, percentile rank, and ACT scores controlling for ethnicity. High school class size is defined by the number of students in the graduating class. Percentile rank is defined as the student's percentile rank within their graduating class. The ACT (American College Test) scores will only be reported in a descriptive manner due to the lack of respondents in both ethnic groups. ACT scores consist of math, English, social science, natural science, and composite scores.

Table 4: A Comparison of High School Class Size as Related to Ethnicity.

		Ethnicity		
		White	Black	
HSCS	0 - 277	61 (33.2%)	9 (19.6%)	70 (30.4%)
	278 - 555	90 (48.9%)	23 (50.0%)	113 (49.1%)
	556 - 833	33 (17.9%)	14 (30.4%)	47 (20.4%)
		184	46	230

$*\bar{x}$ = 343.2 $*\bar{x}$ = 425.9

*t = -2.60 p = .01, df = 228

As shown in Table 4, 30.4 percent of the black population attended large high schools and mid-sized high schools (50.0%) while small high schools contain only 19.6 percent of the total population. On the other hand, white students tend to be representative of small (33.2%) to mid-sized (48.9%) high schools with only 17.9 percent having large graduating classes. As further indicated in Table 4, the significant difference in means clearly show black students tend to come from larger high schools than do their white peers.

Table 5: Percentile Rank in High School Graduating Class as Related to Ethnicity.

Percentile Rank	Ethnicity: White	Ethnicity: Black	
0 - 9	2 (1.1%)	1 (2.2%)	3 (1.3%)
10 - 19	4 (2.2%)	2 (4.3%)	6 (2.6%)
20 - 29	11 (6.0%)	4 (8.7%)	15 (6.5%)
30 - 39	8 (4.3%)	4 (8.7%)	12 (5.2%)
40 - 49	17 (9.2%)	3 (6.5%)	20 (8.7%)
50 - 59	23 (12.5)	11 (23.9%)	34 (14.8%)
60 - 69	42 (22.8%)	7 (15.2%)	49 (21.3%)
70 - 79	22 (12.0%)	6 (15.2%)	28 (12.2%)
80 - 89	23 (12.5%)	6 (13.0%)	29 (12.6%)
90 - 100	32 (17.4%)	2 (4.3%)	34 (14.8%)
	184	46	230

$*\bar{x} = 65.4$ $*\bar{x} = 56.9$

*t = 2.29, p = .023, df = 228

Table 5 suggests that there is a significant relationship between ethnicity and percentile rank since only 23 times out of 1,000 will this relationship occur by chance. The majority of black freshman students (54.3%) fall within the 0 to 59 percentile rank in their graduating class while the 50 to 59 percentile interval contains the largest percentage of black freshmen (23.9%) and their computed mean percentile. However, the white freshman students (64.7%) fall within the 60 to 100 percentile range indicating that 22.8 percent are within the 60 to 69 percentile interval of the computed mean percentile. This shows clearly that white

freshman students tend to rank higher than do black freshmen in their high school graduating class.

The following table, while profiling student's ACT scores may not be fully representative of actual means and mean differences. Student files containing ACT scores were incomplete for both groups and in-state students entering the UM were not required to have ACT scores as a criteria for admission between 1975 and 1980. However, these mean scores may give some indication as to the levels and types of academic performance students demonstrated in high school core subjects.

Table 6: The Mean Differences between ACT scores as Related to Ethnicity. (*Based on 115 out of 184 cases for whites; ** based on 15 out of 46 cases for blacks).

	Ethnicity			
	White	Black	t-Ratio	Prob.
Math	17.6	12.7	2.37	.019
English	17.9	12.6	2.22	.028
Soc. Sci.	19.4	12.5	2.90	.004
Science	21.5	15.3	2.56	.12
Composite	19.2	13.1	2.86	.005

*115 **15

* Missing Cases = 69

** Missing Cases = 31

As Table 6 indicates, there is a significant difference in mean math scores ($p = .019$). The relationship between math scores and ethnicity suggests that black freshman students entering the UM may not be receiving

preparation in major high school subjects that would allow them to compete on an equal level with their white peers. However, this must be a tentative conclusion based on the number of missing cases involved. That is, significant ethnic differences occur where missing cases may be influencing the validity of measurement. While the ACT scores are not a complete representation from all students, given the ethnic differences in high school rank, they may be representative of differences that do exist.

The mean score difference varies by nearly 7 points with social science scores, having a slightly larger point difference between means than all other ACT scores. It is interesting to note (as will be pointed out later in this chapter) that social science scores show the lowest performance level of black freshmen and are the least frequent areas of study at the UM which is contrary to other findings reviewed in earlier literature.

While mean scores show a significant difference between science scores and ethnicity ($p = .012$), a rise in mean scores is indicated for both ethnic groups. The difference between mean scores narrows slightly with science scores yet, a general pattern of ACT score differences continues to exist when related to ethnicity. With a rise in science scores it is likely that both black and white freshman students will tend to declare majors in the hard sciences at a higher rate than in math, English or social science at the UM. In addition, there is a significant difference in composite mean scores between black and white freshmen ($p = .005$); that is, only 5 times out of 1,000 will this relationship occur by chance.

In summary, a generalized assumption about student performance on the ACT exam and institutional intensity on the high school level may be

determining factors helping to explain differences between black and white ACT scores. Keep in mind, while significant differences appear, there is no reliable way of predicting the importance of ACT scores to actual college performance without a higher return in test scores for both ethnic groups. To imply that a significant relationship exists here would overstate the methodology of this research and the reliability of these findings. Clearly, however, it can be concluded that black freshmen at UM tend to have graduated from larger high schools and at lower ranks than have their white peers.

College Experience

This section checks for differences in college academic performance between black and white freshman students as measured by the dependent variables: (1) Primary Majors, defined as a student's selected field of study; (2) Second Fall GPA, defined as a student's GPA at the beginning of their second fall term; (3) Second Fall Cumulative Credits, defined as credits attained beginning first fall quarter registration and ending at the beginning of their second fall quarter registration; and (4) Second Fall Registration, defined as those students returning for a second fall year, thus comparing retention and attrition rates among both ethnic populations.

The following table consists of a categorization of schools within the UM. In order to compare differences in selected majors, the table has been collapsed into ten categories with the appropriate majors falling within each school. These categories are as follows: (1) General, consisting of general studies for students who have not declared a primary

major during their first year; (2) Hard Sciences, including majors in biology, botany, chemistry, computer science, pre-engineering, pre-medical science, and zoology; (3) Behavioral Sciences, consisting of primary majors in geography, social work, sociology, economics, political science, and economics - political science majors; (4) Liberal Arts, consisting of primary majors in the areas of English, French, history, history-political science, pre-law, and Spanish; (5) Education, or majors found in health and PE, home economics, elementary education, education, and business education; (6) Fine Arts, including primary majors in art, drama, and music. The remaining four schools consist of majors in pharmacy, forestry (wildlife biology), business administration (business accounting), and journalism (radio and TV).

These categories are based on primary major record files, as the UM separates schools within the university system and those majors which fall within these schools. The student records master table file listings were obtained from the UM Administrative Data Processing Service.

Table 7: Primary Majors of University of Montana Freshman Students as Related to Ethnicity.

Primary Majors	Ethnicity: White	Ethnicity: Black	
General	58 (31.5%)	15 (32.6%)	73 (31.7%)
Bus. Admin.	37 (20.1%	7 (15.2%)	44 (19.1%)
Hard Sciences	17 (9.2%)	5 (10.9%)	22 (9.6%)
Forestry	16 (8.7%)	2 (4.3%)	18 (7.8%)
Education	14 (7.6%)	3 (6.5%)	17 (7.4%)
Behavioral Sc.	14 (7.6%)	3 (6.5%)	17 (7.4%)
Liberal Arts	9 (4.9%	6 (13.0%)	15 (6.5%)
Pharmacy	8 (4.3%)	2 (4.3%)	10 (4.3%)
Journalism	6 (3.3%)	1 (2.2%)	7 (3.0%)
Fine Arts	5 (2.7%)	2 (4.3%)	7 (3.0%)
	184	46	230

Chi-square = 7.1, $p > .50$, df = 9

The percentages in Table 7 clearly indicate the majority of freshman students do not declare a major during their first year. However, both black and white freshmen show the most interest in business administration. Whereas more black freshmen declare majors in Liberal Arts (13.0%), white freshmen show more interest in Forestry (8.7%), as the third most popular school in the university system. It is interesting to note that both black freshmen (10.9%) and white freshmen (9.2%) declare majors in the hard sciences as the second most popular school at the UM.

Schools that include primary majors in Education, Behavioral Sciences, Pharmacy, Journalism, and Fine Arts seem to suggest the areas of lowest

interest for both ethnic groups looking at both separate and combined percentages. Whereas Fine Arts shows the lowest interest for white freshmen (2.7%), black freshmen indicate least interest in Journalism (2.2%) while the remaining schools (Education, Behavioral Sciences, and Pharmacy) share somewhat equal interest in declared major for both populations.

While primary majors show no statistical ethnic differences, it is interesting to note the direction in which students view the world outside of an academic environment. That is, black students are not over represented in social sciences as other earlier studies have shown. With the highest percentages of black and white freshmen majoring in the School of Business Administration, we can assume the mid-1970's and early 1980's have oriented students into a field which they believe will generate employment after graduation.

The following table represents a comparative and descriptive view of GPA with an actual range from 0.0 to 4.0 as GPA cannot extend higher than a 4.0 average.

Table 8: Second Fall Cumulative GPA of University of Montana Freshman Students as Related to Ethnicity.

		Ethnicity		
		White	Black	
GPA	0.0 - 0.9	53 (28.8%)	7 (15.2%)	60 (26.1%)
	1.0 - 1.9	10 (5.4%)	1 (2.2%)	11 (4.8%)
	2.0 - 2.9	48 (26.1%)	27 (58.7%)	75 (32.6%)
	3.0 - 3.9	57 (31.0%)	11 (23.9%)	68 (29.6%)
	4.0	16 (8.7%)	0 (0.0%)	16 (6.9%)
		184	46	230

* $\bar{x}$ = 1.8 * $\bar{x}$ = 2.0

* t = -0.63, p = .53

As Table 8 points out, there are some interesting differences in GPA between black and white freshmen as cell percentages indicate. In the cell idicating 0.0 to 0.9 GPA, only 15.2 percent of the black freshman population cumulated less than a D average GPA during their first year, compared with 28.8 percent of their white peers. It is clear that these low GPA's contribute to the low mean averages as the individual (black and white) group means indicate. In the combined population, more than one quarter of the total population (230 cases) attain a failing GPA which would directly relate to the dropout rate of freshman students at UM.

The most significant cell percentage for black freshmen falls within the 2.0 to 2.9 range with 58.7 percent of all black freshmen showing a cumulative GPA, however, white freshmen falling within this range represent only 26.1 percent of their total population. The most significant

cell percentage for white freshmen falls within the 3.0 to 3.9 range where black freshmen do not average as well (23.9%) as their white peers do (31.0%) and do not cumulate a 4.0 GPA. Black freshmen are not as representative of 3.0 to 4.0 GPA's, their overall mean GPA is slightly higher than that of their white peers. However, cumulative GPA's between black and white freshman students at the UM show no significant differences in their cumulative GPA performances and that ethnicity may not be a factor in overall academic performance for freshmen at the UM as measured by cumulative GPA.

Table 9: Second Fall Cumulative Credits of University of Montana Freshman Students as Related to Ethnicity.

Cumulative Credits	Ethnicity: White	Ethnicity: Black	
0 - 4	54 (29.3%)	8 (17.4%)	62 (27.0%)
5 - 9	3 (1.6%)	0 (9.0%)	3 (1.3%)
10 - 14	2 (1.1%)	0 (0.0%)	2 (0.9%)
15 - 19	4 (2.2%)	1 (2.2%)	5 (2.2%)
20 - 24	5 (2.7%)	1 (2.2%)	6 (2.6%)
25 - 29	8 (4.3%)	3 (6.5%)	11 (4.8%)
30 - 34	15 (8.2%)	6 (13.0%)	21 (9.1%)
35 - 39	17 (9.2%)	7 (15.2%)	24 (10.4%)
40 - 44	33 (17.9%)	12 (26.1%)	45 (19.6%)
45	43 (23.4%)	8 (17.4%)	51 (22.2%)
	184	46	230

$t = -1.02$, $p = .30$

$\bar{x} = 28.6$ $\bar{x} = 32.3$

There is an interesting similarity between GPA and cumulative credits. As Table 8 pointed out, 28.8 percent of the white freshmen population attained a 0.0 to 0.9 GPA, and 15.2 percent of the black freshmen population fell within this same GPA range. Looking at cumulative credits, an interesting pattern develops, 29.3 percent of the white freshmen cumulate only 0 to 4 credits during their freshmen year, while 17.4 percent of black freshmen do the same. This would suggest that the lower a students' GPA is, the more likely he or she will take less credits in order to improve upon the GPA. As with the combined percentage of students (26.1%) falling within the 0.0 to 0.9 GPA range, 27.0 percent of the combined populations having cumulative credit of 0-4 shows the same pattern for cumulative credits earned.

Looking at 45 cumulative credits and above, 77.8 percent of the combined populations in this study are returning as freshmen at second fall registration. The black freshman population indicates 17.4 percent returning as sophmores and 23.4 percent of their white peers gaining the same status. While black freshmen do not attain sophmore status as readily as white freshmen, overall black freshmen tend to cumulate more credits during their freshman year than do their white peers, however, this difference is not statistically significant.

In summary, no significant ethnic difference exist between black and white freshman students in terms of cumulative credits earned at the UM. As with GPA, ethnicity does not correlate with overall academic performance for black and white freshman students at the UM as measured by second fall cumulative credits earned.

Table 10: Second Fall Registration of University of Montana Freshman Students as Related to Ethnicity.

	Ethnicity: White	Ethnicity: Black	
Non-Registered	82 (44.6%)	22 (47.8%)	104 (45.2%)
Registered	102 (55.4%)	24 (52.2%)	126 (54.8%)
	184	46	230

$\bar{x}$ = .55 $\bar{x}$ = .52

Chi-square = .05, p = .82, df = 1

The third and final dependent variable in this study (Second Fall Registration) as with GPA and cumulative credits earned, indicates no significant ethnic difference in dropout rates among black and white freshman students. Table 10 concludes that 47.8 percent of the black freshman population dropout of school by second fall registration and 44.6 percent of the white freshman population do the same. Thus, there is no significant difference in the rates at which black and white students drop out of the UM during their freshman year.

SUMMARY

Various ethnic differences between black and white freshman students at the UM have been shown in Chapter 2. Of the demographic variables, sex and state residency indicated significant ethnic differences. Blacks are more likely to be male and to reside outside the state. Student differences in dependency upon parental support were not significant. Results indicate that 57.1 percent of the black freshman population is female, only 37.0 percent of the black freshmen population is female indicating a significant difference between the black and white freshman

populations. A much larger black freshman population are non-resident students (76.1%), whereas 75.5 percent of the white population indicated residency in the State of Montana.

Of the high school variables, high school class size, percentile rank in graduating class and ACT scores all indicated significant ethnic differences exist between black and white freshman students at UM. Black freshmen tend to come from larger high schools than do their white peers. Percentile rank indicated that black students do not rank as high in their graduating class as do their white peers, and ACT scores suggested that (even with a large number of missing cases for students tested), black freshmen in all areas (Math, English, Social Science, Science, and Composite Score) do not score as high as their white peers at an average of about 6 to 7 points below the white freshman mean scores.

Among the remaining demographic variables, transfer code is the only variable that indicated a significant ethnic difference. Black freshmen were more likely to transfer into the UM from other colleges or universities either from within or outside the state of Montana. No significant ethnic differences were found among the remaining variables: matriculation quarter, matriculation age, and primary major.

Among college variables, (Cumulative GPA, Cumulative Credits Earned, and Second Fall Registration) no significant ethnic differences were found to exist. As this study has set out to determine whether academic performance differs between black and white freshman students, the crosstabular analysis does not indicate any significant ethnic differences. Even though ethnic differences exist as to sex, state of residency, high school class

size, percentile rank, ACT scores, and transfer code, black and white freshman students at the UM are found to have no significant differences as to actual college performance as measured by GPA, cumulative credits, and second fall registration.

This chapter thus concludes that although black freshman students tend to be male non-residents of Montana, attend larger high schools, rank lower in their high school graduating class, and transfer into the UM more often, they are about the same age at matriculation, tend to major in the same fields, but more importantly, they perform equally with their white peers during their freshman year at the UM.

Chapter 3

MULTIVARIATE RESULTS

In the previous chapter, the results indicated some significant ethnic differences when comparing relevant demographic, high school variables and college performance and attrition rates. This chapter, uses stronger statistical measures to examine the intercorrelations between ethnicity and other dependent variables and the amount of variance explained by ethnicity when using other dependent variables as potential predictors of cumulative GPA, cumulative credits earned and second fall registration.

Regression analysis is used in this chapter to help determine a set of predictors from a larger pool of potential predictors with the variable having the highest zero-order correlation entered first in predicting the dependent variables. In this way, those variables most likely to predict college performance and attrition rates can be discussed as to their measured impact on UM freshmen. The reader is cautioned at this point that regular multiple regression ordinarily assumes a linear, additive model with dependent and independents being interval and/or ratio variables with means and reasonably normal distributions. However, multiple linear regression can also incorporate the use of categorical independent factors (such as sex, ethnicity, etc.) through the use of dummy variables (e.g., see Blalock, 1981 and Kerlinger and Pedhazur, 1973). The use of dummy variables together with interval variables as independents predicting a dependent interval is a more powerful (and less restricted) general technique that is exactly analogous to an analysis of covariance design that simply measures the main effects of independent categorical factors and interval variables on a given interval level dependent variable. This

multiple regression technique also can incorporate additional dummy variables to analyze interaction effects as well as main effects, but these procedures go beyond the scope and intent of this study. Since this research has a primary focus on exploring factors and variables potentially or most likely to directly impact freshman academic performance measures, only the main (or additive) effects via the multiple regression technique are utilized in this initial study.

This chapter examines six areas relevant to this study; (1) the correlations between ethnicity and all other variables; (2) the intercorrelations among independent variables; (3) cumulative GPA correlated with the best set of potential predictors; (4) cumulative credits earned correlated with the best set of potential predictors; (5) second fall registration (attrition rates)* correlated with the best set of potential predictors; and (6) the implications of these finding for future research in this area and a sub-profile examining two future research issues that may help explain differences in academic performance and attrition rates of UM freshmen students.

*Second fall registration is used in this study as a dependent variable and measured as a dummy variable. While there are certain methodological problems involved (Loether and McTavish, 1980, 363-365 and Van de Geer, 1971) it discriminates between those freshmen students who return and those who dropout of UM by their second fall term. By correlating all other variables with second fall registration, casual characteristics of UM attrition rates gives some indication of those variables most likely to explain differences between returning and non-returning freshmen students.

INTERCORRELATIONS WITH ETHNICITY

The coefficients in Table 11 indicate five variables having a significant relationship with ethnicity. Sex (-0.16) indicates those students who are female are unlikely to be black. Out of a total of 122 females in this study, only 17 are black (13.9%) thus, representing only 37 percent of the total black freshman population and 7.4 percent of the combined populations. Transfer code also indicates a negative correlation (-0.18) with ethnicity. This indicates that compared to other freshman students those who are black are more likely to transfer into the UM from other colleges.

Table 11: Correlations Between Ethnicity and All Other Variables.

Variable Name	Correlation Coefficient
Sex	-0.16*
Quarter First Registered	0.03
Transfer Code	-0.18*
High School Class Size	0.17*
Parent/Spouse Indicator	-0.10
Cumulative GPA	0.04
Cumulative Credits	0.07
Second Fall Registration	-0.03
High School Percentile Rank	-0.15*
State of Residence	-0.43*
Matriculation Age	0.04

*$p \leq .05$ level of significance

High school class size indicates a significant relationship with ethnicity (0.17) meaning, black freshman students tend to enter UM from larger high schools than do their white peers. Whereas the black freshmen high school graduating class size is 425.9 students, their white peers'

mean is 343.2 students. However, high school percentile rank indicates black freshmen entering UM do not rank as high in their graduating class as do their white peers. On the average, black freshmen fall at the 56.9 percentile while their white peers fall within the 65.4 percentile in their respective high school graduating classes.

The final significant relationship with ethnicity is state of resident (-0.43) which indicates black freshmen students are significantly registered at UM from out-of-state (76.1%) whereas white freshmen tend to be residents of Montana (75.5%). The remaining variables first quarter registration, parent/spouse indicator, cumulative GPA, cumulative credits, second fall registration and matriculation age show no signficant relationship with ethnicity.

INTERCORRELATIONS AMONG INDEPENDENT VARIABLES

Table 12: Intercorrelation Matrix of Independent Variables.

	Sex	Qtr	Code	HSCS	PSI	Rank	State	Matage
Sex	1.00							
Quarter	-0.04	1.00						
Code	-0.06	0.24*	1.00					
HSCS	-0.06	0.07	-0.01	1.00				
PSI	0.02	-0.04	-0.03	-0.08	1.00			
Rank	0.37*	0.09	0.05	-0.07	0.01	1.00		
State	0.14*	0.11*	0.12*	-0.14*	0.01	0.12*	1.00	
Matage	0.04	-0.30*	-0.25*	-0.05	0.05	-0.17*	-0.19*	1.00

*$p \leq .05$ level of significance

The data in Table 12 suggest a number of small but significant relationships among independent variables. State of residence significantly correlates with a number of variables; when correlated with sex, the data suggest that females are more likely than males to be residents. Resident students at UM also are more likely to register fall quarter than any other quarter during the year. This is further indicated by the relationship between transfer code and first quarter registration; that is, non-transfer students are more likely to enter UM fall quarter. The data also indicates that non-transfer students tend to be residents, suggesting that transfer students are morely to enter UM from out of state colleges rather than instate colleges. State of residence also indicates that instate students are more likely to come from smaller high schools and tend to rank higher in their high school graduating class than do their out-of-state peers. Ironically, this would indicate that resident students at UM while not required to have any admissions criteria other than Montana residency are entering the UM with higher percentile ranks in their high school graduating class than their out-of-state peers who are required to meet certain academic admissions criteria (see Figure 1) for entering UM.

Out-of-state students also tend to be older and Table 12 indicates that the older the studenttends to be the lower the percentile rank. Table 12 indicates transfer students tend to be older when entering UM than are their non-transfer peers, but transfer students and non-transfer students at UM show no significant difference in percentile rank in their high school graduating class. However, Table 12 suggest that older students are more likely than younger freshmen to enter UM during quarters other than fall registration.

Finally, the data in Table 12 suggest that females tend to rank higher in their high school graduating class than do males. It is interesting to note the relationship between sex and cumulative GPA, and, if, in fact, females continue to perform at a higher level in college than do males. Previous literature has suggested that students who rank higher in their high school graduating class tend to perform better at the college level. Thus, the results should indicate females performing academically higher than their male counterparts. However, there is also literature that suggests that females start to lose their academic superiority in college for various reasons ranging from society's stereotypes of the female role in society to various forms of discrimination in higher education (Ballantine, 1983, 76-85, and Pavalko, 1976, 47).

PREDICTORS OF CUMULATIVE GPA

This section will look at the best set of potential predictors of Cumulative GPA, Cumulative Credits and Second Fall Registration that accounts for the most variance using stepwise regression. Since one of the primary purposes of this study is to search for the most likely predictors of freshman academic performance, a stepwise regression procedure will be utilized rather than a single final solution procedure (i.e., inclusion of all independent variables, regardless of whether or not they are significantly related to the dependent variable). The stepwise procedure in multiple regression provides the additional information of the order of importance (or statistical significance) at each step (inclusion) of independent variables entering the equation; that is, the best predictors of the dependent variable enter first (see Kerlinger and Pedhuzer, 1973

for a more extended discussion). An additional benefit of the stepwise solution over the final solution (with all variables entered) is that the stepwise process can be halted when there are no more independent variables or factors (dummy variables) that would significantly improve the multiple R^2. In other words, the stepwise procedure allows the researcher to eliminate independent variables or factors that do not statistically improve our explanation of the dependent variable (in this particular study, academic performance as measured by cumulative GPA and cumulative credits earned).

Table 13: Correlations Between Cumulative GPA and Potential Predictors.

Variable Name	Correlation Coefficient
Sex	0.00
Quarter First Registered	-0.14*
Transfer Code	-0.14*
High School Class Size	0.04
Parent/Spouse Indicator	0.09
High School Percnetile Rank	0.23*
State of Residence	-0.05
Matriculation Age	0.06

*$p \leq .05$ level of significance.

As Table 13 points out, quarter of first registration, transfer code and high school percentile rank all indicate a significant zero-order correlation. However, in the following table using stepwise multiple regression techniques, the potential predictors of cumulative GPA are entered stepwise to indicate the best predictors of the dependent variable rather than relying on simple correlations. This analysis allows for the possibility that the effect of one variable controlling

Table 14

Stepwide Multiple Regression Results,
Predicting Cumulative GPA

Predictors of Cumulative GPA	Zero-Order R	Unstandardized B	Standardized Beta	Standard Error of B	F	% of Table Variance	% of Explained Variance
Percentile Rank	.2262	.0158	.2874	.0038	17.580	6.5009	64.4291
Quarter First Registered	-.1368	-.5513	-.1355	.2661	4.292	1.8536	18.3706
Transfer Code	-.1390	-.7213	-.1289	.3654	3.897	1.7931	17.7710
Sex	.0045	-.2861	-.1148	.1705	2.817	-.0530	-.5252
(Constant Term)		2.1757				10.09	100.0

Standard Error - 1.1923

R Square - 0.1009

Multiple R - 0.3177

for the effects of another variable adds to the explained variance, while at the same time indicating the best set of potential predictors of cumulative GPA.

Table 14 indicates the four best potential predictors of cumulative GPA for UM freshman students and are as follows: (1) the higher a student's percentile rank in their high school graduating class, the higher the cumulative GPA at the end of their first year at UM; (2) students who register fall quarter tend to have lower cumulative GPA's than those students who register during winter, spring or summer quarters; (3) students who transfer into UM are more likely to have higher cumulative GPA's at the end of their first year; and (4) females tend to have lower cumulative GPA's than males at the end of their first year at UM.

A student's percentile rank in their high school graduating class accounts for the most variance in cumulative GPA (6.5% of the total variance). As with previous literature, which indicates students who rank high in their high school graduating class are also likely to achieve higher at the college level, the data in Table 14 indicate that students at UM who rank high in their high school graduating class also tend to attain higher cumulative GPA's at the end of their freshman year. The variable that accounts for the second highest amount of variance explained in cumulative GPA is first quarter registration (4.3% of the total variance). Students who enter fall quarter do not produce cumulated GPA's as high as students who enter UM during other quarters; also, transfer students tend to cumulate higher GPA's than do non-transfer

students. Students who transfer into UM also account for the third highest amount of variance explained in cumulative GPA (3.9% of the total variance).

The fourth and final variable which accounts for a significant amount of variance explained in cumulative GPA is sex. The data indicates that females tend to cumulate lower GPA's at the end of their first year, even though females ranked higher in their high school graduating class which appears to argue against previous literature which indicates the higher the high school rank the higher the achievement in college. This relationship can be best explained by Herman J. Loether and Donald G. McTavish who state:

> "It is possible to have a third variable act to suppress the observed relationship between two variables and, in fact, to mask it completely as a suppressor variable. This sometimes happens with variables such as sex or race when a relationship in one conditional association is equally strong but opposite in direction to the association in another conditional. The result is that one relationship could cancel the other out, so that the overall association may be zero." (Loether and McTavish 1980, 309-310)

The zero-order relationship between sex and cumulative GPA was positive but not found to be significantly different than zero, thus, sex acts as a suppressor variable. Holding sex constant reverses the sign of the relationship between sex and cumulative GPA and allows the correlation between percentile rank and college GPA to increase when sex is held constant.

The four variables in Table 14 only account for 10 percent of the variance in cumulative GPA, so most of the variance (90%) is still unaccounted for by the eight independent variables in Table 13. This would

indicate that other factors outside of the variables used in this study may help account for a high percent of variance in cumulative GPA for freshman students at UM.

PREDICTORS OF CUMULATIVE CREDITS

The variables in Table 15 which indicate a significant zero-order correlation with cumulative credits are transfer code, high school class size, parent/spouse indicator and cumulative GPA.

Table 15: Correlations Between Cumulative Credits Earned and Potential Predictors.

Variable Name	Correlation Coefficient
Sex	-0.03
Quarter First Registered	-0.09
Transfer Code	-0.21*
High School Class Size	0.11*
Parent/Spouse Indicator	0.11*
High School Percentile Rank	0.03
State of Residence	-0.02
Matriculation Age	0.02
Cumulative GPA	0.77*

*$p \leq .05$ level of signficance

Students who transferred from out-of-state, graduated from larger high school classes, were less dependent on parental support and most importantly, those who had higher cumulative GPA's appear to earn more credits by the end of their freshmen year. Other correlations were not significantly different from zero. However, multivariate analysis will indicate which of these correlations remain significant while holding other independent variables constant.

Table 16

Stepwise Multiple Regression Results,
Predicting Cumulative Credits Earned

Predictors of Cumulative Credits	Zero-Order R	Unstandardized B	Standardized Beta	Standard Error of B	F	% of Table Variance	% of Explained Variance
Cumulative GPA	0.7669	14.0214	0.7888	0.7539	345.897	60.4930	96.0511
Percentile Rank	0.0274	- 0.1506	-0.1545	0.0416	13.075	-0.4233	-0.6721
Transfer Code	-0.2086	-11.0095	-0.1107	4.2182	6.812	2.3092	3.6665
Matriculation Age	0.0176	- 0.4242	-0.0809	0.2243	3.577	-0.1423	-0.2259
High School Class Size	0.1123	0.0075	0.0663	0.0046	2.630	0.7445	1.1821
(Constant Term)		29.1259				62.98	100.0

Standard Error - 13.6297

R Square - 0.6298

Multiple R - 0.7936

In Table 16, those variables which account for the most variance explained in cumulative credits earned will be discussed using stepwise multiple regression techniques when all potential predictors of cumulative credits compete to enter in the equation.

The five variables in Table 16 explain about 63 percent of the total variance in cumulative credits students earn by the end of their freshman year. As shown in Table 16, cumulative GPA accounts for largest percentage of explained variance (96%) and over 60 percent of the total variance, indicating the importance of GPA in predicting cumulative credits. The higher a student's cumulative GPA, the more credits cumulated by the end of the first year at UM. A student's percentile rank in high school graduating class turns out to be a suppressor variable and therefore contributes a -.67 percent toward the explained variance; that is, students who rank high in their high school graduating class tend to cumulate less credits at the end of their first year in college. Transfer code enters third as a predictor of cumulative credits accounting for about 4 percent of the explained variance which indicates that transfer students tend to cumulate more credits than non-transfer students.

Table 16 further indicates that older students cumulate less credits and the larger the high school graduating class the more credits a student is likely to take. Matriculation Age is a suppressor variable indicating the age of a student when first registered contributes a -.23 percent toward the explained variance while high school class size accounts for just over one percent of the explained variance.

PREDICTING SECOND FALL REGISTRATION

As indicated in Table 17, quarter first registered, transfer code, matriculation age, cumulative GPA and cumulative credits all show a significant zero-order correlation.

Table 17: Correlations Between Second Fall Registration and Potential Predictors.

Variable Name	Correlation Coefficient
Sex	0.05
Quarter First Registered	0.17*
Transfer Code	0.21*
High School Class Size	0.08
Parent/Spouse Indicator	0.01
High School Percentile Rank	0.03
State of Residence	0.05
Matriculation Age	-0.11*
Cumulative GPA	0.58*
Cumulative Credits	0.61*

*$p \leq .05$ level of significance

The zero-order correlations in Table 17 indicate: (1) that students who register during fall quarter are more likely to register for a second fall term; (2) transfer code indicates that non-transfer students are also more likely to register for a second fall term; (3) matriculation age indicates that the older the student is the less likely he/she is to register for a second fall term; (4) the more credits students cumulate, the more likely they are to register for a second fall term; and (5) the higher the GPA the more likely students will register for a second fall term at UM.

As with cumulative GPA and cumulative credits, the stepwise regression procedures provides additional information about the order of importance utilizing the best predictors of second fall registration.

The use of partial correlations allows this study to measure the strength of the relationship between second fall registration and a single predictor while controlling for the level of another variable.

Cumulative credits enters the equation first with a .61 zero-order correlation; that is, the more credits students cumulate, the more likely they are to register for a second fall term. When holding constant cumulative credits, transfer code enters second into the regression equation with a .45 partial correlation, this indicates that non-transfer students are more likely to register for a second fall term than are transfer students. Entering third into the regression equation is cumulative GPA with a .23 partial correlation indicating that the higher the GPA, the more likely students are to register for a second fall term while holding constant transfer code and cumulative GPA. The final variable showing major significance (partial coefficient greater than .20) in predicting second fall registration is quarter of first registration. When holding constant cumulative GPA, transfer code and cumulative credits, quarter of first registration indicates a .26 partial correlation; that is, students who register during fall quarter are more likely to register for a second fall term at UM.

SUMMARY

While certain variables help predict cumulative GPA, cumulative credits and second fall registration, earlier indications have suggested

that ethnicity is not significantly related to any of these dependent variables. As the literature review has pointed out, student performance in high school tends to be a good indicator of how they will perform in college. As the regression tables have pointed out, high school rank helps predict cumulative GPA, but not cumulative credits nor retention through registering again after completing the first year at UM. However, the literature also shows that high school rank may not be a good predictor of black students performance on the college level. As the data in this study have shown, black freshman students performed equally with their white peers even though their high school ranks were significantly lower than that of white students.

The data in this study have also shown that the dropout rates among black and white freshman students at UM do not vary significantly and parallel the national attrition rates for college students. The regression data point out further that transfer students are more likely to take more credit and attain higher GPA's; despite that non-transfer students tend to register for a second fall term at UM more often than do transfer students. Overall, holding constant those variables most likely to effect black and white freshmen academic performance and attrition rates, black and white freshman students at UM are not academically different in their overall performance during their first year at UM, which is the question (hypothesis) this study was primarily designed to test.

ACADEMIC PERFORMANCE AND ATTRITION AMONG WHITE FRESHMAN STUDENTS AT UM

Earlier, this study found ethnic differences in demographic and high school variables between black and white freshmen at UM. However, when

holding constant other variables, no significant ethnic differences were found in college academic performance and attrition rates. However, black and white freshmen may differ as to what types or combinations of variables predict their academic performance and attrition rates. This section determines what types of variables predict cumulative GPA, cumulative credits and attrition among white freshmen at UM.

Predicting Cumulative GPA

As indicated in Table 18, quarter first registered, transfer code, cumulative credits, second fall registration and high school percentile rank all show a significant zero-order correlation with cumulative GPA.

Table 18: Correlations Between Cumulative GPA and Potential Predictors for White Freshmen.

Variable Name	Correlation Coefficient
Sex	-0.0016
Quarter First Registered	-0.1370*
Transfer Code	-0.1531*
High School Class Size	0.0364
Parent/Spouse Indicator	0.0793
High School Percentile Rank	0.2569*
State of Residence	-0.0049
Matriculation Age	0.0912

*$p \leq .05$ level of significance

The zero-order correlations in Table 18 indicate: (1) students who register during quarters other than fall, tend to cumulate higher GPA; (2) non-transfer students cumulate lower GPA's than do transfer students and (3) students who graduate high in their high school graduating class tend to cumulate higher GPA's at the end of their freshman year.

When entering all potential predictors stepwise upon the dependent variable, the following table indicates those variables which are the best predictor of cumulative GPA for white freshmen and the amount of variance explained by these variables once other variables are held constant.

The four variables (high school percentile rank, transfer code, quarter first registered and sex) in Table 19, account for approximately 12 percent of the total variance in cumulative GPA for white freshman students.

As indicated, high school percentile rank accounts for the highest percentage (66.8%) of explained variance in predicting cumulative GPA for white freshmen at UM. That is students who graduate high in their high school graduating class tend to cumulate higher GPA's at the end of their freshman year. Transfer code accounts for the second highest percentage (18.4%) of explained variance in predicting cumulative GPA for white freshmen. This shows that transfer students tend to cumulate higher GPA's than do non-transfers at the end of their freshman year once high school percentile rank is held constant. Quarter of first registration, accounts for the third highest percentage (14.6%) of explained variance in predicting cumulative GPA. This indicates that white freshmen who register during quarters other than fall, tend to cumulate higher GPA's at the end of their freshman year. Sex, account for the fourth highest percentage (.17%) of explained variance in predicting cumulative GPA for white freshman students. This shows that males tend to cumulate higher GPA's, than do females at the end of their freshman year, holding constant the other significant predictors.

Table 19

Stepwise Multiple Regression Results
Predicting Cumulative GPA for White Freshman Student at UM

Predictors of Cumulative GPA	Zero-Order R	Unstandardized B	Standardized Beta	Standardized Error of B	F	% of Table Variance	% of Explained Variance
Rank	0.2569	0.0184	0.3144	0.0044	17.604	8.07	66.80
Transfer Code	-0.1531	-1.0703	-0.1449	0.5332	4.030	2.22	18.38
Quarter First Registered	-0.1369	-0.5450	-0.1293	0.3044	3.205	1.77	14.65
Sex	-0.0015	-0.2964	-0.1118	0.1979	2.244	0.02	0.17
(Constant Term)		2.3106				12.08	100.00

Standard Error - 1.2470

R Square - 0.1208

Multiple R - 0.3476

Predicting Cumulative Credits

The variables in Table 20 which indicate a significant zero-order correlation with cumulative credits are transfer code, cumulative GPA and second fall registration. Other correlations were not significantly different from zero.

Table 20: Correlations Between Cumulative Credits Earned and Potential Predictors for White Freshmen.

Variable Name	Correlation Coefficient
Sex	-0.0489
Quarter First Registered	-0.1163
Transfer Code	-0.2399*
High School Class Size	0.1073
Parent/Spouse Indicator	0.1045
Cumulative GPA	0.7720*
High School Percentile Rank	0.0406
State of Residence	0.0260
Matriculation Age	0.0572

*$p \leq .05$ level of significance

Students who transferred into UM and have higher cumulative GPA's appear to earn more credits by the end of their first year. However, stepwise multiple regression analysis will indicate which of these correlations remain significant while holding other variables constant.

There are four variables in Table 21 (Cumulative GPA, Percentile Rank, Transfer Code and Matriculation Age) which account for 64 percent of the total variance in predicting cumulative credits earned by white freshmen at UM.

Cumulative GPA alone, accounts for the highest percentage (96.5%) of explained variance in predicting cumulative credits earned for white

Table 21

Stepwise Multiple Regression Results
Predicting Cumulative Credits Earned for White Freshman Students at UM

Predictors of Cumulative Credits	Zero-Order R	Unstandardized B	Standardized Beta	Standardized Error of B	F	% of Table Variance	% of Explained Variance
Cumulative GPA	0.7720	14.1811	0.8037	0.8310	291.191	62.04	96.53
Percentile Rank	0.0406	-0.1804	-0.1745	0.0488	13.684	-0.71	-1.10
Transfer Code	-0.2399	-19.0653	-0.1463	0.3683	8.963	3.51	5.46
Matriculation Age	0.0572	-0.5359	-0.1017	0.2594	4.267	-0.57	-0.89
(Constant Term)		43.5403				64.27	100.00

Standard Error - 14.0276

R Square - 0.6427

Multiple R - 0.8017

freshmen. This shows that the higher the GPA, the more credits white freshman tend to cumulate. Transfer code, accounts for the second highest percentage (5.5%) of explained variance in predicting cumulative credits earned. While this indicates that transfer students tend to cumulate more credits at the end of their freshman year, cumulative credits is mostly dependent upon cumulative GPA in predicting cumulative credits. A student's rank in their high school graduating class turns out to be a suppressor variable once cumulative GPA is held constant, therefore, contributes a -1.10 percent toward the explained variance; that is, students who rank high in their high school graduating class tend to cumulate fewer credits at the end of their freshman year. Matriculation age, also acts as a suppressor variable once transfer code, percentile rank and cumulative GPA are held constant. This shows that the younger students cumulate more credits and matriculation age contributes a -.89 percent toward the explained variance in predicting cumulative credits earned.

Predicting Second Fall Registration

As indicated in Table 22, quarter of first registration, transfer code, cumulative GPA and cumulative credits all show a significant zero-order correlation.

Table 22: Correlations Between Second Fall Registration and Potential Predictors for White Freshmen.

Variable Name	Correlation Coefficient
Sex	0.0617
Quarter First Registered	0.1436*
Transfer Code	0.1432*
High School Class Size	0.1016
Parent/Spouse Indicator	0.0124
Cumulative GPA	0.6329*
Cumulative Credits Earned	0.6531*
High School Percentile Rank	0.0275
State of Residence	0.0749
Matriculation Age	-0.0923

*$p \leq .05$ level of significance

The zero-order correlations in Table 22 indicate: (1) that students who register during fall quarter are more likely to register for a second fall term; (2) that non-transfer students are also more likely to register for a second fall term; (3) that the more credits students cumulate, the more likely they are to register for a second fall term; and (5) the higher the cumulative GPA the more likely students will register for a second fall term at UM.

As with the combined regression results predicting second fall registration, the results for white freshmen also show: (1) cumulative credits have the highest zero-order correlation (.65) in predicting second fall registration; that is, students who cumulate more credits are more likely to register for a second fall term; (2) transfer code enters second with a .41 partial correlation holding constant cumulative credits, indicating that non-transfer students are more likely to register for a

second fall term; (3) cumulative GPA enters third with a .27 partial correlation; that is, the higher the GPA the more likely students will register for a second fall term holding constant transfer code and cumulative credits; and (4) quarter of first registration with a .26 partial correlation holding constant GPA, transfer code and cumulative credits; that is, students who register during fall quarter are more likely to register for a second fall term at UM.

ACADEMIC PERFORMANCE AND ATTRITION RATES OF BLACK FRESHMEN ATHLETES AND NON-ATHLETES

This study has determined that various differences exist between black and white freshman students using demographic indicators and high school performance information drawn from student files. The most important ethnic differences have appeared within the high school data which indicated that black UM freshmen do not rank as high in the graduating classes as do their white peers. However, there is no theoretical explanation as to why black freshman students perform equally with their white peers by the end of their freshman year at UM. In searching for a reasonable explanation, it was noted that approximately 37 percent of the black freshman population at UM since the fall of 1975 through the fall of 1980 were in the UM athletic department programs. Black freshman athletes have participated in four major athletic programs; football, basketball, cross-country and track. Of these participants, 14 have been males and 3 have been female as indicated by the UM athletic department participation lists.

This section's intent is to determine if any differences exist between black freshman athletes and non-athletes in academic performance and attrition rates, and to look for other possible explanations, as to what

types of variables predict GPA and attrition rates for black freshman students while attending UM.

Table 23: Correlations Between Athletics and Potential Independent Predictors for Black Freshmen.

Variable Name	Correlation Coefficient
Sex	-0.3063*
Quarter First Registered	0.2363
Transfer Code	0.0291
High School Class Size	0.1357
Parent/Spouse Indicator	-0.1849
Cumulative GPA	0.3227*
Cumulative Credits	0.3537*
Second Fall Registration	0.2822*
High School Percentile Rank	-0.1037
State of Residence	-0.0068
Matriculation Age	-0.2832*

*$p \leq .05$ level of significance

The significant zero-order correlations in Table 23 indicate that black freshman athletes: (1) tend to be male; (2) tend to cumulate higher GPA's at the end of their freshman year; (3) tend to cumulate more credits by the end of their freshman year; (4) are more likely to register for a second fall term; and (5) are more likely to be younger than black freshmen not involved in athletics.

When entering all potential predictors stepwise upon the dependent variable, the following table indicates those variables which are the most significant predictors of cumulative GPA for black freshman students and the amount of variance explained by these variables once other variables are held constant.

Table 24

Stepwise Multiple Regression Results
Predicting Cumulative GPA for Black Freshman Students at UM

Predictors of Cumulative GPA	Zero-Order R	Unstandardized B	Standardized Beta	Standard Error of B	F	% of Table Variance	% of Explained Variance
Transfer Code	0.3911	1.5950	0.4568	0.4572	12.170	17.87	52.3
Athletics	0.3227	0.8390	0.3444	0.3341	6.305	11.11	32.5
Sex	0.0390	0.7046	0.2892	0.3367	4.379	1.13	3.3
Matage	-0.2156	-0.0648	-0.1892	0.0456	2.015	4.08	11.9
(Constant Term)		0.5360				34.19	100.0

Standard Error - 1.0102

R Square - 0.3419

Multiple R - 0.5848

The four variables (Transfer Code, Athletics, Sex, and Matriculation Age) in Table 24, account for approximately 34 percent of the total variance in cumulative GPA for black freshman students.

As indicated, transfer code accounts for the highest percentage (52.3%) of explained variance in predicting cumulative GPA for black freshman students at UM. This indicates that non-transfer students tend to cumulate higher GPA's at the end of their freshmen year. Athletics accounts for the second highest percentage (32.5%) of explained variance in predicting cumulative GPA's for black freshman students. This indicates that black freshman athletes tend to cumulate higher GPA's than do non-athletes among the black freshman population whether or not they are transfer students. Matriculation age, accounts for the third highest amount of explained variance (11.9%) in predicting cumulative GPA for black freshman students. The younger a black freshman student is, the higher the cumulative GPA whether or not these students are transfers, athletes or female. Sex, accounts for the fourth highest amount of explained variance in Table 24, indicating that black freshman females, more than males; tend to cumulate higher GPA's, holding constant the other significant predictors.

The final results of Table 24, indicate that black freshman athletes play a significant role in improving the cumulative GPA for the black freshman population at UM. While some questions as to the types of primary majors athletes are involved in may arise, this study found no significant difference in selected majors between athletes and non-athletes at the .05 level of significance (Chi-Square = 19.55, p = 0.42). It should also be recalled that this study found no significant ethnic differences between black and white freshman students in their choices of primary majors at UM.

There are four variables in Table 25 (Cumulative GPA, Transfer Code, Parent/Spouse Indicator and Athletics) which account for 62 percent of the total variance in predicting cumulative credits earned by black freshman students at UM. Cumulative GPA accounts for the highest percentage of explained variance (68.9%) in predicting cumulative credits earned; this indicates that the higher the GPA, the more credits black freshman students tend to cumulate. However, holding cumulative GPA constant, transfer students tend to cumulate more credits during their freshman year accounting for the second highest percentage of explained variance (13.4%) in predicting cumulative credits earned by black freshman students.

Athletics accounts for the third highest percentage of explained variance (9.9%) in predicting cumulative credits earned; the results indicate that other things held constant, black freshman athletes tend to cumulate more credits during their first year than do non-athletes. The final variable in Table 25 (parent/spouse indicator) indicates that the less black freshman students are dependent upon parents, the more credits cumulated by the end of their first year.

Again, athletics is a significant factor, not only in predicting cumulative GPA but also in predicting cumulative credits earned by black freshmen students at UM. Early results including all freshman students at UM, indicated the higher the cumulative GPA, the more credit cumulated and the more likely freshman students were to register for a second fall term. However, for black freshmen at UM, the single variable cumulative GPA accounts for 94 percent of explained variance in second fall registration. This indicates that cumulative GPA is the single most important

Table 25

Stepwise Multiple Regression Results
Predicting Cumulative Credits Earned
for Black Freshman Students at UM

Predictors of Cumulative Credits	Zero-Order R	Unstandardized B	Standardized Beta	Standard Error of B	F	% of Table Variance	% of Explained Variance
Cumulative GPA	0.59845	10.3912	0.7142	1.6304	40.617	42.74	68.93
Transfer Code	-0.18306	-23.0437	-0.4536	5.3788	18.354	8.33	13.43
Parent/Spouse Indicator	0.2260	7.2914	0.2098	3.4380	4.498	4.74	7.65
Athletics	0.3537	6.2094	0.1752	3.7140	2.795	6.20	9.99
(Constant Term)		32.7844				62.01	100.00

Standard Error - 11.1680

R Square - 0.6201

Multiple R - 0.7874

factor in predicting whether black freshman students will return to UM after completing their first year.

In summary, the academic performance of black freshmen athletes at UM significantly improve the cumulative GPA and cumulative credits earned among the black freshman population at UM from fall quarter 1975 through fall quarter of 1980. However, the attrition rate among black freshman student athletes and non-athletes shows no significant differences when holding constant other variables, since cumulative GPA alone accounted for about 94 percent of the variance in predicting second fall registration.

COMPARATIVE CAUSAL MODELS OF WHITE AND BLACK FRESHMAN STUDENTS AT UM

In further illustrating the final results of this study, the following two causal models illustrate the interrelationships among a series of variables holding constant other variables in predicting their effect upon academic performance and attrition rates. The zero-order correlation coefficients are representing variables not influenced by other variables in the models, while the signs indicate direction of one variable holding other variables constant.

Causal Model of White Freshmen Students at UM

As a further application of stepwise multiple regression, the results in figure 3, indicate cumulative GPA as a direct function of percentile rank, quarter of first registration, transfer code and sex, that is, freshmen who rank high in their high school graduating class, are registered

at UM during quarters other than fall, transfer from other colleges and are male, tend to cumulate higher GPA's at the end of their freshman year at UM. Figure 3 further indicates, cumulative credits earned as a direct function of cumulative GPA (accounting for the highest percentage of explained variance), percentile rank, transfer code, and matriculation age. That is, freshmen who cumulate higher college GPA's, rank lower in their high school graduating class, are transfer students, and younger at matriculation, tend to cumulate more credits at the end of their freshman year at UM. Finally, second fall registration is a direct function of cumulative credits earned (accounting for the highest percentage of explained variance), cumulative GPA, transfer code, and quarter of first registration, that is, freshmen who cumulate more credits are non-transfer students, and register during fall quarter, tend to return for a second fall term at UM.

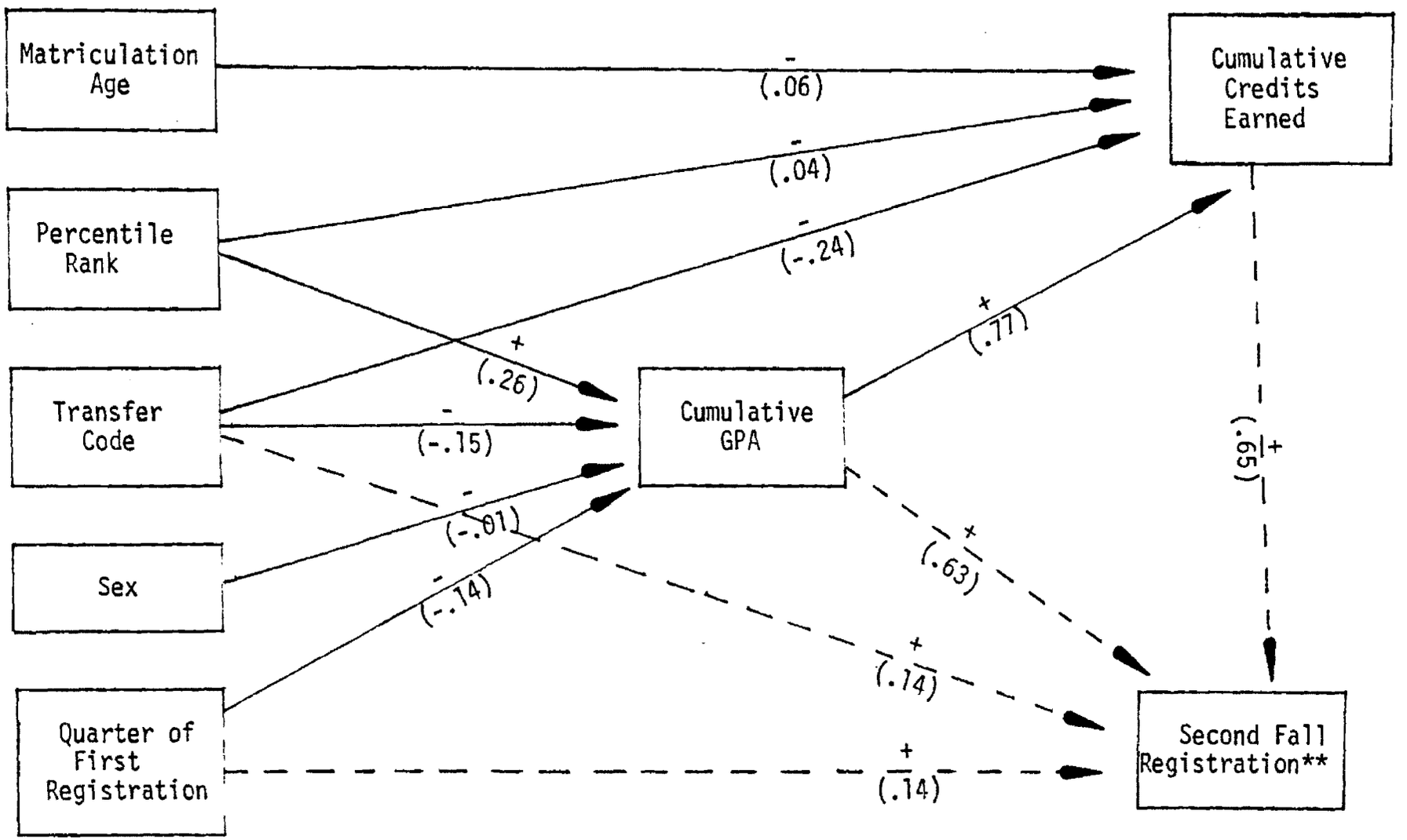
In summary, figure 3 indicates second fall registration being largely dependent upon the amount of credits cumulated, whereas cumulative credits earned is largely dependent upon a student's cumulative GPA. The independent variables in figure 3, are empirically the best set of potential predictors in determining academic performance and attrition rates at UM. The lines illustrate which dependent variable the independent variable predicts and the direction of that relationship.

Causal Model of Black Freshman Students at UM

The results in figure 4, illustrate the direction of those variables most likely to effect academic performance and the attrition rate of black

Figure 3

Causal Model of White Freshman Students Academic Performance



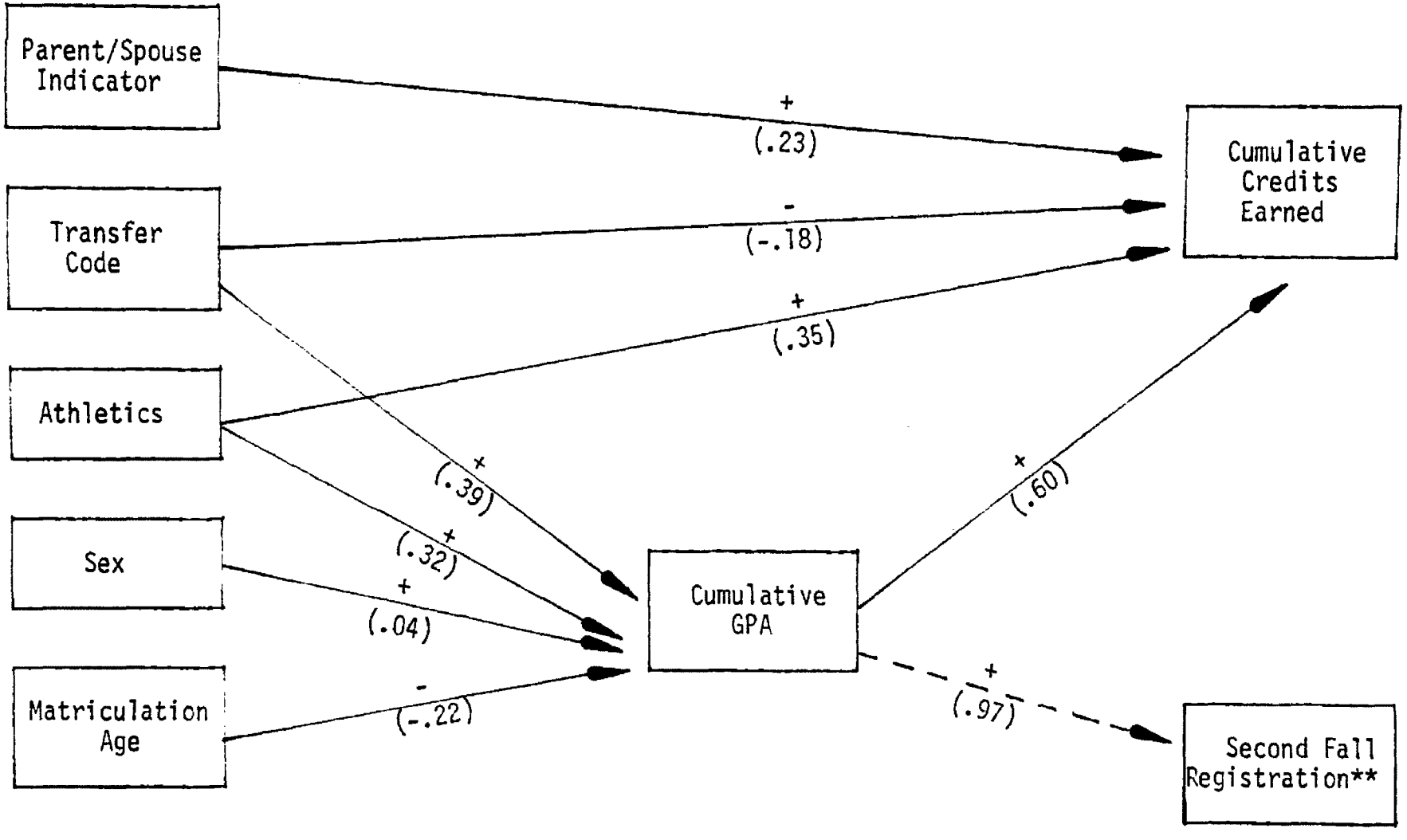
*Zero-order correlation coefficients in parenthesis, signs indicating direction above line.
**The causal arrows predicting second fall registration are shown as dashes to remind the reader that this dependent measure is a dummy variable rather than a true interval variable.

freshman students at UM. Separating the black freshman students into a separate model allows this study to examine potential relationships giving insight into what types of variables may contribute to black freshman students performing equally with their white peers. With the addition of athletics as a predictor, this study also examines whether academic performance and attrition rates are effected by the differences in black freshmen students attending UM. The results indicate that cumulative GPA is a direct function of transfer code, athletics, sex and matriculation age; that is, black freshmen who do not transfer from other colleges, are student athletes, are female and younger at matriculation, tend to cumulate higher GPA's at the end of their freshman year at UM. Cumulative credits earned, is shown as a direct function of cumulative GPA, athletics, transfer code and parent/spouse indicator. That is, black freshmen who cumulate high college GPA's, are athletes, are transfers and do not depend upon parental support, tend to cumulate more credits at the end of their freshman year at UM. Finally, second fall registration is a direct function of cumulative GPA (accounting for 94% of the total variance) that is, black freshmen who cumulate high college GPA's are more likely to return for a second fall term at UM.

As illustrated in figure 4, second fall registration is almost completely dependent upon cumulative GPA which is also the strongest predictor of cumulative credits earned. It is interesting to note that athletics has a direct relationship in improving cumulative GPA and cumulative credits. However, second fall registration (attrition rate) is not affected by

Figure 4

Causal Model of Black UM Freshman
Students Academic Performance



*Zero-order correlation coefficients in parenthesis, signs indicating direction above line.
**The causal arrows predicting second fall registration are shown as dashes to remind the reader that this dependent measure is a dummy variable rather than a true interval variable.

athletics indicating that the attrition rate of black freshman students is indirectly, not directly, affected by whether these students are athletes or nonathletes.

Summary

Some basic differences exist in strength, direction and types of variables predicting academic performance when comparing the two causal models. The most obvious difference is illustrated in predicting second fall registration. Black freshman students largely depend upon their cumulative GPA to determine whether or not they drop out of UM. In the model (figure 3) the attrition rate of UM white freshmen is determined by a number of variables largely by that of cumulative credits earned and cumulative GPA with other independent variables having a direct relationship with the dropout rate at UM.

The causal model of black freshman students also indicates that support is negatively related to cumulative credits earned while this relationship does not exist for white freshman students. Another variable not entered in both causal models is high school class size which indicates a direct relationship with cumulative credits earned for all white students, however, is not a factor in predicting academic performance or attrition rates for black freshman students. The final variable not entered in both causal models is quarter of first registration, and is not instrumental in predicting academic performance or attrition rates for black freshman but is a factor in white attrition at UM.

Of those variables represented in both causal models, the direction in transfer code predicting cumulative GPA indicates a positive relation-

ship for black freshmen while indicating a negative relationship in predicting cumulative GPA for white freshman students at UM. The same indication occurs with sex when predicting black freshman students' cumulative GPA, a positive relationship exists holding other variables constant. However, a negative relationship exists between sex and cumulative GPA holding other variables constant for the model representing white freshman students. Matriculation age indicates a negative direction in both causal models, however matriculation age helps predice cumulative GPA for black freshmen while predicting cumulative credits earned for all freshman students.

Finally, it is interesting to note that high school percentile rank is not a factor in predicting academic performance for black freshman students while cumulative GPA, cumulative credits earned, are a function of high school percentile rank for white freshman students in this study.

As a variable, ethnicity is not a predictor of academic performance and attrition, however, the separate models indicate those variables which are the best predictors of academic performance and attrition rates for black and white freshman students at UM.

Chapter 4

SUMMARY AND IMPLICATIONS

This thesis began with the idea of testing whether differences in college performance existed between black and white freshman students at the University of Montana (UM). By analyzing demographic, high school, and college related information from UM student files, a number of findings were focused upon creating overall profiles and prediction models of black and white students' freshman year at UM.

In reviewing previous literature, studies comparing black and white students' academic performance focused on intellective as well as non-intellective measures. This study chose to link both intellective and non-intellective measures by using demographic variables as descriptive indicators of the types of students who attend UM, and high school and college data as predictors of how those students actually performed. Evidence from previous literature suggested various isolated factors which helped this study to determine those variables most likely to effect academic performance and attrition rates among black and white freshman students at UM. The level of academic performance and success in this study were determined by students' overall cumulative GPA and cumulative credits earned by the end of their freshman year. Attrition rates, indicating the extent of dropout among various types of freshman students were determined by second fall registration.

CROSS-TABULATION ETHNIC COMPARISONS

When testing for ethnic differences between black and white freshmen students, a number of interesting results occurred. Demographically, black freshmen students differed by sex, residency and as transfer students. However, quarter of first registration and matriculation age showed no significant ethnic differences. In summary, the UM freshman student population is predominately white and generally female. The measure of residency indicated more black freshmen (76.1%) than white freshmen (24.5%) enter UM from outside the State of Montana; the blacks had a higher percentage (13.0%) of transfer students than their white peers (3.3%). While no significant ethnic differences were indicated as to parental support, the results showed that black freshman students were more often single and dependent on parental support, whereas matriculation age showed no significant difference between black and white freshman students.

Data examining black and white freshman students' high school experience indicated ethnic differences in high school class size, percentile rank in graduating class and ACT (American College Test) scores. Specifically, black freshmen at UM come from larger high schools with an average high school class size of 425.9 students per graduating class while their white peers averaged 343.2 students per graduating class. Also, white UM freshmen tend to rank higher than do their black peers in their high school graduating class. The majority of black students (54.3%) fell within the 0 - 60 percentile range while the majority of their white white peers (64.7%) fell within the 60 - 100 percentile range. ACT scores

scores were not fully representative of actual means and mean differences. Resident students at UM were not required to have ACT scores as a criteria for admission between 1975 and 1980. However, some indications of academic performance were demonstrated by the ACT scores in high school core subjects. In all cases, significant ethnic differences were found to exist for the ACT scores in math, English, social science, science and composite score. The mean score differences varied by nearly 7 points with social science scores having a slightly higher point difference. However, problems in reliability exist because of the low percentage of ACT scores retrieved from student files and all conclusions are tentative based on the number of missing cases, with 69 missing cases out of 184 for white freshmen and 31 missing cases out of 46 for black freshmen. Given the ethnic differences in high school percentile rank, where black freshman students rank lower in their high school graduating class, ACT scores may be representative of actual differences though this study does not give much weight to the results.

The determining factors of this study, however, are based upon the college experience and whether ethnic differences in performance and attrition rates are significant after holding constant other variables. The final results testing for significant ethnic differences of UM freshman students indicated: (1) both black and white freshmen tend not to declare a major during their freshmen year, and no significant ethnic differences were found to exist in primary majors when majors were declared; (2) holding constant other variables, no significant ethnic differences were found in cumulative GPA performances at the end of their freshman

year; (3) holding constant other variables no significant ethnic differences existed between black and white freshman students in terms of cumulative credits earned; and (4) there was no significant ethnic difference in the rates at which black and white freshmen dropped out of the UM by the end of their freshman year. Thus, while black freshmen tend to be male non-residents, attend larger high schools, rank lower in their high school graduating class, black and white freshmen students tend to major in the same fields and are approximately the same age at matriculation and most importantly, black freshmen perform equally with their white peers during their freshman year at UM.

CORRELATIONAL ETHNIC COMPARISONS

When ethnicity was correlated with all other variables sex, transfer code, high school class size, high school percentile rank and state of residence again indicated significant relationships with ethnicity. Similarly, no significant correlational ethnic differences were found among black and white freshman students in their college performance.

The intercorrelations among independent variables (see Table 13) resulted in eleven moderate but significant relationships at the .05 level of significance. Of the eleven significant relationships among independent variables, the relationship between state of residence and high school percentile rank was particularly interesting. The admissions criteria at UM (see Figure 1) indicates that certain criteria must be met for out-of-state students to be admitted into the UM, whereas in-state

students are only required to be residents of Montana. The results indicated that resident students are entering UM with higher percentile ranks in their high school graduating classes than are their non-resident peers. Based upon UM admissions criteria, this study expected to find non-resident students performing in high school at a higher level than their resident peers. Furthermore, state of residence was not found to be a significant predictor of cumulative GPA, cumulative credits earned or second fall registration, indicating that residents and nonresidents perform equally at UM holding constant all other relevant variables.

MULTIVARIATE ANALYSIS

While no significant ethnic differences existed in cumulative GPA, cumulative credits earned and second fall registration, certain other variables were found which help predict academic performance and attrition rates for black and white freshmen at UM. The four variables that account for the most variance in predicting cumulative GPA for white freshmen at UM are high school percentile rank, quarter first registered, transfer code and sex. As previous literature has suggested, high school rank has been a significant predictor of college academic performance (Brown & Ervin, 1979; Clark & Plotkin, 1964; Cleary, 1968), and theoretically the results of this study agree with those previous findings indicating that the higher the percentile rank the more likely students are to achieve higher at the college level. The results further indicate that students who enter UM during quarters other than fall quarter are cumulating higher

GPA's during their freshman year. Transfer students also tend to cumulate higher GPA's than do nontransfer students, whereas females tend to cumulate lower GPA's at the end of their freshman year at UM.

The five variables that account for a significant amount of variance in predicting cumulative credits earned are cumulative GPA, high school percentile rank, transfer code, matriculation age and high school class size. For white freshmen, the higher the cumulative GPA, the more credits students cumulated during their freshman year. However, the greater the high school rank, the fewer cumulative credits were earned, once GPA and other significant predictors were held constant. In addition, transfer students cumulate more credits than nontransfers, students who are older take fewer credits and the larger the high school graduating class the more credits a student is likely to earn.

When predicting second fall registration (attrition rates) at UM, the best set of potential predictors in order of importance are cumulative credits, transfer code, cumulative GPA, quarter first registered, sex and high school percentile rank. It is interesting to note that cumulative credits rather than cumulative GPA resulted in the highest percentage of explained variance (46%) in predicting attrition rates for freshmen students; cumulative GPA accounted for approximately 34 percent. This suggests that the more credits students earn during their first year is most likely to determine their registering for a second fall term at UM. The results reported earlier indicated that the number of cumulative credits is directly related to cumulative GPA (i.e., the higher the cumulative GPA the more credits earned) and thus, the more likely they are to register for a second fall term. The results also indicate that

while transfer students cumulate more credits and higher GPA's, non-transfer students are more likely to register during second fall quarter. Although not included in the earlier analysis, females are more likely than males to register for second fall, and students with higher percentile ranks in their high school graduating class are less likely to register for a second fall term at UM. Interestingly, high school percentile rank has been a significant factor in predicting all three dependent variables, however, while students who rank higher in their graduating class cumulate higher GPA's, those students do not cumulate as many credits or register second year as frequently as students who rank lower in their high school graduating class. That is, holding GPA and other significant predictors constant, students with higher percentile ranks in high school cumulate fewer credits and drop out of UM more often than do lower ranking high school graduates.

PREDICTING BLACK STUDENT PERFORMANCE

The initial thrust of this research was to determine whether there were (as the literature suggests) ethnic differences in college performance. However, the final results indicate black and white freshman students at UM show no significant differences in their college performances, even though various demographic and high school information show black students having lower high school ranks, coming from larger high schools and being predominantly nonresident students of UM. To see what types of variables are most important in predicting black UM freshman

students' cumulative GPA, cumulative credits and second fall registration, stepwise multiple regression analysis again was utilized to determine possible explanations.

In regard to cumulative GPA, the best set of potential predictors for black freshman students include: (1) transfer code, indicating that black transfer students are less likely to attain higher cumulative GPA's; (2) athletics*, indicating that black athletes tend to cumulate higher GPA's; (3) sex, indicating that black females tend to cumulate higher GPA's than black males; and (4) matriculation age, indicating that younger, more than older, black students tend to cumulate higher GPA's.

In predicting cumulative credits earned, the best set of potential predictors for black freshman students include: (1) cumulative GPA, indicating the higher the GPA, the more credits earned by the end of their first year; (2) transfer code, indicating transfer students cumulate more credits than do nontransfer students; (3) athletics, indicating black athletes cumulate more credit than non-athletes; and (4) parent/spouse indicator, indicating that black freshmen who are less dependent on parental support tend to cumulate more credits at the end of their first year.

While the variable measuring cumulative credits was the determining factor in second fall registration for UM freshman students in general, cumulative GPA is not only significant, but an extremely powerful predictor

*Since many of the black freshmen students (37%) enter UM as student athletes, this variable was added into the regression models to help determine whether it would account for any differences in academic performance or attrition rates among black freshmen attending UM.

of second fall registration (94% of total variance) for black freshman students at UM. Also, it is interesting to note that high school rank was not a significant predictor of college academic performance or attrition rates for black freshman students since in previous literature, high school rank was shown to be a low predictor of black student performance in college (Cleary, 1968; Stanley & Thomas, 1969; Pfeifer & Sedlacek, 1971).

The final results of this study indicate two important factors; first, black and white freshman students at UM do not differ significantly in academic performance even though some differences exist demographically (sex, state of residence and transfer code), and among high school variables (high school class size, percentile rank and ACT scores). Dropout rates also do not differ among black and white freshman students (47.8 percent of black freshman student dropout of UM before their second fall registration, while 44.6 percent of their white peers do the same).

The profile of black freshman students indicates that athletes play a significant role in raising the overall cumulative GPA and credits earned for the black freshman population while cumulative GPA explains the attrition rate, explaining 94 percent of the total variance. But most important by holding all significant independent variables constant, this study concludes that academic performance and attrition rates among black and white freshmen attending UM from the fall of 1975 through the fall of 1980 do not differ significantly in cumulative GPA, cumulative credits earned nor attrition rates.

IMPLICATIONS OF THE STUDY

While this study was designed to test for intellective differences in college academic performance among black and white freshman students at UM, non-intellective measures were not tested in this study. The dropout rate in this study is nearly 50 percent for both ethnic groups, which is greater than the national average and the 1980 UM freshman class attrition rate (see page 19). The dropout rate at UM is nearly 50 percent for both ethnic groups. Poor grades are the main determining factor for black freshman attrition rates, while it appears grades, credits earned, and other variables (as indicated in figure 3) determine attrition rates for the general population. Further research involving both intellective and non-intellective measures may provide assistance in maintaining a higher retnetion rate among freshmen students at UM.

A study designed to test non-intellective measures (psychological, emotional, and attitudinal) and their relationship to academic performance and attrition rates would be beneficial in explaining what this study has theoretically inferred while researching relevant behavioral data. For example, this study was only able to explain approximately 10 percent of the total variance for the combined sample in predicting potential predictors of cumulative GPA while 37 percent of the total variance was explained in predicting cumulative GPA of black freshmen. With further investigation into non-intellective measures, the results of this study may be further enhanced by a higher predictability of cumulative GPA using nonacademic variables, and various attitudinal and personality measures.

Since most of the relevant research in this area has been done at large universities, many of the relationships between black and white freshman students may differ at UM where recruiting techniques at large universities located by urban areas may be different from those of UM. However, the theoretical relationships between black and white college students can be used as guidelines for future research of UM freshman students. Further research in the area of athletics would be useful in determining how and why athletes perform better than the general student population (at least in the case of black UM freshmen), even though this study shows athletes started college having lower high school ranks. Finally, an investigation into the area of entrance requirements, which in this study resulted not in higher, but in lower qualified out-of-state students as compared to instate students.

Future applied research in this area should also increase the sampling boundaries to include other significant ethnic populations on the UM campus. With the knowledge of what types of students attend UM and how they perform while attending, will provide various student services with improved knowledge and evaluation techniques to help students increase their performance level which is likely to result in increased retention rates among all students at UM.

BIBLIOGRAPHY

Altman, Robert A. and Synder, Patricia O.
1971 "The Minority Student on the Campus: Expectations and Possibilities." Western Interstate Commission for Higher Education, Boulder, Colorado.

Astin, Alexander W.
1971 Predicting Academic Performance in College: Selective Data for 2300 American Colleges, New York, New York: The Free Press.

Ballantine, Jeanne H.
1983 The Sociology of Education: A Systematic Analysis, Englewood Cliffs, New Jersey: Prentice-Hall Inc.

Bayer, A. E. and Boruch, R. F.
1969 "Black and White Freshmen Entering Four Year Colleges," Educational Record Fall: 371-386.

Braddock, Jomills Henry II.
1981 "Predicting Black Academic Achievement in Higher Education." Journal of Negro Education, 50:319-327.

Brown, Sidney E. and White, Anthony J.
1979 "Differences Between Actual and Predicted Grade Point Averages of Black and White College Students." Perceptual and Motor Skills, 48:1140-1142.

Burlew, Kathleen Hoard.
1979 "Black Youth and Higher Education: A Longitudinal Study." Ohio: Eric Document Reproduction Service No. Ed 181 100.

Cleary, T. A.
1968 "Test Bias: Prediction of Grades of Negro and White Students." Journal of Educational Measurement, 5:115-124.

Council, Kathryn A.
1974 "Graduation and Attrition of Black Students at North Carolina State University." North Carolina State University, Division of Student Affairs, Raleigh, North Caroline: Eric Document Reproduction Service No. Ed 130 588.

Daves, Samuel C. and Loeb, Jane W. and Robinson, Lehymann F.
1970 "A Comparison of Characteristics of Negro and White College Freshmen Classmates." Journal of Negro Education, 39:290-303.

Feldman, Kenneth A. and Newcomb, Theodore M.
1969 The Impact of College on Students, San Francisco, California: Jossey-Bass Publishers, Inc.

Froe, O. D.
1964 "Educational Planning for Disadvantaged College Youth." Journal of Negro Education, 33:290-303.

Glenny, Lyman A.
1980 "Demographic and Related Issues for Higher Education in the 1980's." Journal of Higher Education, 51:363-380.

Gough, H. G.
1964 Manual for the California Psychological Inventory, Palo Alto, California: Consulting Psychological Press.

Grimsley, Harvey, and Suddick, David E. and White, Anthony J.
1981 "Five Years After Matriculation: A Comparison of Grades and Attrition of Black and White College Students." Journal of College Student Personnel, March:177.

Hedegard, James M. and Brown, Donald R.
1969 "Encounters of Some Negro and White Freshmen With a Public Multiversity." Journal of Social Issues, 25:131-144.

Holland, J. L.
1965 Manual: Vocational Preference Inventor, Iowa City, Iowa.

Jencks, Christopher.
1972 Inequality: A reassessment of the Effect of Family and Schooling in America, New York, New York: Harper and Row Publishers.

Kaye, Robert A.
1972 "A Required Counseling - Study Skills Program for Failing College Freshmen." Journal of College Student Personnel, March:159-162.

Lenning, O. T.
1974 "Nonintellective Correlates of Grades, Persistence and Academic Learning in College." Iowa City, Iowa, American College Testing Program.

McKelpin, J. P.
1965 "Some Implications of the Intellectual Characteristics of Freshmen Entering a Liberal Arts College." Journal of Educational Measurement, 2:161-166.

Newcomb, Theodore M. and Wilson, Everett K.
1966 College Peer Groups, Chicago, Illinois: Aldine Publishing Company.

Pavalko, Ronald M.
1976 Sociology of Education: A Book of Readings, Itasca, Illinois: F. E. Peacock Publishers, Inc.

Pfeifer, C. Michael Jr. and Sedlacek, William E.
1974 "Predicting Black Student Grades with Non-Intellectual Measures." Journal of Negro Education, 43:67-76.

Pfeifer, C. Michael Jr. and Sedlacek, William E.
1971 "The Validity of Academic Predictors for Black and White Students at a Predominantly White University." Journal of Educational Measurement, 8:253-261.

Rootman, Irving.
1972 "Voluntary Withdrawal from a Total Adult Socialization Organization: A Model." Sociology of Education, 45: 258-270.

Sowell, Thomas.
1972 Black Education Myths and Tragedies, New York, New York: David McKay Company, Inc.

Stanley, Julian C.
1971 "Predicting College Success of the Educationally Disadvantaged." Science, 171:640-647.

Stanley, Julian C. and Thomas, Charles Leo.
1969 "Effectiveness of High School Grades for Predicting College Grades of Black Students: A Review and Discussion." Journal of Educational Measurement, 6:203-215.

Wallace, Walter L.
1966 Student Culture, National Opinion Research Center, Chicago, Illinois: Aldine Publishing Company.