

AN ANALYSIS OF INTERVENTION PROGRAMS AND THEIR EFFECTS UPON  
THE ACHIEVEMENT OF BLACK GRADUATES OF PREDOMINATELY  
WHITE AND BLACK HIGH SCHOOLS

by

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(ABSTRACT)

The purpose of this study was to compare the academic performance of black freshmen at Virginia Polytechnic Institute and State University who had graduated from predominantly black and predominantly white high schools after their involvement in Intervention Programs on selective variables with those students who have graduated from black and white high schools who did not participate in these programs.

Four groups were created for this comparison: Group A--those students who graduated from black high schools and participated in Intervention Programs; Group B--those students who graduated from predominantly black high schools and who did not participate in these programs; Group C--those students who graduated from predominantly white high schools and who participated in Intervention Programs; Group D--those students who graduated from predominantly white high schools and who did not participate in these programs.

The 4 groups were compared on their mean high school grade point average (HGPA), Scholastic Aptitude Test (SAT) scores, math and verbal, the Test of Standard Written English (TSWE) scores, and freshmen cumulative grade point average (FGPA).

A two-way analysis of variance (ANOVA) was conducted for type of school graduated, predominantly black or white, and participation or non-participation in Intervention Programs. Also a Pearson product-movement correlation coefficient (Pearson correlation) was performed to ascertain relationship between HGPA and FGPA. In addition, a Pearson correlation was performed between FGPA and the following variables: amount of financial aid, citizenship, family income, and kinds of financial aid.

The findings revealed the following:

Even though black students who participated in Intervention Programs had significantly lower high school grade point averages and standardized test scores, after 1 year, students who had participated in Intervention Programs mean FGPA was not significantly different from those students who had not participated in these programs. The results showed that there was an association between participation in Intervention Programs and improved academic performance.

Even though black graduates of predominantly white high schools had higher standardized test scores than did black graduates of predominantly black high schools, these higher test scores did not translate into a higher mean freshmen grade point average.

Graduates of predominantly black high schools who came from low-income families did better academically than did graduates of predominantly white high schools who came from low-income families.

Students who received financial aid had a higher mean freshmen grade point average than did students who did not receive financial aid.

Graduates of predominantly black high schools had a slightly higher mean grade point average, from high school through college, than did graduates of predominantly white high schools.

For students who participated in Intervention Programs, their high school grade point averages were not good predictors of their college grade point averages. In general, students who participated in Intervention Programs fared as well as students who did not when compared for academic survival. However, for students who did not participate in these programs, their high school grade point averages were good predictors of their college grade point averages.

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## CHAPTER I

### INTRODUCTION

Currently, much is being discussed about educational opportunities for minorities in Virginia and in the nation. Because of segregation laws and because of fewer opportunities in the past, blacks did not attend predominantly white state colleges and universities in the South.

According to Bennett (1969), Butt (1978), Garrett (1972), and Swint (1967), there were no provisions and fewer opportunities for blacks to receive an education prior to the Civil War. There were laws on the books which said that it was against the law to teach blacks how to read in many southern states (Bennett, 1969; and Wynes, 1965). The education which was available to blacks after the Civil War was inferior to that which was offered whites and it was usually offered separately from whites (Holmes, 1934).

Because the majority of the black population lived in the South during this period and because they were required by law to be educated in separate schools, this form of segregation was sanctioned by law until the Supreme Court ruled in 1954 that racial segregation in public schools is unconstitutional (Raffel, 1980; Stephen & Feagin, 1981; Yarmolinsky, et. al., 1981).

Even though segregation was ruled unconstitutional in 1954, Ely (1976) stated that Virginia still operated virtually a dual segregated system until the 1970s. Because of this dual system, the office of

Civil Rights informed Virginia that it needed to devise a plan for equal educational opportunity for all of its students.

Currently, many public higher educational institutions in the South are soliciting blacks in order to fulfill guidelines set by the Federal Government in regard to desegregation. The general held contention, which is supported by the literature, is that many black students are admitted with lower test scores than what are considered necessary for the regular student body (Stafford and Dolin, 1974; Morris, 1979; Smith, 1980; Chase, 1981 and Flemings, 1984).

However, research studies show that Grade Point Average (GPA) is a better predictor for academic success for blacks than standardized test scores (Chase, 1981; Coggiloa 1980; & Garvey, 1981). Yet Thomas and Stanley (1969) and Sedlack, Lewis, and Brooks (1973) have stated that high school grade point average is a poor predictor of college success for black males.

Even more important, Robert Newby (1982) stated that black children who attended predominantly black schools do not achieve as well as other children, black or white, who attended predominantly white schools. In this regard, James Coleman (1966), in what is referred to as the "Coleman Report," stated that while blacks who attended predominantly white schools, do show some gains on achievement tests, black males score poorly on achievement tests when they had attended overwhelmingly white schools. However, Crain and Mahard (1978) analyzed data from the National Longitudinal Reported Study of the senior class of 1972 and reported that southern black graduates of predominantly white high schools were less likely to attend and survive

in college than those from predominantly black schools. In the North the opposite was true. Blacks who graduated from predominantly white high schools were more likely to attend and survive college.

Because of these findings and differences, the author decided that an interesting study would be to investigate the academic performance of black freshmen graduates of predominantly black and white high schools at Virginia Polytechnic Institute and State University (Virginia Tech).

#### Research Problem

Do black students at Virginia Polytechnic Institute and State University who have graduated from predominantly black and predominantly white high schools differ on selected variables after their involvement in interventional type of programs from those black students who graduated from predominantly black and predominantly white high schools who did not participate in these type of programs?

#### Purpose

The purpose of this study was to compare the academic performance of black students who have graduated from predominantly black high schools after completing the freshmen year at Virginia Polytechnic Institute and State University with the academic performance of black students who have graduated from predominantly white high schools. The primary objectives were to determine:

(1) the academic performance of the four groups as measured by high school grade point average (HGPA), Scholastic Attitude Test (SAT),

math/verbal scores, and the Test of Standard Written English (TSWE) score;

(2) the correlation of their college freshmen academic performance as measured by freshmen mean grade point average (FGPA) with their high school academic performance as measured by their mean high school grade point average (HGPA);

(3) the effect of Intervention Programs on the retention rate for students;

(4) the relationship between academic performance and the major field of study for students;

(5) the relationship between academic performance and family income for students;

(6) the relationship between academic performance and time utilized for employment for students;

(7) the relationship between the academic performance and the sex of the students; and

(8) the relationship between the academic performance and the amount of financial aid received by the students.

### Research Questions

The following questions were generated for this study.

Research Question 1. Is there a difference in the mean high school grade point average (HGPA)<sup>1a</sup>, Scholastic Attitude Test (SAT) scores<sup>1b</sup>, math and verbal, and the Test of Standard Written English (TSWE) scores<sup>1c</sup> among the four groups?

Research Question 1a. Is there a difference in the mean high school grade point average (HGPA) among the 4 groups? Is there a difference as a function of sex?

Research Question 1b. Is there a difference in the mean Scholastic Attitude Test verbal (SATV) and math (SATM) scores among the 4 groups? Is there a difference as a function of sex?

Research Question 1c. Is there a difference in the Test of Standard Written English (TSWE) score among the 4 groups? Is there a difference as a function of Sex?

Research Question 2. Is there a difference in the freshmen grade point average (FGPA) among the 4 groups? Is there a difference as a function of sex?

Research Question 3. Is there a correlation between the mean high school grade point average (HGPA) and the freshmen grade point average (FGPA) for the 4 groups?

Research Question 4. Is there a relationship between FGPA and the student's major field of study for the 4 groups? Is there a difference as a function of sex?

Research Question 5a. Is there a relationship between FGPA and family income, for the 2 groups, those students who graduated from predominantly black high schools and those students who have graduated from predominantly white schools?

Research Question 5b. Is there a relationship between FGPA and family income for all students, both groups combined?

Research Question 6a. Is there a relationship between the FGPA and the kinds of financial aid received - that is, scholarship, work-study, grant, or loans - for the 2 groups, graduates of predominantly black high schools and graduates of predominantly white high schools?

Research Question 6b. Is there a relationship between FGPA and the kinds of financial aid received for all students both groups combined?

Research Question 7a. Is there a relationship between the mean FGPA and the amount of financial aid received for the 2 groups, graduates of predominantly black high schools, and graduates of predominantly white high schools?

Research Question 7b. Is there a relationship between FGPA and the amount of financial aid received for all students, both groups combined?

Research Question 8a. Is there a relationship between the mean FGPA and the type of college directed courses taken in high school for the the 2 groups, graduates of predominantly black or white high schools? With college-courses being defined in this study as advanced/honors English, and any course in chemistry, physics, and computer science?

Research Question 8b. Is there a relationship between the mean FGPA and the number of math courses taken in high school beyond algebra II for the 2 groups, graduates of predominantly black or white high schools?

Research Question 9a. Is FGPA correlated with citizenship for the 2 groups, graduates of predominantly black or white high schools? With citizenship being defined for this study as participation in any one of the following in high school: athletics, clubs or student government.

Research Question 9b. Is FGPA correlated with citizenship for all students, both groups combined?

Research Question 10. Is there a difference between the status of academic probation for black freshmen who had graduated from predominantly black and predominantly white high schools and who participated in Intervention Programs and those black freshmen who had graduated from predonimantly black and predominantly white high schools and did not participate in these programs?

Research Question 11. What is the retention rate for all four groups?

#### SIGNIFICANCE OF THE STUDY

Currently, Virginia Tech is in the midst of a recruiting campaign to enroll more minorities from the state's public schools. This study should provide valuable information which can be used in recruitment and retention of black students by investigating whether Intervention Programs produced improvement in the academic performance of black black students. In addition the study should yield valuable

information about the academic preparation of black students from both predominantly black and predominantly high schools.

#### DEFINITION OF TERMS

The following words or phrases have been defined specifically for this study:

Academic Performance -- high school and college grade point average.

Intervention Programs -- those programs which were designed to enhance the academic and social well being of students. For this study, the following are intervention programs: (a) Counseling (b) Study Hall, (c) Tutoring, (e) Special classes, and (5) Summer Transitional programs sponsored by the college and state.

Predominantly Black High Schools -- are those schools whose racial make-up is more than fifty percent black.

Predominantly White High Schools -- are those schools who racial make-up is more than fifty percent white.

Financial Aid Scholarship -- is both aid awarded on the basis of need and merit.

#### LIMITATION OF THE STUDY

The following limitations must be placed on all generalization of the findings of this study and their application to other population:

1. This study is limited to black freshmen at Virginia Polytechnic Institute and State University, a state university in rural Southwest Virginia.

2. All of subjects were graduated from Virginia's high schools.

3. The Intervention Programs were conducted by the University.

Therefore, any generalization of the findings of this study may not be applicable to population so different from this group. In addition, because this study was an ex post facto design, it suffers from all of the weaknesses of such a design. The inability of the investigator to manipulate the independent variables reduced the interpretations from causals to associations. That is, the whys of the findings are suggestive rather than definitive.

#### SUMMARY

The question, do students who have graduated from predominantly black high schools differ on selective variables from students who have graduated from predominantly white high schools? This question has support from both sides. One group of researchers said that black graduates of predominantly black high schools would not fair as well academically as black graduates of predominantly white high schools on achievement test, while other researchers stated that black graduates of predominantly white high schools were less likely to survive and succeed in college than black graduates of predominantly black high schools. Because of these differences, the author designed this research to investigate this question at Virginia Tech.

This study is an effort to investigate the effects of the type of high school graduated upon the academic performance of black students and also to ascertain whether Intervention Programs are doing what they were designed to do at Virginia Tech. The next chapter presents a review of the literature for the research problem.

## CHAPTER II

### HISTORICAL REVIEW OF THE LITERATURE ON BLACK EDUCATION

Black Americans have had a very different experience in regard to citizenship and education. Any attempt to explain Black education must begin with this different experience of how Blacks arrived in this country.

According to Bennett (1969) the first group of Blacks arrived in this country in 1619 as indentured servants, not as slaves. However, this privileged was short-lived. For the next 240 years most Blacks came to this country in chains and were sold into slavery. Although the majority of Blacks in this country served as slaves, there were some free Blacks throughout the history of slavery, and some of these freemen, according to Bennett even owned slaves. However, the number of slaves greatly exceeded the number of freemen.

In regard to education, there were no provisions made for the education of Blacks and very little was provided for whites until after the Revolutionary War. However, Butts (1978) stated that between 1642 - 1647 the Colonial governments of Massachusetts, Connecticut, and New Hampshire enacted laws requiring parents to see to it that their children learn to read, learn the capital laws, learn the Orthodox Catechism, and become skilled in a trade. They required that the towns appoint teachers and pay them out of local taxes if people voted for the schools.

In spite of this, private education was the way the majority of people received an education. Therefore, only the middle class or those who were fortunate enough to have a sponsor received an education (Butts, 1978).

Although there was not any formal recognition for Black education by the colonies, Garrett (1972) stated that Elias Neau opened a school for Negroes and Indians in 1704 and that Anthony Benezet established an evening school for Blacks in Philadelphia. These were isolated cases for the most part. Blacks were not considered as teachable as whites. Most of the Black population was located in the deep South at this period in our history. Dabney (1936) stated that many curious slave owners experimented with the idea of teaching reading to their slaves to ascertain whether they could learn to read or not, while other slave owners encouraged their slaves to learn to read the Bible so that they could become more tractable? Some free Blacks even went off to schools in the North for formal education. One such Black was John Chavis. Garrett (1972) stated that Chavis was born in Granville County, North Carolina in 1753 and he attended Princeton where he studied under Dr. Witherspoon. When Chavis returned to the south, he started a college preparatory school for young white men in North Carolina and had among his students many who distinguished themselves in the history of North Carolina. One of his former students became a U. S. Senator and another became a governor. Garnett tells of several more of Chavis' students who went on to acclaim in North Carolina. Chavis operated the school until he was forced to close it down after Nat Turner's revolt.

Since Turner and several of the persons who were with him could read and write, many states passed laws prohibiting the teaching of Blacks to read or write (Garrett, 1972).

While there were laws made to prevent Blacks from receiving an education, Thomas Jefferson was espousing the idea of universal education. Dabney (1936) stated that Jefferson proposed to the Virginia General Assembly a "Bill for the More General Diffusion of Knowledge." Although the Virginia General Assembly did not pass the bill, public education was put into practice in New England. Dabney stated that the institution of slavery kept the idea of universal education from beginning in the South. Because of slavery, the wealthy class refused to provide education for the poor. When the South was defeated in the Civil War and people were reduced to one class, then they united to establish public education in all of the states. Dabney stated that North Carolina and Kentucky were the only states which had anything approaching a system of public schools prior to 1860.

During the last years of the Civil War and throughout the period of reconstruction, Pipkin (1971) stated that groups of northern teachers were selected and supported by a number of freedmen's aid societies, aid commissions, and educational association. He stated that some of these societies were organized as relief agencies with their principal object being the alleviation of suffering among the freedmen and the white refugees. After the basic needs were met, these societies cooperated with the Freedmen's Bureau by providing education to Blacks.

The Freedmen's Bureau was established on March 3, 1865, General O. O. Howard, a graduate of West Point and former commander of the Army of Tennessee, was placed in charge. The Bureau was created to help with the relief of freedmen through medical and hospital service; the establishment of schools; the supervision of labor contracts; and the control of all confiscated or abandoned lands.

According to Swint (1967), the Bureau was authorized to sell or lease any property which had belonged to the Confederate Government and to use the money to lease and construct school buildings. The Bureau established schools all over the South and usually staffed them with Northern teachers. Swint stated that there were several groups establishing schools in the South at this time. One of the most notable is the American Missionary Association (AMA). The AMA engaged in relief work and education with the freedmen. The AMA, according to Swint, was an outgrowth of the Amistad Committee, which was organized in 1839 by S. S. Jocelyn, Joshua Leavitt, and Lewis Tappan for the defense of a group of slaves who had killed the captain of the Amistad. The Amistad was a ship on which they were held captive. In 1846, at Syracuse, New York the association was formally organized.

Other groups joined in the movement for the education of Blacks. Hugo Brown (1961) stated that New England Freedman's Aide Society started the education for Negroes in South Carolina and that Chaplains of Northern regiments took an early interest in educating Negroes in North Carolina. Freedmen Societies were organized and members were sent to the South to teach Negroes. Also, religious organizations sent

ministers and teachers to various states to teach the freedmen. Many of the schools created at that time were named colleges and academies, but they were actually elementary schools in nature.

The American Baptist Home Missionary Society contributed to many small schools at that time and continues, even until today, to be the custodian for the endowment fund of Shaw University (Brown, 1961). As already mentioned, many organizations were engaged in the task of aiding freedmen in the south. However, the first Black institution of higher learning in the United States was Ashmun Institute (afterward named Lincoln). It was founded by Presbyterians in 1854 in Lincoln, Pennsylvania (Garrett, 1972).

The first day school for Freedmen, according to Washington (1967) and Garrett (1972), was established on September 17, 1861 in the town of Hampton, Virginia. This school later became Hampton Institute, the alma mater of Booker T. Washington who is considered by some as the greatest Black educator of all time.

Hampton Institute had a curriculum which was basically industrial, designed to train a man for a vocation (Dabney, 1936). Booker T. Washington was trained in this curriculum and when he founded Tuskegee Institute he instituted the same type of curriculum. Washington (1967) made a famous speech at the Atlanta Exposition in which he advocated separate status for Blacks. He said that in things that are purely purely social the races can be as separate as the fingers on one's hand, but for things which are economical, we can be partners. According to Franklin (1967) many Blacks, especially W. E. B. Dubois, objected to that speech.

Dubois who was a Harvard graduate with a Ph.D., did not want second class treatment. Franklin stated that Dubois wanted full equality and thought that Washington's plan of industrial education was a sell-out to the white race. Whatever the case, Washington's speech helped to allay the fears of Southern whites who had felt that Blacks would take over the government after the Civil War (Franklin, 1967).

While Tuskegee and Hampton espoused an industrial education, some Black Colleges which offered the classical curriculum were established. Among these were Howard University, Fisk University, Atlanta University, and Rust University (Holmes, 1934). There were many other private Black colleges established throughout the South, but almost no integrated colleges.

One integrated college was Berea College. According to Pipin (1971) Berea College was an integrated College in Berea, Kentucky in 1858. It operated for several years as a school for blacks and whites.

Whatever thoughts blacks had concerning an integrated education, they were soon dealt a severe blow. The U.S. Supreme Court ruled in Plessy versus Ferguson that separate facilities were constitutional as long as they were equal. This ruling, according to Dubois (1918) set the Black race back, in terms of full acceptance in America, at least twenty years. After the decision in the Plessy versus Ferguson case, segregation laws were passed throughout the south in everything from schools to water fountains. Blacks were forbidden by law from sitting on the same side of the train station, from attending schools with whites, and from drinking out of the same water fountain as whites. If

they attended the same movie house, Blacks had to sit upstairs while whites sat downstairs (Bennett, 1969)

For the next 58 years Blacks fought through the courts challenging the segregation laws. Finally in 1954 the Supreme Court rendered a decision in Brown versus the Board of Education of Topeka, Kansas that separate educational facilities are inherently unequal; therefore, school segregation was unconstitutional. After this decision Blacks begin to have new hope for full participation in the American Dream. However, although the courts had ruled that segregation was unconstitutional, whites who controlled the ballot and the bullets set about to circumvent the law in the South. Few blacks attended schools with whites in 1955 in the South (Chambers, 1968). When blacks began to demand their constitutional right by attempting to enroll in the segregated colleges of the South, they were resisted by mobs of angry whites and armed police who tried and succeeded in most cases to deny their entry.

After much agitation and many deaths, the schools of the South began to enroll Black students. But, it took the power of the President of the U. S. and the Attorney General to desegrate schools in Alabama and Mississippi. Even after desegregation, few Blacks attended predominantly white colleges in the South. Some states had devised plans to slow the rate of desegregation.

#### Desegregation

According to Ashmore (1954), because the U.S. Supreme Court had decided that separate but equal was constitutional in the Plessy Case,

many southern states did little more than give lip service to the doctrine. He stated that neither salaries nor school facilities were equal for blacks. Yet this condition continued until the U.S. Supreme Court reversed itself in the Brown versus the Board of Education of Topeka (1954). In this decision the Court ruled that separate but equal facilities is unconstitutional and that "enforced school segregation imposed inferior status on Negro Children." This decision ushered in what is widely known as the period of "Massive Resistance" to school integration in Virginia and many other states of the South (Ely, 1976).

Ely stated that the State Board of Education told local school officials to continue policy as usual and to disregard the Court's order on desegregation of public schools. He quoted a Richmond News Leader pole released in 1958 which showed that 92 percent of whites favored segregation and only 6 percent opposed it. The Richmond News Leader was not alone in its opposition to school desegregation. Ely stated that virtually every major daily newspaper of the state supported the idea of massive resistance except the Norfolk Virginia-Pilot. Therefore, the politicians continued working to circumvent the intentions of the Court.

Ely (1976) stated that Virginia completed 1957-58 without racial integration of its elementary and secondary schools. However in the fall of 1958 in Warren County, a county in Northwest Virginia, the Court ordered that black students be allowed to attend schools in the county. Prior to this Court order, blacks had been educated in

surrounding counties. When the County implemented the Court order to provide schools for its residences, the Governor of the state announced that the Warren County High School, which was all white at the time, was closed and that it was no longer a part of the state's public school system. Therefore, the state was using its power to keep local communities from desegregation (Ely, 1976).

Desegregation of public schools in Virginia was hampered by elected officials and by the news media. In regard to the elected officials, Ely quoted the Virginia Senate Joint Resolution No. 3 in 1956 as follows:

And be it finally resolved that until the question here asserted by the state of Virginia be settled by clear Constitutional Amendment, we pledge our firm intention to take all appropriate measures, leagally and constitutionally available to us to resist this illegal encroachment upon our soreveign powers and to urge upon our sister states, whose authorities over their own most cherished powers may next be imperiled, their prompt deliberate efforts to check this and futher encroachment by the Supreme Court, through judicial legislation, upon the resolved powers of the state.

This legislative Act for "Massive Resistance" led to stiff opposition by whites to desegregation which eventually led to the closing of schools in Prince Edward County and to the mass exodus of white students from the public schools in Surry County. While Prince

Edward closed its schools for both white and black to resist desegregation, Surry's whites left to attend a private academy leaving the school to blacks.

Even though the Supreme Court had ruled that segregated education is unconstitutional, Virginia remained basically a state with two separate systems until the 1970s (Ely, 1976).

### Busing

How did Virginia schools system remain virtually segregated for all of these years after the Supreme Court ruled in Brown Versus the Board of Education (1954) that segregation by race is unconstitutional? According to Yarmolinsky, and others (1981), after the massive resistance strategy had run its course, the politicians and local school board officials implemented a new plan for volunteer voluntary desegregation of schools. This plan was general referred to as "Freedom of Choice Plan." Under the "Freedom of Choice Plan", parents could petition local school boards for permission to transfer their children to the school of their choice. However, so few blacks participated that the schools were still virtually segregated by race. Yarmolinsky stated that "Ninety-eight percent of black children remained in all black schools after the 1964 Civil Rights Act was signed." Because of this lack of school integration, the Supreme Court issued a Court order for countywide busing in the case of Swann Versus Charlotte-Mecklenburg Board of Education (1971).

In the Swann case, the Court stated that it had an obligation based upon Brown Versus the Board of Education (1954) to eliminate racially segregated public schools. Therefore, it ruled that "Busing is an appropriate tool to use for integration of schools" (Mills, 1979). From this decision, the Charlotte-Mecklenburg School System was ordered to bus children for desegregation of public schools.

Other school districts soon followed the Charlotte-Mecklenburg school desegregation plan. Because of this busing within school districts to achieve racial balance, according to Buncher (1975) Mills (1979), and Stephan and Feagin (1980), whites began to move into districts which had small black populations to circumvent the chance that their children would attend predominantly black schools. The authors implied that whites were avoiding predominantly black schools because the schools were perceived as inferior to predominantly white schools. In regard to moving, usually this meant whites moving from an urban city which had a large school-age population to a suburb which had a small black population. However, in rural areas where blacks represent a small percentage of the school-age population, whites have established a pattern of inward migration, thereby, increasing the likelihood that schools will remain predominantly white (Yarmolinsky, others, 1981).

As we now know, Buncher (1975), Mills (1979), Raffell (1980), Stephan and Feagin (1980), and Yarmolinsky, et. al., (1981), many inner city schools in large urban areas are now predominantly black. If the Brown Versus the Board of Education decision is true: that racially

segregated schools are inherently unequal and that black children suffer feelings of inferiority by attending them. What effect does attending the de facto segregated high school have on blacks? That is, what effect does attending a predominantly black high school have on the educational outcome of black students? Is there a difference between the achievement level of black students who attend predominantly black versus predominantly white high schools? The next section will examine the literature in regard to achievement in desegregated predominantly- black and predominantly-white schools.

#### Achievement in Desegregated Schools

Research on black achievement in desegregated schools seems to be in favor of desegregation. For example, Robert Newby, in the Urban Review Journal (1982), stated that black children who attended predominantly black schools do not achieve as well as other children, black or white, who attend predominantly white schools. In this connection, James Coleman (1966) in what is referred to as the "Coleman Report" stated that while blacks who attended predominantly white schools shows some gains on achievement tests, black males score poorly on achievement when they attended overwhelmingly white schools. Crain and Mahard (1978), however, analyzed data from the National Longitudinal Reported Study of the senior class of 1972 and reported that southern graduates of predominantly white high schools are less likely to attend and survive in college than those from predominantly black schools. In the North the opposite was true. "Blacks who

graduated from predominantly white high schools were more likely to attend and survive college."

In regard to achievement, Coleman, et al (1966) stated that the achievement of black students is predicated more on the school they attended than does the achievement of whites. Similarly, Crain and Mahard (1972) in a meta-analysis of 93 research reports on school desegregation and black achievement, conducted a study to determine why some studies differ on desegregation effects on achievement and whether some desegregation plans yielded greater achievement gains than others. They isolated two methodological factors which they believed explained difference in black achievement in desegregated schools. They concluded that blacks benefit most if they begin desegregated schools in kindergarten or first grade and that research showed that black achievement is highest in schools in the South where black students constitute from 10 to 30 percent of the desegregated school population. And that blacks demonstrated greater achievement in reading and language arts in elementary school and in science and social studies in high schools.

In contrast, Wolters (1984) conducted a study and revisited some school districts thirty years after Brown Versus the Board of Education of Topeka. Wolters stated that he examined the data in the major areas where the Brown decision was drawn upon. He collected and based his findings on data from the following school districts: Clarendon County, South Carolina, New Castle, Delaware, Prince Edward County, Virginia, Topeka, Kansas, and Washington, D.C. He reported that the

education offered to blacks now is no different than that which was offered in 1954. He cited the low scores of blacks on standardized achievement test as evidence for this belief.

Yet, Miller (1982) conducted a meta analysis of 19 desegregation studies and he found that the studies taken collectively showed some moderate academic benefit when black children attend desegregated schools. Similar, Bradley and Bradley (1977) found moderate gains in achievement for blacks who attended integrated schools. These findings on marginally improved academic achievements seemed to be shared by another investigator as well. Krol (1980) used meta-analysis techniques to determine the effects of desegregation on academic achievement when students were grouped by academic subjects, grade level, and by length of desegregation. Data were collected from 71 studies between 1955 and 1971 on the effects of desegregation on academic achievement from K through 12. The findings were that the desegregated group (experimental) benefitted by 0.16 standard deviation. The author reported these differences as stated before, by academic subject, grade level and length of desegregation, and found the results statistically significant. Therefore the author implied that the jury was still out on the effects of desegregation on achievement.

Middleton and Crosby (1979) examined studies on the academic achievement of black students before and after the "Coleman report". They found that academic achievement did not decline for whites as long as the white students were in the majority and the black students

tended to demonstrate improved academic achievement in desegregated schools. Desegregation outcomes were higher in desegregated classrooms than in desegregated schools. Therefore they believed that the jury was in on black achievement in desegregated schools.

In addition, another author found moderate gains for blacks in achievement when they attended desegregated schools. Stephan's (1983) meta-analysis of 19 studies on desegregation for the National Institute of Education Panel was conducted to ascertain the effects on black achievement, self-concept, and race relationships. He found that reading achievement improved for black, whereas math achievement did not. Similarly, another investigator, Cook (1983) used meta-analysis to analyze 19 studies presented to the National Institute of Education (NIE) Panel on the effects of school desegregation on black achievement. He stated that he found little evidence to support the claim that black achievement shows improvement when blacks attend desegregated schools. Instead, Cook's findings showed that blacks did show improvement on reading achievement, but this was not statistically significant. Some improvements were shown in math but this improvement was lower than that which was demonstrated in reading. Therefore, Cook believed that the verdict is still out on black achievement and desegregated schools.

In conclusion, the evidence found is not divided. Instead, most studies show that integration raises achievement levels for blacks and few studies oppose these findings.

Studies Using Interventional Techniques for Improved Academic Performance

According to Arwardy and Chafin (1980); Donnangelo and Sarta Rita (1982), because colleges and universities are increasingly admitting students who are underprepared to do regular college work, many colleges and universities have developed orientation and remedial courses or programs to increase the probability of students surviving academically. These interventional programs are designed to assist students with their educational, career, and personal development. This section will examine those programs which were designed to ameliorate the academic preparation of underprepared students. For this study, these programs are collectively called interventional programs.

In regard to this study, Young (1980) examined the academic development throughout secondary education of participants in one of seven Upward Bound Programs in Iowa. The general goals of this study were to measure the outcome of a compensatory educational program and to measure its effects on student achievement and academic success. The study attempted to determine whether the participants as a group demonstrated significant gains in achievement as a direct result of their involvement in Upward Bound. They were compared against a randomly selected group of regular students who are called non-participants in this study.

The investigator found that the more years the students participated in Upward Bound was directly related to the increase of

successful outcomes. Eighty-one percent of Upward Bound participants completed secondary education on time compared to 80 percent of the non-participants. The author reported that sixty percent of the Upward Bound participants enrolled in post-secondary education compared to forty-nine percent of the non-participant groups.

According to Young, after a two year follow-up study of the class of 1977-78, it was found that forty percent of the Upward Bound participants had completed two or more years of study, while only twenty-nine percent of the non participants had completed two years or more. Also a greater percentage of Upward Bound participants (66%) entered four year colleges than non-participants(51%). The conclusion is that the Upward Bound participants made greater progress than the non-participating group.

Similarly, Armstrong (1976) conducted a study to compare students in the Martin Luther King (MLK) Program at the University of Minnesota with Non-Martin Luther King (Non-MLK) students. The MLK Program was developed to assist disadvantaged students by offering them intense counseling and tutorial services. The Non-MLK participants were randomly selected from the freshmen class of 1972. The study was a four year study, from freshmen to supposedly graduation in 1976.

The data for this study was drawn from high school and pre college test performance.

Three sets of comparisons were made in the study. The first set contrasted MLK to the Non-MLK sample within each college, the second compared students who received degrees with students who did not

receive degrees within the MLK, and a third compared students who received degrees with those who did not in the Non-MLK sample. Student's *t* were run on each variable comparison to ascertain whether observed differences in means were statistically significant. He found that while, the MLK group had lower test scores, there were no significant differences between the high school and college grade point averages. The Non-MLK group graduated at a higher rate, but not significantly higher.

Another investigator Wright (1973) studied the academic performance of the regularly admitted student, the honor or scholarship award students, and the disadvantaged students in a tutorial program at the University of Maryland. The disadvantaged students were admitted under the exception admission policy. In addition, Wright compared disadvantaged students who did not participate in the tutorial program with those who did. As expected, the disadvantaged students in the tutorial program had lower GPA than the honor or regular student; however, they scored higher as a group than did the non-participating disadvantaged group.

Donnangelo and Santa Rita (1982) conducted a study to investigate the effects of the freshmen orientation course at the Bronx Community College upon the mean cumulative grade point average (GPA) and upon the retention of entering freshmen enrolled in SPD-99, a 10 session non-credit course in the fall of 1981.

Comparisons were made between those who attended five or more sessions and those who attended none. The analysis of covariance

revealed a significant increase in the mean GPA and retention rate for those who attended five or more sessions.

In the fall of 1982, the entering class was enrolled in OCD-01, a 15 session one credit course. Comparisons were made between those students who attended seven or more sessions and those who did not attend any sessions. An analysis of covariance indicated a significant increase in mean GPA and retention rate for those who attended seven or more sessions. Then a comparison was made between the two groups of students who attended the orientation sessions. It was found that the SPD-99, fall 1981 group had a higher mean GPA than did the OCD-01, fall 1982 group.

Similarly, Romano and Garfield (1980) conducted a study in 1979 to investigate whether participation in the University of Minnesota's General College (GC) Pilot Education Program (PEP) for academically under prepared minority students improved the academic performance of the participants. The participants in PEP were compared against two control groups. One group consisted of non-white students who did not participate in PEP. This group was randomly selected from the General College. The second group was the entire freshmen psychology class, generally referred to as the psychology-class group. The PEP group received intensive academic advising, counseling, and tutoring. At the end of the 1979-80 year, grades were examined for two control groups and for PEP.

The authors found that PEP students had lower test scores and GPA at the beginning of the program. Yet, the PEP students were found to

be at comparable levels for the fall quarter with regular GC student; however, they tended to perform more poorly than the student in the control groups during the winter and spring quarters.

In a study to examine the effects of academic performance and financial aid factors on retention for the freshmen class of 1974 at Florida State University, Odutola (1983) examined financial aid recipients records to determine if: (a) the type of financial aid package received, (b) amount of money awarded, (c) age, (d) family income, (e) race, and (f) sex were related to academic performance and retention. Data were collected from the student's permanent records and a multi-regression analysis was conducted to analyze the data.

The major findings of the study were: (A) high school grade point average was significant in predicting graduation; (B) the undergraduate grade point average was the most important academic variable in predicting students retention; (C) more females tended to graduate than males; (D) students from higher income families tended to graduate more often than did students from lower income families; (E) the grant package was the most important financial aid type package in explaining retention. However the author found that students who had the loan plus the work study program had the highest attrition rate of any financial aid package. Also the amount of aid awarded was statistically related to the retention.

In general, the studies suggest that interventional type programs were useful mechanisms for improving academic achievement for disadvantaged students.

Method and Procedures for Conducting Comparative Types of Studies  
On Academic Performance

This section will be concerned with examining the literature in the area of research design, procedure for data collection, and analysis of data in comparative types of studies. A limited review of the literature has shown that several investigators have used a descriptive comparison of means, standard deviation, and frequencies for comparative studies on academic performance. In this section, an attempt will be made to report those studies which relate directly to the present study in the area of research design, data collection, and analysis of data.

Similarly, several investigators used descriptive comparison of the academic performance of college students. One such investigator, Armstrong (1976) conducted a study to compare students in the Martin Luther King (MLK) program at the University of Minnesota with Non-Martin Luther King (Non-MLK) students. The MLK program was developed to assist disadvantaged students by offering them intensive counseling and tutorial services. The Non-MLK participants were randomly selected from the freshmen class of 1972. The study was a four year study, from freshmen 1972 to supposedly graduation 1976.

The members of the sample was chosen in the fall of 1972 from the college of liberal arts and from the general college. The data for this study were drawn from high school and pre-college test performances and college attendance and performance. The data was processed by computer as SPSSX to provide distributions and statistics

for all variables. Additional computation yield grade point average for each student.

Then three sets of comparisons were made in the study. The first set contrasted MLK to NON-MLK sample within each college, the second compared students who received degrees with students who did not receive degrees within MLK and a third compared students who received degrees with those who did not in the Non-MLK sample. Student's *t* were run on each variable comparison to ascertain whether observed differences in means were statistically significant. He found that while the MLK group had lower test scores, there were no significant differences between the high school and college grade point averages. The Non-MLK group graduated at a higher rate, but not significantly higher.

Another investigator Wright (1973) investigated the academic performance of the regularly admitted student, honor or scholarship award students, and disadvantaged students at the University of Maryland, Baltimore County. The disadvantaged students were admitted under the exception admission policy. A comparison was made of the effect of tutorial assistance upon grade point average of those students who were classified as disadvantaged and took part in the program compared to those who were classified as disadvantaged and did not participate in the program. Data were collected on grade point average, cumulative hours earned, SAT scores, Math and Verbal. A descriptive comparison of academic performance using mean grade point average and participation or non-participant in the tutorial programs.

Basic statistics of means, standard deviations and frequencies were used to describe the groups and an analysis of variance was used for analysis of relationship between means. Although the experimental group had a lower GPA than the regular or honor group, Wright found that the disadvantaged students who took part in the tutorial program had a significantly higher mean grade point average than did the group who did not participate.

Yet another investigator, Hrabowski (1975), conducted a study to compare the graduate academic performance of blacks students who graduated from predominantly black colleges with those who graduated from predominantly white colleges. This study was conducted at the University of Illinois at Urbana-Champaign.

The purpose of this study was to compare the academic performance of black American graduate students who graduated from traditionally black colleges with the performance of black American graduate students who graduated from predominantly or historically white colleges. This current study is based upon some concepts and some of the methodology of this study.

This study is a descriptive comparison of the graduate academic performance between black students who attended predominantly black undergraduate school with those who attended predominantly white undergraduate school. The design is an ex post facto analysis of the relationships between attendance at black versus attendance at a white college and graduate academic performance as measured by grade point average (GPA). Two groups were formed: Group A -- black graduates

from predominantly black colleges and Group B--black graduates from predominantly white colleges. The two groups were compared on GPA, at the master's-level graduation rate, doctorals level retention rate, and doctoral level graduate. Students were further classified by field of study, and then compared within their field.

The sample consisted of 350 black American graduate students who entered master's or doctoral degree program at the University of Illinois at Urbana-Champaign between June, 1968 and February, 1973. In the sample, the number of graduates of predominantly black colleges exceeded the number of graduates of predominantly white college. Data was collected from the Graduate College student files and from the Minority Student Affairs Office at the University. The undergraduate grade point average, quality rating of the institution, type of degree, and sex were descriptive and independent variables. The dependent variable is graduate grade point average.

A two-way analysis of variance was performed to test the significance of difference in mean graduate grade point average, black college versus white college, within their field of study.

He found that the performance of the two groups were not significantly different as measured by grade point average, retention rate, graduation rate. Therefore, he concluded that the University should continue to recruit on predominantly black college campuses.

In general, studies suggest that ex post facto design is a widely used design for analysis of relationship between groups, and that academic performance is measured by grade point average in these

studies. In addition, descriptive data and a two way analysis of variance were used as a test of significant in some comparison studies.

### Conclusion

Some investigators believed that the predominantly white high schools improved the achievement of blacks, while others believed that there is no significance difference between predominantly black and predominantly white high schools. For this reason, the author believes that the current investigation will contribute valuable information to Virginia Tech on recruitment and on the retention rates of black graduate of predominantly black and predominantly white high schools. In addition, this study should reveal whether intervention type programs, which are designed to improve academic performance at Virginia Tech, are accomplishing what they were designed to accomplish.

## CHAPTER III

### METHOD OF STUDY

This chapter presents and describes the method of this study under the following headings: (a) design, (b) research question (c) sample, (d) data collection, (e) procedure for analyzing data, and limitation. In accordance with the design of this study the research questions examined the difference in academic performance between four groups of students on selective variables after their graduation from high school and after their freshmen year of college. A correlation was computed between high school GPA and freshmen GPA for all groups. Comparisons were made between students who have participated in Intervention Programs and those who have not participated in these types of programs. The discussion of the sample provided a detailed description of the four groups. The data collection section has included a list of variables used in the study, and the last section presents the statistical analysis of the data for this study.

#### Design

The design was an ex post facto 2x2 ANOVA descriptive analysis of the relationship between participation in Intervention Programs and non-participation in these programs, and the relationship between attendance of a predominantly white or black high school and academic performance in high school and college as measured by grade point average.

For this purpose of comparison, students were divided into four groups: (Group A, Group B, Group C, and Group D). Group A constituted those students who have graduated from predominantly black high schools and who have participated in Intervention Programs. Group B constituted those students who have graduated from predominantly black high schools and who did not participate in Intervention Programs. Group C constituted those students who graduated from predominantly white high schools and did participate in Intervention Programs. Group D constituted those students who graduated from predominantly white high schools and did not participate in Intervention Programs.

The four groups were compared on their mean high school grade point average (HGPA), Scholastic Aptitude Test (SAT) scores, math and verbal, Test of Standard Written English (TSWE) score, and freshmen grade point average (FGPA). In addition, two groups, graduates of predominantly black and graduates of predominantly white high schools, were compared on variables for employment, high school activities, courses taken in high school, financial aid, family income, sex, and their academic performance according to college enrolled. The problem for this study was:

Do black students at Virginia Polytechnic Institute and State University who have graduated from predominantly black and predominantly white high schools differ on selected variables after their involvement in Intervention Programs from those black students who graduated from predominantly black and predominantly white high schools who did not participate in these type of programs?

The following research questions were analyzed with the specific statistical procedure mentioned:

Research Question 1a. Is there a difference in the mean high school grade point average (HGPA) among the 4 groups? Is there a difference as a function of sex?

An ANOVA procedure was conducted with HGPA as the dependent variable, and the sex of the participants, their involvement in Intervention Programs, and the type of high school graduated, predominantly black or white as the independent variables.

Research Question 1b. Is there a difference in the mean Scholastic Attitude Test verbal (SATV) and math (SATM) scores among the 4 groups? Is there a difference as a function of sex?

An ANOVA procedure was conducted with SATV and SATM as the dependent variables, and the sex of the participants, their involvement in Intervention Programs, and type of high school graduated, predominantly black or white as the independent variables.

Research Question 1c. Is there a difference in the Test of Standard Written English (TSWE) score among the 4 groups? Is there a difference as a function of sex?

An ANOVA procedure was conducted with TSWE score as the dependent variable, and the sex of the participants, their involvement in Intervention Programs, and type of high school graduated, predominantly black or white as the independent variables.

Research Question 2. Is there a difference in the freshmen grade point average (FGPA) among the 4 groups? Is there a difference as a function of sex?

An ANOVA was conducted with FGPA as the dependent variable, and the sex of the participants, their involvement in Intervention Programs, and

the type of high school graduated, predominantly black or white as the independent variables.

Research Question 3. Is there a correlation between the mean high school grade point average (HGPA) and the freshmen grade point average (FGPA) for the 4 groups?

A Pearson product-movement correlation coefficient was performed between HGPA and FGPA for each Group.

Research Question 4. Is there a relationship between FGPA and the student's major field of study for the 4 groups? Is there a difference as a function of sex?

An ANOVA was conducted to ascertain the relationship between FGPA and college enrolled. FGPA and family income, for the 2 groups, those students who graduated from predominantly black high schools and those students who have graduated from predominantly white high schools?

Research Question 5a. Is there a relationship between FGPA and family income, for the 2 groups, those students who graduated from predominantly black high schools and those students who have graduated from predominantly white schools?

An ANOVA was conducted with FGPA as the dependent variable, and type of high school graduated, predominantly black or white, and family income as the dependent variables.

Research Question 5b. Is there a relationship between FGPA and family income for all students, both groups combined?

A Pearson product correlation coefficient was conducted between the FGPA and family income for all students.

Research Question 6a. Is there a relationship between the FGPA and the kinds of financial aid received - that is, scholarship, work-study, grant, or loans - for the 2 groups, graduates of predominantly black high schools and graduates of predominantly white high schools?

An ANOVA procedure was performed with FGPA as the dependent variable, and type of high school graduated and type of financial aid received as the independent variables.

Research Question 6b. Is there a relationship between FGPA and the kinds of financial aid received for all students both groups combined?

All four types of financial aid were computed to create a new variable called KFINAID. An ANOVA was performed with FGPA as the dependent variable and KFINAID as the independent variable.

Research Question 7a. Is there a relationship between the mean FGPA and the amount of financial aid received for the 2 groups, graduates of predominantly black high schools, and graduates of predominantly white high schools?

An ANOVA was performed with FGPA as the dependent variable, and the type of high school graduated, predominantly black or white, and the amount of financial aid as the independent variables.

Research Question 7b. Is there a relationship between FGPA and the amount of financial aid received for all students, both groups combined?

A Pearson product-movement correlation coefficient was performed between variables FGPA and FINAID.

Research Question 8a. Is there a relationship between the mean FGPA and the type of college-directed courses taken in high school for the the 2 groups, graduates of predominantly black or white high schools? With college-courses being defined in this study as advanced/honors English, and any course in chemistry, physics, and computer science?

An ANOVA procedure was performed with FGPA as the dependent variable, and type of high school graduated, predominantly black or white, and type of courses taken as the independent variables.

Research Question 8b. Is there a relationship between the mean FGPA and the number of math courses taken in high school beyond algebra II for the 2 groups, graduates of predominantly black or white high schools?

For the question, the number of courses taken beyond algebra II was counted. All students in this study had taken algebra II in high school.

AN ANOVA was performed with FGPA as the dependent variable, and the type of high school graduated, predominantly black or white, and number of math courses taken beyond algebra II as the independent variables.

Research Question 9a. Is FGPA correlated with citizenship for the 2 groups, graduates of predominantly black or white high schools? With citizenship being defined for this study as participation in any one of the following in high school: athletics, clubs or student government.

For this question, a new variable was created by computing athletics, clubs and student government into CITSHIP.

A Pearson product-movement correlation coefficient was performed between the variables FGPA and CITSHIP for both groups, graduates of predominantly black and predominantly high schools.

Research Question 9b. Is FGPA correlated with citizenship for all students, both groups combined?

A Pearson correlation was performed between the variables FGPA and CITSHIP for all students.

Research Question 10. Is there a difference between the status of academic probation for black freshmen who had graduated from predominantly black and predominantly white high schools and who participated in Intervention Programs and those black freshmen who had graduated from predominantly black and predominantly white high schools and did not participate in these programs?

An ANOVA was performed with FGPA as the dependent variable, and involvement in Intervention Programs and type of high school graduated, predominantly black or white, as the independent variables.

Research Question 11. What is the retention rate for all four groups?

An ANOVA was performed with FGPA as the dependent variable, and involvement in Intervention Programs and type of high school graduated, predominantly black or white as the independent variables. The computer was programmed to select only those grade point averages which was 1.50 and above.

#### Population

The population consists of 159 black freshmen students who entered Virginia Polytechnic Institute and State University in the fall of 1984. These were first time freshmen. There were no transfer students included. All students were Virginia high school graduates.

#### Procedure

Because this is a study for descriptive comparison of academic achievement, students were divided into four groups. Group A -- black students who graduated from predominantly black high schools who participated in Intervention Programs and Group B -- black students who have graduated from predominantly black high schools who did not participate in Intervention Programs. Group C -- black students who graduated from predominantly white high schools who did participate in Intervention Programs. Group D -- black students who graduated from predominantly white high schools who did not participate in Intervention Programs.

Collection of Data

Data on students were collected from the undergraduated student files and the Minority Student Affairs Office at Virginia Polytechnic Institute and State University. The high school variables and test scores were collected from the undergraduated admission office and from the office of Minority Affairs. The freshmen grade point averages were retrived from the office of Student Systems, and variables associated with financial aid and family income were collected from the Finanical Aid Office.

The following variables were tested in this study.

1. Academic Major (College Enrolled)
2. College Freshmen Grade Point Average (FGPA)
3. Citizenship (Participating in athletics, clubs and student government in high school)
4. College-Directed Courses (courses taken in high school for preparation for college)
5. Family Income
6. Financial Aid
7. High School Grade Point Average (HGPA)
8. Intervention Program
9. Scholastic Attitude Test (SAT) scores, math and verbal
10. Sex
11. Test of Standard Writing English (TSWE) score
12. Type of High School (Predominantly) Black or White

The dependent variables used for this study were FGPA, HGPA, SAT scores, math and verbal, and TSWE scores.

### Data Analysis

The data collected was analyzed using the Statistical Package for the Social Science (SPSSX) at Virginia Polytechnic Institute and State University. The following statistical procedures were used to answer the research questions: (1) An Analysis of Variance (ANOVA) procedure was used to form the four groups and it was also used to test significant among means. (2) A Pearson Product Movement Correlation coefficient procedure was used to ascertain relationships and correlation between two variables; and (3) a Tukey -- B test was used to test for significant among means.

### Rational for Statistical Techniques

An Analysis of Variance (ANOVA) was one of the statical procedure chosed for this study because Ary et al (1972) stated that it was an effective technique to test for significant difference among more than two means and because it can test the effect of more than one independent variable and also the interactional effect.

A perason product movement correlation coefficient (Pearson correlation) procedure was used to show relationship between the dependent variable and the independent variable. Ary et al (1972) stated that:

correlation techniques are particularly useful in making predictions. If we know that there is a

correlation between two variables, then we can predict from one variable to the other. For example, since we know that IQ and grade point average (GPA) are positively correlated, we can predict with some degree of accuracy that an individual with a high IQ will probably have a high GPA. To be valuable for predictions, the extent of correlation between two variables must be substantial, and, of course, the higher the correlation, the more accurate the prediction.

#### LIMITATION OF THE STUDY

This study is limited to black freshmen at Virginia Tech, a state university in Southwest Virginia. All of the subjects were graduated from Virginia's high schools. And the Intervention Programs were designed and conducted by the university. Therefore, any generalization of the findings of this study may not be applicable to populations different from this group.

Because this study was an ex post facto design, it suffers from all of the weaknesses of such a design. The inability of the investigator to manipulate the independent variables reduced the interpretations from causals to associations. That is, the whys of the findings are suggestive rather than definitive.

The next Chapter, Chapter 4 presents the findings for this study.

## CHAPTER IV

### PRESENTATION OF RESULTS

The problem for this study was to ascertain whether black students at Virginia Polytechnic Institute and State University who have graduated from predominantly black and predominantly white high schools differ on selected variables after their involvement in Intervention Programs from those black students who have graduated from predominantly black and predominantly white high schools who did not participate in these type of programs?

This chapter reports the results of the research questions involved and consist of the following: (1) a statement of the particular research question involved; (2) a tabular presentation of the findings for the question, (3) a narrative presentation of the findings for the particular question, and (4) additional findings discovered through investigation of this study.

#### Results

##### Research Question 1:

1. Is there a difference in the mean high school grade point average (HGPA)1a, Scholastic Attitude Test (SAT) scores 1b, Math and Verbal, and the Test of Standard Written English (TSWE) scores 1c among the four groups?

The four groups are as follows: Group A--those black students who had graduated from predominantly black high schools and who

did participate in Intervention Programs; Group B--those black students who had graduated from predominantly black high schools and who did not participate in Intervention Programs; Group C--those black students who had graduated from predominantly white high schools and who did participate in Intervention Programs; Group D--those black students who had graduated from predominantly white high schools and who did not participate in Intervention Programs.

Research Question 1a. Is there a difference in the mean high school grade point average (HGPA) among the 4 groups? Is there a difference as a function of sex?

An analysis of variance (ANOVA) procedure was conducted to ascertain the mean HGPA among the four groups.

Table 1 shows the results of the ANOVA procedure with HGPA as the dependent variable, and the sex of the participants, their involvement in Intervention Programs (INTP), and the type of high school from which they have graduated (HISCBW), predominantly black or predominantly white, as the independent variables.

The ANOVA procedure revealed that there were significant differences at .05 alpha level by sex, by HISCBW, by INTP.

The F value for the mean HGPA comparison between females and males was 8.859. This value was significant at .05 alpha level. Females had a higher mean HGPA 3.14 than males 2.92, and there were more females 84 than males 75.

The F value for the mean HGPA comparison between students who participated in Intervention Programs and those students who did not was 20.164. This value was significant at .05 alpha level. Students

Table 1.

Black Freshmen High School Grade Point Average at Virginia Tech by  
Sex, INTP, HISCBW

Source of Variance	SUMMARY ANOVA				
	Sum of Squares	df	Mean Square	F	Significance of F
Main Effects	7.522	3	2.507	11.286	0.000
Sex	1.968	1	1.968	8.859	0.003*
INTP	4.479	1	4.479	20.164	0.000*
HISCBW	0.572	1	0.572	4.377	0.038*
Two Way Interactions	0.443	3	0.148	0.664	0.038
Sex INTP	0.296	1	0.296	1.334	0.250
Sex HISCBW	0.056	1	0.056	0.253	0.616
INTP HISCBW	0.107	1	0.107	0.482	0.488
Three Way Interactions	0.311	1	0.311	1.401	0.238
Sex INTP HISCBW	0.311	1	0.311	1.401	0.238
Explained	8.276	7	7.182	5.322	0.000
Residual	33.544	151	0.222		
Total	41.820	158	0.265		

Note: Sex = Female, male

INTP = Intervention Program, participated or non-participation

HISCBW = High School graduated, predominantly black or white

\* = Significant difference at .05 alpha level

who participated in Intervention Programs had a lower mean HGPA 2.80 than did those students who did not participate in Intervention Programs 3.15. There were 52 students who participated in Intervention Programs and 107 students who did not participate.

The F value for the mean HGPA comparison between students who had graduated from predominantly black high schools and those students who had graduated from predominantly white high schools was 4.377. This value was significant at .05 alpha level. Graduates of predominantly black high schools had a higher mean HGPA 3.15 than did graduates of predominantly white high schools 2.97. There were 60 students who graduated from predominantly black high schools and 99 students who graduated from predominantly white high schools.

As shown in Table 2, Group A had a mean HGPA of 2.88 and 19 students. Group B had a mean HGPA of 3.28 and 41 students. Group C had a mean HGPA of 2.76 and 33 students. Group D had a mean HGPA of 3.07 and 66 students. Groups A and C were significantly different from Groups B and D. However, Group A was not significantly different from Group C, and Group B was not significantly different from Group D.

In conclusion, females had a higher mean HGPA 3.14 than males 2.92; students who graduated from predominantly black high schools had a higher mean HGPA 3.15 than graduates of predominantly white high schools 2.97; and students who participated in Intervention Programs had a lower mean HGPA 2.80 than students who did not participate in these programs 3.15.

Groups A and B were groups which participated in Intervention Programs and Groups C and D were groups which did not participate in

Table 2

Black Freshmen High School Grade Point Average (HGPA) at Virginia Tech  
by High Schools and Involvement in Intervention Programs

	Graduates of Predominantly Black High School	Graduates of Predominantly White High School
Participation In Intervention Program	Group A  $\bar{x} = 2.88$  $n = 19$	Group C  $\bar{x} = 2.76$  $n = 33$
Non-Participation In Intervention Program	Group B  $\bar{x} = 3.28$  $n = 41$	Group D  $\bar{x} = 3.07$  $n = 66$

$\bar{x}$  = Mean of each condition

$n$  = Number of students in each condition

these programs. Groups A and C were significantly different from Groups B and D. The intervention groups (A and C) had significantly lower grade point averages than did the non-intervention groups (B and D).

Research Question 1b. Is there a difference in the mean Scholastic Attitude Test verbal (SATV) and math (SATM) scores among the 4 groups? Is there a difference as a function of sex?

An ANOVA procedure was conducted with SATV score as the dependent variable, and the sex of participants, their involvement in Intervention Programs (INTP), and type of high school graduated (HISCB), predominantly black or white, as the independent variables.

As shown in Table 3, the F value for the mean SATV score comparison between females and males was 0.832. This value was not significant at the .05 alpha level. The ANOVA revealed that females had a means SATV score of 420 and males 430. There were SATV scores for 84 females and 74 males. The F value for the mean SATV score comparison between students who participated in Intervention Programs and those students who did not was 28.994. This value was significant at .05 alpha level. Students who participated in Intervention Programs had a lower mean SATV score 380 than did those students who did not participate in Intervention Programs 460. There were 51 students who participated in Intervention Programs and 107 who did not participate in Intervention Programs.

The F value for the mean SATV score comparison between students who have graduated from predominantly black high schools and those students who have graduated from predominantly white high schools was 7.066. This value was also significant at the .05 alpha level. Graduates of predominantly black high schools had a lower mean SATV

Table 3

Scholastic Attitude Test, Verbal (SATV) scores by Sex INTP HISCBW

SUMMARY OF ANOVA					
Source of Variation	Sum of Squares	DF	Mean Square	F	Significance of F
MAIN EFFECTS	2050.179	3	683.393	11.891	0.000
SEX	2.608	1	2.608	0.045	0.832
HISCBW	406.076	1	406.076	7.066	0.009*
INTP	1666.273	1	1666.273	28.994	0.000*
TWO WAY INTERACTIONS	34.703	3	11.568	0.201	0.895
SEX HISCBW	4.908	1	4.908	0.085	0.771
SEX INTP	30.960	1	30.960	0.539	0.464
HISCBW INTP	0.890	1	0.890	0.539	0.901
THREE WAY INTERACTIONS	18.344	1	18.344	0.015	0.573
SEX HISCBW INTP	18.344	1	18.344	0.319	0.573
EXPLAINED	2103.226	7	300.461	0.319	0.00
RESIDUAL	8620.451	150	57.470	5.228	
TOTAL	10723.677	157	68.304		

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159 Cases were Processed

1 Case (0.6 pct.) was missing

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Note: Sex = Male, female

HISCBW = High school graduated, predominantly black or white

INTP = Involvement in Intervention Program, predominantly black or white.

\* = Significant difference at .05 alpha level

score 410 than did graduates of predominantly white schools 440. There were SATV scores available for 59 students who had graduated from predominantly black high schools and 99 students who had graduated from predominantly white high schools.

As shown in Table 4, Group A had a mean score of 350 and 18 students. Group B had a mean SATV score of 430 and 33 students. Group C had a mean SATV score of 390 and 41 students. Group D had a mean SATV score of 460 and 66 students. Groups A and C were significantly different from Groups B and D. However, Group A was not significantly different from Group C, and Group B was not significantly different from Group D.

An ANOVA was performed with the Scholastic Attitude Test Math (SATM) score as the dependent variable and the sex of the participants, their high school graduated (HISCBW), and their involvement in Intervention Programs (INTP) as the independent variables.

As shown in Table 5, the F value for the mean SATM score comparison between females and males was 1.543. This value was not significant at .05 alpha level. The ANOVA revealed that females had a mean SATM score of 480 and the mean SATM score for males was 490. There were SATM scores available for 84 females and 74 males.

The F value for the mean SATM score comparison between students who participated in Intervention Programs and those students who did not was 18.320. This value was significant at .05 alpha level. Students who participated in Intervention Programs had a lower mean SATM score 440 than did those students who did not participate 500.

Table 4

Black Freshmen Mean SATV Scores at Virginia Tech

	Graduates of Predominantly Black High School	Graduates of Predominantly White High School
Participation In Intervention Program	Group A  $\bar{x} = 350$  $n = 18$	Group C  $\bar{x} = 390$  $n = 41$
Non-Participation In Intervention Program	Group B  $\bar{x} = 430$  $n = 33$	Group D  $\bar{x} = 460$  $n = 66$

$\bar{x}$  = Mean of each condition

$n$  = Number of students in each condition

Table 5

Mean SATM by Sex, HISCBW, INTP

SUMMARY OF ANOVA					
Source of Variation	Sum of Squares	DF	Mean Square	F	Significance of F
MAIN EFFECTS	1290.467	3	430.156	7.997	0.000
SEX	83.000	1	83.000	1.543	0.216
HISCBW	187.073	1	187.073	3.478	0.064
INTP	985.468	1	985.468	18.320	0.000*
TWO WAY INTERACTIONS	678.044	3	226.025	4.202	0.007
SEX HISCBW	201.871	1	201.871	3.753	0.055
SEX INTP	387.535	1	387.535	7.204	0.008*
HISCBW INTP	199.216	1	199.216	3.703	0.056
THREE WAY INTERACTIONS	27.018	1	27.018	7.204	0.480
SEX HISCBW INTP	27.018	1	27.018	3.703	0.480
EXPLAINED	1995.529	7	285.076		
RESIDUAL	8068.831	150	53.792		
TOTAL	10064.361	157	64.104		

159 Cases were Processed

1 Case (0.6 pct.) was missing

Note: Sex = Male, female

HISCBW = High school graduated, predominantly black or white

INTP = Involvement in Intervention Program, Predominantly black or white.

\* = Significant difference at the .05 alpha level

There were SATM scores available for 51 students who participated in Intervention Program and 99 students who did not participate.

The F value for the mean SATM score comparison between students who had graduated from predominantly black high schools and those students who had graduated from predominantly white high schools was 3.478. This value was not significant at .05 alpha level. Graduates of predominantly black high schools had a lower mean SATM score 470 than did graduates of predominantly white high schools 500. There were SATM scores available for 59 graduates of predominantly black high schools and 99 graduates of predominantly white high schools.

In addition, there were a significant interactional effect between sex and involvement in Intervention Programs. The F value was 7.204. As shown in Table 6, females who participated in Intervention Programs had a higher mean SATM score 460 than did males 430 who participated in Intervention Programs. However, of the students who did not participate in Intervention Programs, males had a higher mean SAT score 520 than females 480. Both of these differences were significant at .05 alpha level.

Group A had a mean SATM score of 420 and 33 students. Group B had a mean SATM score of 490 and 33 students. Group C had a mean SATM score of 460 and 33 students. Group D had a mean SATM score of 500 and 66 students. Groups A and C were significantly different from Groups B and D. Group A was not significantly difference from Group C, and Group B was not significantly different from Group D.

Table 6

Mean SATM Scores by Sex and by Involvement in Intervention

	Female	Male
Participation In Intervention Program	$\bar{x} = 460$  n = 29	$\bar{x} = 430$  n = 22
Non-Participation In Intervention Program	$\bar{x} = 480$  n = 55	$\bar{x} = 520$  n = 52

$\bar{x}$  = Mean of each condition

n = Number of students in each condition

In conclusion, there was no significant difference between females and males mean SATV and SATM scores. However, females had lower SATV and SATM mean Scores 420 and 430 respectively than males 430 and 490 respectively.

There was a significant difference between the mean SATV score for students who had graduated from predominantly white high school had a higher mean SATV score 440 than did graduates of predominantly black high schools 410. However, there was no significant difference between the SATM score as a function of high school graduated. Graduates of predominantly black high schools had a lower mean SATM score 470 than graduates of predominantly white high schools 500. Students who participated in Intervention Programs had significantly lower mean SATV and SATM scores 380 and 440 respectively than did students who did not participate, 460 and 500 respectively.

Groups A and C (the Intervention groups) were significantly different from Groups B and D. The intervention groups (A and C) had significantly lower test scores than did the non-intervention groups (B and D).

Research Question 1c. Is there a difference in the Test of Standard Written English (TSWE) score among the 4 groups?  
Is there a difference as a function of Sex?

An ANOVA was conducted with TSWE score as the dependent variable, and the sex of participants, type of high school graduated (HISCBW), and their involvement in Intervention Programs (INTP) as the dependent variables.

As shown in Table 7, the F value for the mean TSWE score comparison between females and males was 0.014. This value was not significant at .05 alpha level. Females had a slightly lower mean TSWE score 46 than males 47. There were 81 TSWE scores available for females and 69 for males.

The F value for the mean TSWE score comparison between students who participated in Intervention Programs and those students who did not participate was 11.084. This value was significant at the .05 alpha level. Students who participated in Intervention Programs had a lower mean TSWE score 43 than students who did not participate 48. There were 46 TSWE scores available for students who participated in Intervention Programs and 92 TSWE scores were available for students who did not participate in Intervention Programs.

The F value for the mean TSWE score comparison between students who graduated from predominantly black high schools and students who graduated from predominantly white high schools was 1.060. This value was not significant at the .05 alpha level. Graduates of predominantly black high schools had a slightly lower mean TSWE score 45 than did graduates of predominantly white high schools 47. There were TSWE scores available for 58 graduates of predominantly black high schools and 92 graduates of predominantly white high schools.

A two-way ANOVA was conducted to form the 4 groups. Group A had a mean TSWE score of 41 and 17 students. Group B had a mean TSWE score of 47 and 41 students. Group C had a mean TSWE score of 43 and 29 students. Group D had a mean TSWE score of 48 and 63 students.

Table 7

TSWE Scores by Sex INTP HISCBW

SUMMARY OF ANOVA					
Source of Variation	Sum of Squares	DF	Mean Square	F	Significance of F
MAIN EFFECTS	992.445	3	330.815	4.006	0.009
SEX	1.160	1	1.160	0.014	0.906
HISCBW	87.566	1	87.566	1.060	0.305
INTP	915.427	1	915.429	11.084	0.001*
TWO WAY INTERACTIONS	18.361	3	6.120	0.074	0.974
SEX HISCBW	3.409	1	3.409	0.041	0.839
SEX INTP	15.263	1	15.263	0.185	0.668
HISCBW INTP	1.920	1	1.920	0.023	0.879
THREE WAY INTERACTIONS	3.398	1	3.398	0.041	0.840
SEX HISCBW INTP	3.398	1	3.398	1.041	0.840
EXPLAINED	1014.204	7	144.886	1.754	0.101
RESIDUAL	11727.536	142	82.588		
TOTAL	12741.740	149	85.515		

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159 Cases were Processed

9 Case (5.7 pct.) were missing

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Note: Sex = Male, female

HISCBW = High school graduated, predominantly black or white

INTP = Involvement in Intervention Program, Predominantly black or white.

\* = Significant difference at .05 alpha level

Groups A and C were significantly different from Groups B and D at the .05 alpha level. However, group A was not significantly different from Group B, and Group B was not significantly different from Group D. In conclusion those students who participated in Intervention Programs had significantly lower TSWE scores than those students who did not participate.

Research Question 2. Is there a difference in the freshmen grade point average (FGPA) among the 4 groups? Is there a difference as a function of sex?

An ANOVA was conducted with FGPA as the dependent variable, and the sex of the participants, their involvement in Intervention Programs (INTP), and the high school graduated (HISCBW) predominantly black or white as the independent variables.

As shown in Table 8, the F value for the mean FGPA comparison between females and male was 0.526. This value was not significant at .05 alpha level. The ANOVA revealed that females had a slightly higher mean FGPA 1.93 than did males 1.85. There were FGPA for 84 females and 75 males.

The F value for the mean FGPA comparison between students who participated in Intervention Programs and those students who did not participate was 1.800. This value was not significant at the .05 alpha level. Students who participated in Intervention Programs had a mean FGPA of 1.80 and students who did not participate had a mean FGPA of 1.93. There were 52 students who participated in Intervention Programs and 107 students who did not.

Table 8

Freshmen Grade Point Average (FGPA) by Sex, HISCBW, INTP at Virginia Tech

SUMMARY OF ANOVA					
Source of Variation	Sum of Squares	DF	Mean Square	F	Significance of F
MAIN EFFECTS	1.537	3	0.512	1.389	0.248
SEX	0.194	1	0.194	0.526	0.469
HISCBW	0.553	1	0.553	1.500	0.223
INTP	0.722	1	0.722	1.956	0.164
TWO WAY INTERACTIONS	0.377	3	0.126	0.341	0.796
SEX HISCBW	0.373	1	0.373	1.011	0.316
SEX INTP	0.000	1	0.000	0.000	0.986
HISCBW INTP	0.000	1	0.000	0.000	0.994
THREE WAY INTERACTIONS	0.113	1	0.113	0.308	0.580
SEX HISCBW INTP	0.113	1	0.113	0.308	0.580
EXPLAINED	2.028	7	0.290	0.785	0.601
RESIDUAL	55.692	151	0.369		
TOTAL	57.719	158	0.365		

159 Cases were Processed

Note: Sex = Male, female

HISCBW = High school graduated, predominantly black or white

INTP = Involvement in Intervention Program, predominantly black or white.

The F value for the mean FGPA comparison between students who graduated from predominantly black high schools and students who graduated from predominantly white schools was 1.956. This value was not significant at .05 alpha level. The ANOVA revealed that graduates of predominantly black high schools had a higher mean FGPA 1.98 than did graduates of predominantly white high schools 1.83. There were 60 students who graduated from predominantly black high schools and 99 students who graduated from predominantly white high schools.

In answer to the question, is there any difference among the four groups?

As shown in Table 9, Group A had a mean FGPA of 1.89 and Group B had a mean FGPA of 2.02. There were 19 students in Group A and 41 in Group B. Group C had a mean FGPA of 1.76 and Group D had a mean FGPA of 1.87. There were 33 students in Group C and 66 in Group D. There were no statistically significant differences among the groups according to the ANOVA in Table 8.

Research Question 3. Is there a correlation between the mean high school grade point average (HGPA) and the freshmen grade point average (FGPA) for the 4 groups?

A Pearson product-movement correlation coefficient (Pearson correlation) was performed between HGPA and FGPA for each group.

The Pearson correlation between HGPA and FGPA for students who had graduated from predominantly black high schools and who had participated in Intervention Programs (Group A) was  $r = .38$  for 19 cases ( $p > .05$ ).

The Pearson correlation between HGPA and FGPA for students who had graduated from predominantly white high schools and who had participated in Intervention Programs (Group C) was  $r = .24$  for 33 cases ( $p > .05$ ).

Table 9

Mean FGPA by High School Graduated and by Involvement in  
Intervention Programs

	Graduates of Predominantly Black High School	Graduates of Predominantly White High School
Participation In Intervention Program	Group A  $\bar{x} = 1.89$  $n = 19$	Group C  $\bar{x} = 1.76$  $n = 33$
Non-Participation In Intervention Program	Group B  $\bar{x} = 2.02$  $n = 41$	Group D  $\bar{x} = 1.87$  $n = 66$

$\bar{x}$  = Mean of each condition

$n$  = Number of students in each condition

The Pearson correlation between HGPA and FGPA for students who had graduated from predominantly black high schools and who did not participate in Intervention Programs (Group B) was  $\underline{r} = .58$  for 41 cases ( $\underline{p} < .05$ ).

The Pearson correlation between HGPA and FGPA for students who had graduated from predominantly black high schools and who did not participate in Intervention Programs (Group D) was  $\underline{r} = .54$  for 66 cases ( $\underline{p} < .05$ ).

There was no significant correlation between HGPA and FGPA for students who participated in Intervention Programs. However, there was a significant correlation between the HGPA and FGPA for students who did not participate in Intervention Programs.

For students who participated in Intervention Programs their high school grade point averages were not good predictors of their college freshmen grade point averages. However, for students who did not participate in these programs, their high schools grade point averages were fairly reasonable predictors of their college freshmen grade point averages.

Research Question 4. Is there a relationship between FGPA and the student's major field of study for the 4 groups? Is there a difference as a function of sex?

An ANOVA was conducted to ascertain the relationship between FGPA and College (Coll) enrolled. FGPA was the dependent variable with sex, INTP, HISCBW, and Coll as the independent variables.

As shown in Table 10, there was no significant difference as a function of sex. The F value .0463 was not significant at .05 alpha

Table 10

Freshman Grade Point Average by Sex, INTP


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SUMMARY OF ANOVA

Source of Variation	Sum of Squares	DF	Mean Square	F	Significance of F
MAIN EFFECTS	6.962	10	0.696	2.030	0.034
SEX	0.159	1	0.159	0.463	0.497
INTP	0.000	1	0.000	0.000	0.988
HISCBW	0.795	1	0.795	2.317	0.130
COLL	5.425	1	0.775	2.260	0.033*
EXPLAINED	6.962	10	0.696	2.030	0.034
RESIDUAL	50.757	148	0.343		
TOTAL	57.719	158	0.365		

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159 Cases were Processed

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Note: SEX = Male and female

INTP = Involvement in Intervention Programs

HISCBW = Graduates from predominantly black or white high schools

COLL = College enrolled in the University

\* = Significant difference at the .05 alpha level

level. There was no significant difference as a function of high school attended. The F value 2.317 was not significant at .05 alpha level. There was no significant difference as a function of high school attended. The F value 2.317 was not significant at .05 alpha level. However, there was a significant difference as a function of college enrolled. The F value 2.260 was significant at .05 alpha level.

As shown in Table 11, there appeared to be differences among the mean FGPA. However, because of the small number of students in 3 colleges, that difference was not verified by the Post Hoc test of significant.

A Post Hoc test of significant was performed using the Tukey-B Procedure to test for significant difference among the students mean FGPA by college. The Tukey-B procedure revealed that no two groups was significantly different at .05 alpha level.

Although there were not any significant difference among the mean FGPA for colleges, those colleges which tended to require higher high school grade point averages for entrance, for the most part, had higher mean freshmen grade point averages.

Research Question 5a. Is there a relationship between FGPA and family income, for the 2 groups, those students who graduated from predominantly black high schools and those students who have graduated from predominantly white schools?

Family income was divided into five groups: Group 1--lowest income to \$10,000. Group 2--\$10,001 to \$20,000. Group 3--\$20,001, to \$30,000. Group 4--\$40,001 to highest income.

Table 11

Black Students Mean FGPA by College Enrolled

1	2	3	4	5	6	7	8
$\bar{\chi} = 1.71$	$\bar{\chi} = 1.99$	$\bar{\chi} = 1.92$	$\bar{\chi} = 1.73$	$\bar{\chi} = 1.71$	$\bar{\chi} = 2.12$	$\bar{\chi} = 2.51$	$\chi = 1.68$
n = 2**	n = 15	n = 58	n = 26	n = 5**	n = 23	n = 5**	n = 25

Note:  $\bar{\chi}$  = Mean of each college

n = Number enrolled in each college

Note: (1) = Agriculture (2) = Architecture (3) Arts & Science (4) Business  
(5) Education (6) Engineering (7) Human Resources (8) General Arts &  
& Science.

\*\* = Small cell size

An ANOVA was performed with mean FGPA as the dependent variable, and type of high school graduated, predominantly black or white, and family income as the dependent variables.

As shown in Table 12, there was no significant difference between the mean FGPA of those students who have graduated from predominantly black schools and those students who have graduated from predominantly white schools (HISCBW). The F value was 1.616. This value was not significant at the .05 alpha level. However, there was a significant difference of the mean FGPA according to family income (Fincome). The F value was 3.031. This value was significant at the .05 alpha level. Students who came from high income families, generally, had higher grade point averages.

The mean FGPA for students who graduated from predominantly black high schools was 1.98. The mean FGPA for students who had graduated from predominantly white high schools was 1.83. There were 60 students who graduated from predominantly black high schools and 99 students who graduated from predominantly white high schools.

As shown in Table 13, the mean FGPA by family income were as follows: Group 1--1.81, Group 2--1.76, Group 3--2.09, Group 4--2.28, and Group 5--2.31. The number of students in Group 1 was 92. The number of students in Group 2 was 27. The number of students in Group 2 was 27. The number of students in Group 3 was 25. The number of students in Group 4 was 11. The number of students in Group 5 was 4.

Table 14 shows that of the 92 students of Group 1, 34 students had graduated from predominantly black high schools and they had a mean FGPA

Table 12

FGPA by High School Graduated Predominantly Black or White and Family Income

SUMMARY OF ANOVA					
Source of Variation	Sum of Squares	DF	Mean Square	F	Significance of F
MAIN EFFECTS	4.933	5	0.987	2.906	0.016
HISCBW	0.549	1	0.549	1.616	0.206
FINCOME	4.116	4	1.029	3.031	0.019*
TWO WAY INTERACTIONS	1.867	3	0.622	1.833	0.144
HISCBW FINCOME	1.867	3	0.622	1.833	0.144
EXPLAINED	6.800	8	0.850	2.504	0.014
RESIDUAL	50.920	150	0.339		
TOTAL	57.719	158	0.363		

159 Cases were Processed

Note: HISCBW = High school graduated, predominantly black or white

Fincome = Family Income

\* = Significant difference at the .05 alpha level

Table 13

Mean FGPA by Family Income

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Group 1	Group 2	Group 3	Group 4	Group 5
\$0 to \$10,000	\$10,001 to \$20,000	\$20,001 to \$30,000	\$30,001 to \$40,000	\$40,001 to Highest
$\bar{x} = 1.81$	$\bar{x} = 1.76$	$\bar{x} = 2.09$	$\bar{x} = 2.28$	$\bar{x} = 2.31$
n = 92	n = 27	n = 25	n = 11	n = 4

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Note:  $\bar{x}$  = Mean of each group

n = Number in each group

Table 14

Family Income by High School Graduated

Predominantly Black High School	Group 1	Group 2	Group 3	Group 4	Group 5
	\$0 to \$10,000	\$10,001 to \$20,000	\$20,001 to \$30,000	\$30,001 to \$40,000	\$40,0001 to Highest
	$\bar{x} = 1.94$	$\bar{x} = 1.98$	$\bar{x} = 1.91$	$\bar{x} = 2.18$	$\bar{x} = 0.0$
	n = 34	n = 9	n = 8	n = 9	n = 0
Predominantly White High School	$\bar{x} = 1.73$	$\bar{x} = 1.64$	$\bar{x} = 2.17$	$\bar{x} = 2.69$	$\bar{x} = 2.31$
	n = 58	n = 18	n = 17	n = 2	$\bar{x} = 4$

Note:  $\bar{x}$  = Mean of each group

n = Number in each group

of 1.94 and 58 students had graduated from predominantly white high schools and they had a mean FGPA of 1.73. Of the 27 students in Group 2, 9 students had graduated from predominantly black high schools and they had a mean FGPA of 1.98 and 18 students had graduated from predominantly white high schools and they had a mean FGPA of 1.64. Of the 25 students of Group 3, 8 had graduated from predominantly black high schools and they had a mean FGPA of 1.91; and 17 students had graduated from predominantly white high schools and they had a mean FGPA of 2.17. Of the 11 students of Group 4, 9 students had graduated from predominantly black high schools and they had a mean FGPA of 2.18, and 2 had graduated from predominantly white high schools and they had a mean FGPA of 2.69. Of the 4 students of Group 5, all had graduated from predominantly white high schools and they had a mean FGPA of 2.31.

There was no significant difference between the mean FGPA as a function of high school graduated for family income. However, students who had graduated from predominantly black high schools and who came from low-income families tended to make better grades than black students who had graduated from predominantly white high schools and who came from low-income families (see Table 14). In general, students who came from high income families tended to have higher freshmen grade point averages.

Research Question 5b. Is there a relationship between FGPA and family income for all students, both groups combined?

A Pearson product correlation coefficient (Pearson correlation) was conducted between the FGPA and the family income for all students.

A Pearson correlation or  $r < .25$  for 159 cases ( $p < .05$ ). In general, as family income increased so did FGPA (see Table 12).

Students who came from high-income families tended to have higher freshmen grade point averages, and students who came from low-income families tended to have lower freshmen grade point averages.

Research Question 6a. Is there a relationship between the FGPA and the kinds of financial aid received--that is, scholarship, work-study, grant, or loans--for the 2 groups, graduates of predominantly black high schools and graduates of predominantly white high schools?

An ANOVA procedure was performed which had FGPA as the dependent variable with high school graduated (HISCBW), predominantly black or white, and scholarship (SCHOLA) as the independent variables.

As shown in Table 15, there was no significant difference of the mean FGPA between students who had graduated from predominantly black high schools and students who had graduated from predominantly white high schools. The F value was 0.704. This value was not significant at .05 alpha level. However, there was a significant difference between the mean FGPA and awarding of scholarships. The F value was 19.009. This value was significant at .05 Alpha level.

As shown in Table 16, of the students who received scholarships, graduates of predominantly black high schools had a slightly higher mean FGPA 2.20 than graduates of predominantly white high schools 2.17. Students who had graduated from predominantly black high schools and did not receive scholarships had a lower mean FGPA 1.82 than those students who had graduated from predominantly black high school and did receive scholarship 2.20. Students who had graduated from predominantly white high schools and received scholarship had a higher

Table 15

FGPA by HISCBW and SCHOLA

Source of Variation	SUMMARY OF ANOVA				
	Sum of Squares	DF	Mean Square	F	Significance of F
MAIN EFFECTS	7.027	2	3.513	10.754	0.000
HISCBW	0.230	1	0.230	0.704	0.403
SCHOLA	6.210	1	6.210	19.009	0.000*
TWO WAY INTERACTIONS	0.055	1	0.055	0.170	0.681
HISCBW SCHOLA	0.055	1	0.055	1.170	0.681
EXPLAINED	7.082	3	0.361	0.226	0.000
RESIDUAL	50.637	155	0.327		
TOTAL	57.719	158	0.365		

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159 Cases were Processed

1 Case (0.6 pct.) was missing

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Note: HISCBW = High school graduated, predominantly black or white

SCHOLA = Scholarship, received or did not receive

\* = Significant difference at .05 alpha level

Table 16

Mean FGPA by High School Graduated and Scholarship Awarded

	Graduated Predominantly Black High School	Graduated Predominantly Black High School
Scholarship	$\bar{x} = 2.20$ N = 26	$\bar{x} = 2.17$ N = 27
Non-Scholarship	$\bar{x} = 1.82$ N = 34	$\bar{x} = 1.71$ N = 72

$\bar{x}$  = Mean FGPA in each condition

N = Number of each condition

mean FGPA 2.17 than did students who had graduated from predominantly white high schools and did not receive scholarships 1.71. Students who had graduated from predominantly black high schools and did not receive scholarships had a slightly higher mean FGPA 1.82 than students who had graduated from predominantly white high schools and did not receive scholarships 1.71. There were 53 students who received scholarships and 106 who did not.

The ANOVA revealed that students who received scholarships had a significant higher mean FGPA 2.18 than did those students who did not receive scholarships 1.74. This difference was significant at .05 alpha level. There was no differentiation made between scholarship awarded on a need basis and scholarship awarded on merit.

An ANOVA procedure was conducted with FGPA as the dependent variable, and type of high school graduated (HISCBW) and work-study (WORKSTY) as the independent variables.

The ANOVA procedure revealed that there was not a significant difference between the mean FGPA and type of high school graduated, and that there was not a significant difference between the mean FGPA of students who participated in work-study and those students who did not. The F value for type of school graduated, predominantly black or white, was 2.031. This value was not significant at .05 alpha level. The F value for participation in WORKSTY was 0.400. This value was not significant at .05 alpha level.

Students who had graduated from predominantly black high schools and participated in WORKSTY had a lower mean FGPA 1.88 than students

who graduated from predominantly black high schools and did not participate in WORKSTY 2.00. Students who had graduated from predominantly white high schools and who had participated in WORKSTY had a higher mean FGPA 2.13 than did those students who had graduated from predominantly white high schools and who did not participate in WORKSTY 1.81. Neither of these differences were statistically significant at .05 alpha level. There were 17 students who participated in WORKSTY and 142 who did not.

An ANOVA Procedure was performed with FGPA as the dependent variable, and type of high school graduated (HISCBW) and Grants as the independent variables.

The ANOVA revealed that there was no significant difference between the mean FGPA and the type of high school graduated (HISCBW). The F value was 1.585. This value was not significant at .05 level.

However, there was a significant difference between the mean FGPA for students who received Grants and those students who did not receive Grants. There were 53 students who received Grand and 106 who did not. The F value was 0.006. this value was significant at the .05 alpha level. Students who received Grants had a higher mean FGPA 2.08 than students who did not receive Grants 1.79.

Students who graduated from predominantly black high schools and who received Grants had a mean FGPA of 2.09 and students who graduated from predominantly black high schools and did not receive Grants had a mean FGPA of 1.92. Students who graduated from a predominantly white high school and received Grants had a mean FGPA of 2.07, and students

who graduated from predominantly white high schools and did not receive Grants had a mean FGPA of 1.72.

An ANOVA procedure was conducted with FGPA as the dependent variable, and type of high school graduated (HISCBW) and LOANS as the independent variables.

The ANOVA revealed that there was no significant difference between the mean FGPA and the type of high school graduated (HISCBW), predominantly black or white. The F value was 1.585. This value was not significant at .05 level.

However, there was a significant difference between the mean FGPA for students who received LOANS and students who did not receive LOANS. The F value was 3.467. This value was significant at .05 level alpha level. There were 44 students who received loans and 115 who did not.

Students who received LOANS had a higher mean FGPA 2.05 than did those students who did not receive LOANS 1.83. Represented were 44 students who received LOANS and 55 students who did not. There were 21 students who had graduated from predominantly black high schools and their mean FGPA was 2.08, and there were 23 students who had graduated from predominantly white high schools and their mean FGPA was 2.02. There were 39 students who had graduated from predominantly black high schools who did not receive loans and their FGPA was 1.93. There were 76 students who had graduated from predominantly white high schools who did not receive loans and their mean FGPA was 1.78.

Research Question 6b. Is there a relationship between FGPA and the kinds of financial aid received for all students, both groups combined?

All four types of financial aid were computed to create a new variable called KFINAID. An ANOVA was performed with FGPA as the dependent variable and KFINAID as the independent variable.

As shown in Table 17, the ANOVA procedure revealed that students who received some kind of financial aid had a significantly higher mean FGPA 2.08 than those students who did not receive some kind of financial aid 1.68. There were 82 students who received some kind of financial aid and 77 students who did not.

A Pearson Product-Movement Correlation Coefficient (Pearson correlation) was performed between the variables FGPA and KFINAID. A Pearson correlation of  $r = .33$  for 159 cases ( $p < .05$ ) was found. Indicating, in general, that the more types of financial aid received the higher the FGPA.

Research Question 7a. Is there a relationship between the mean FGPA and the amount of financial aid received for the 2 groups, graduates of predominantly black high schools, and graduates of predominantly white high schools?

An ANOVA was performed with FGPA as the dependent variable, and the type high of school graduated (HISCBW), predominantly black or white, and the amount of financial aid (FINAID) as the independent variable.

For the question, FINAID was divided into 6 groups: Group 1, lowest amount to \$1,000; Group 2, \$1,000 to \$2,000; Group 3, \$2,001 to \$3,000; Group 4, \$3,001 to \$4,000; Group 5, \$4,001 to highest amount.

As shown in Table 18, the summary of ANOVA revealed that there was no significant difference in the mean FGPA as a function of the high school graduated, predominantly black or white. The  $F$ -value was 0.450. This value was not significant at .05 alpha level.

Table 17

Freshmen Grade Point Average (FGPA) by KFINAID

SUMMARY OF ANOVA					
Source of Variation	Sum of Squares	DF	Mean Square	F	Significance of F
MAIN EFFECTS	6.352	1	6.352	19.414	0.000*
KFINAID	6.352	1	6.352	19.414	0.000*
EXPLAINED	6.352	1	6.352	19.414	0.000*
RESIDUAL	51.367	157	0.327		
TOTAL	51.719	158	0.365		

159 Cases were Processed

Note: KFINAID = Kinds of financial aid received or not received.

\* = Significant difference at the .05 alpha level

Table 18

FGPA by HISCBW and FINAID.


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Source of Variation	SUMMARY OF ANOVA				
	Sum of Squares	DF	Mean Square	F	Significance of F
MAIN EFFECTS	7.429	6	1.238	3.650	0.002
HISCBW	0.153	1	0.153	0.450	0.503
FINAID	6.612	5	1.322	3.899	0.002*
TWO WAY INTERACTIONS	0.424	5	0.085	0.250	0.939
HISCBW FINAID	0.424	5	0.085	0.250	0.939
EXPLAINED	7.853	11	0.714	2.104	0.023
RESIDUAL	49.867	147	0.339		
TOTAL	57.719	158	0.365		

---

159 Cases were Processed

Note: HISCBW = High school graduated, predominantly black or white

FINAID = Total amount of financial aid

\* = Significant difference at .05 alpha level

However, there was a significant difference in the mean FGPA for the amount of financial aid received (FINAID). The  $F$ -value was 3.899. This value was significant at the .05 alpha level.

There was no significance as a function of interaction. The  $F$ -value was 0.250 and was not significant at the .05 alpha level.

As show in Table 19, Group 1 had a mean FGPA of 2.06 and 88 students. Group 2 had a mean FGPA of 2.06 and 5 students. Group 3 had a mean FGPA of 2.17 and 21 students. Group 4 had a mean FGPA of 1.95 and 24 students. Group 6 had a mean FGPA of 2.20 and 13 students.

A Tukey B Post Hoc test of significance was performed to ascertain significant difference between means.

As shown in Table 20, Group 3, 5, and 6 were significantly different from Group 1, 2, and 4.

In general, those students who received the greatest amount of financial aid also had the highest freshmen grade point averages.

Research Question 7b. Is there a relationship between FGPA and the amount of financial aid received for all students, both groups combined?

A Pearson-product-movement correlation coefficient (Pearson correlation) was performed between variables FGPA and FINAID. The Pearson correlation of  $r = .31$  for 159 cases ( $p < .05$ ). Students who tended to receive the greatest amount of financial aid also tended to make the highest FGPA.

Research Question 8a. Is there a relationship between the mean FGPA and the type of college directed courses taken in high school for the the 2 groups, graduates of predominantly black or white high schools? With college-directed courses being defined in this study as advanced/honors English, and any course in chemistry, physics, and computer science.

Table 19

Freshmen Mean Grade Point Average by Financial Aid Amount

Group 1	Group 2	Group 3*	Group 4	Group 5*	Group 6*
\$0 to \$1,000	\$1,001 to \$2,000	\$2,001 to \$3,000	\$3,001 to \$4,000	\$4,0001 to \$5,000	\$5,000 to highest
$\bar{x} = 1.71$	$\bar{x} = 2.06$	$\bar{x} = 2.17$	$\bar{x} = 1.95$	$\bar{x} = 2.31$	$\bar{x} = 2.20$
n = 88	n = 5	n = 21	n = 24	n = 8	n = 13

Note:  $\bar{x}$  = Mean FGPA

n = Number of students in each group

\* = Significantly different from other groups.

Table 20

Tukey-B Multiple Range Test of Significant difference Among  
Group Means for FINAID

		Group 1	Group 2	Group 3	Group 4	Group 5	Group 6
Mean	Group						
1.7127	Group 1						
1.9458	Group 4						
2.0640	Group 2						
2.1729	Group 3 *						
2.1962	Group 6 *						
2.3062	Group 5 *						

Note: \* = Group significantly different from other groups.

An ANOVA procedure was performed with FGPA as the dependent variable, and type of high school graduated (HISBW), type of courses taken, advanced/honors English, chemistry, physics, and computer science as the independent variables.

As shown in Table 21, there was no significant difference in the mean FGPA as a function of high school graduated. The  $F$ -value was 0.475 and this value was not significant at the .05 alpha level. Graduated of predominantly black high schools had a mean FGPA of 1.98 and there were 60 students in this category. Graduates of predominantly white high schools had a mean FGPA of 1.83 and there were 99 students in this category.

However, there was a significant difference in the mean FGPA as a function of advanced/honors English courses taken in high school. The  $F$ -value was 7.660 and this value was significant at .05 alpha level. The ANOVA revealed that students who had advanced/honors English courses had a higher mean FGPA 2.10 than students who did not take advanced/honors English courses 1.76. There were 60 students who had taken advanced/honors English courses and 99 students who had not taken these courses.

There was no significant difference in the mean FGPA as a function of chemistry courses taken in high school. The  $F$ -value was 0.691 and this value was not significant at the .05 alpha level. Students who had taken chemistry courses in high school had a higher mean FGPA 1.93 than those students who had not taken chemistry courses in high school 1.84. There were 83 students who had taken chemistry courses in high school and 76 students who had not taken these courses.

Table 21

Freshmen Grade Point Average by HISCBW, ADEWG, CHEM, PHYIS,  
and COMPSIC

SUMMARY OF ANOVA					
Source of Variation	Sum of Squares	DF	Mean Square	F	Significance of F
MAIN EFFECTS	8.942	5	1.788	5.617	0.000
HISCBW	0.162	1	0.162	0.510	0.475
ADENG	2.439	1	2.439	7.660	0.006*
CHEM	0.220	1	0.220	0.691	0.407
PHYIS	0.960	1	0.960	3.014	0.085
COMPSCI	3.536	1	3.536	11.107	0.001*
TWO WAY INTERACTIONS	3.247	10	0.325	1.020	0.430
HISCBW ADENG	0.028	1	0.028	0.088	0.767
HISCBW CHEM	0.384	1	0.384	1.205	0.274
HISCBW PHYIS	0.011	1	0.011	0.035	0.852
HISCBW COMPSCI	0.108	1	0.108	0.339	0.562
ADENG CHEM	0.605	1	0.605	1.900	0.170
ADENG PHYIS	0.458	1	0.458	1.439	0.232
ADENG COMPSCI	0.005	1	0.005	0.015	0.903
CHEM PHYIS	1.094	1	1.094	3.437	0.066
CHEM COMPSCI	0.908	1	0.908	2.853	0.093
PHYIS COMPSCI	0.016	1	0.016	0.049	0.825
EXPLAINED	12.188	15	0.813	2.552	0.002
RESIDUAL	45.531	143	0.318		
Total	57.719	158	0.365		

159 cases were processed

Note: HISCBW = High school, predominantly black or white  
 ADENG = Advanced/honors English taken or not taken  
 CHEM = Chemistry taken or not taken  
 PHYIS = Physics taken or not taken  
 COMPSCI = Computer science taken or not taken  
 \* = Significant difference at the .05 alpha level

There was no significant difference in the mean FGPA as a function of physics courses taken in high school. The F value was 3.014 and this value was not significant at .05 alpha level. Students who had taken physics courses in high school had a higher mean FGPA 2.01 than students who had not taken these courses 1.81. There were 65 students who had taken physics courses in high school and 94 students who had not.

There was a significant difference in the mean FGPA as a function of computer science courses taken in high school. The F value was 11.107 and this value was significant at .05 alpha level. The ANOVA revealed that students who had taken computer science courses in high school had significantly higher mean FGPA 2.34 than those students who had not taken computer courses 1.83. There were 17 students who had taken computer courses in high school and 142 students who had not taken these courses.

Students who had taken advanced/honors English or computer science courses in high school had significantly higher grade point averages than did those students who had not taken these courses.

Research Question 8b. Is there a relationship between the mean FGPA and the number of math courses taken in high school beyond algebra II for the 2 groups, graduates of predominantly black or white high schools?

For this question, the number of courses taken beyond algebra II was counted. All students in this study had at least taken algebra II in high school. However, some students had not taken any courses beyond algebra II. The most courses taken by any student beyond algebra II was 5.

An ANOVA was performed with FGPA as the dependent variable, and type of high school graduated (HISCBW), predominantly black or white, and number of math courses taken beyond algebra II (NADMATH) as the independent variable.

There was no significant difference in the mean FGPA as a function of high school graduated (see Appendix A). The F value was 1.472 and this value was not significant at .05 alpha level. Students who graduated from predominantly black high schools had a higher mean FGPA of 2.02 than students who graduated from predominantly white high schools 1.87. There were 51 students who graduated from predominantly black high schools and 91 students who graduated from predominantly white high schools.

There was no significant difference in the mean FGPA as a function of number of math courses taken in high school beyond algebra II (NADMATH). The F value was 0.096. Although there were not any significant difference among the mean FGPA of the 5 groups, those students who had taken more courses tended to have higher freshman grade point averages. (See Appendix B).

Students who had taken 1 math course had a mean FGPA of 1.82 and there were 53 students in this group. Students who had taken 2 math courses had a mean FGPA of 1.89 and there were 35 students in this group. Students who had taken 3 math courses had a mean FGPA of 1.88 and there were 26 students in this group. Students who had taken 4 math courses had a mean FGPA of 2.18 and there were 15 students in this group. And Group 5 had 1 student who had a 2.23 FGPA.

Research Question 9a. Is FGPA correlated with citizenship for the two groups, graduates of predominantly black or white high schools? With citizenship being defined for this study as participation in any one of the following in high school: athletics, clubs or student government.

For Research Question 9a, a new variable was created by computing athletics, clubs, and student government into CITSHIP.

A Pearson product-movement correlation coefficient (Pearson correlation) was performed between the variables FGPA and CITSHIP for both groups, graduates of predominantly black high schools and graduates of predominantly white high schools.

A Pearson correlation of  $\underline{r} = .30$  for 60 cases ( $\underline{p} < .05$ ) was found between FGPA and CITHIP for students who had graduated from predominantly black high schools. The more students had participated in citizenship activities, generally, the higher their grade point averages. A Pearson correlatin of  $\underline{r} = -.05$  for 99 cases ( $\underline{p} > .05$ ) was found between FGPA and CITSHIP for students who graduated from predominantly white high schools. There was no significant correlation between freshmen grade point averages and participation in citizenship activities.

For graduates of predominantly black high schools, there was a significant relationship between participating in citizenship activities in high school and FGPA. However, for graduates of predominantly white high schools there was no significant relationship between participating in citizenship activities in high school and FGPA.

Research Question 9b. Is FGPA correlated with citizenship for all students, both groups combined?

A Pearson Correlation was performed between the variables FGPA and CITSHIP for all students.

A Pearson Correlation of  $\underline{r} = .06$  for 159 cases ( $\underline{p} > .05$ ) was found between FGPA and CITSHIP for all students, graduates of both predominantly black and graduates of predominantly white high schools. There was not a significant correlation between FGPA and CITSHIP.

Research Question 10. Is there a difference between the status of academic probation for black freshmen who had graduated from predominantly black and predominantly white high schools and who participated in Intervention Programs and those black freshmen who had graduated from predominantly black and predominantly white high schools and did not participate in these programs?

An ANOVA was performed with FGPA as the dependent variable, and involvement in Intervention Programs (INTP) and type of high school graduated (HISCBW) predominantly black or white as the independent variables.

The computer was programmed to select only those grade point averages lower than 1.50. All freshmen at Virginia Tech must have a cumulative grade point average of 1.50 at the end of the spring quarter to avoid academic probation.

The Summary of ANOVA revealed that there was no significant mean FGPA difference between those students who had participated in Intervention Programs and those students who had not participated in these (INTP) programs. The F value was 0.936 (See Appendix C). This value was not significant at the point .05 alpha level. Students on academic probation who participated in Intervention Programs had a higher mean FGPA 1.16 than students who did not participate in these

programs 1.03. There were 13 students who participated in Intervention Programs on academic probation and 26 students who did not participate in these programs on academic probation. There were a total of 39 students on academic probation at the end of the Spring Quarter of 1985.

Research Question 11. What is the retention rate for all 4 groups?

As shown in Table 22, in the fall of 1984 there were 19 students in Group A, 41 students in Group B, 33 students in Group C, and 66 students in Group D for a total of 159 students.

At the end of the Spring Quarter of 1985, Group A had a retention rate of 74 percent. Group B had a retention rate of 83 percent. Group C had a retention rate of 76 percent. And Group D had a retention rate of 71 percent. The retention rate for the total black freshmen class was 75 percent. Graduates of predominantly black high schools who participated in Intervention Programs had a 74 percent retention rate and graduates of predominantly black high schools who did not participate in Intervention Programs had a retention rate of 83 percent. Graduates of predominantly white high schools who did participate in Intervention Programs had a 76 percent retention rate, while graduates of predominantly white high schools who did not participate had a 71 percent retention rate. Graduates of predominantly black high schools who participated in Intervention Programs had a higher retention rate 76 percent than did graduates of predominantly white high schools who did not participate in these programs 71 percent.

Table 22

Retention Rate of Black Freshmen by Groups at Virginia Tech

Group	Number of Students In Group	Number on Probation	Percentage On Academic Probation %	Percentage Retention %
Group A	19	5	26	74
Group B	41	7	17	83
Group C	33	8	24	76
Group D	66	19	29	71
Total	159	39	25	75

Note: Group A = Graduates of predominantly black high schools who participated in Intervention Programs.

Group B = Graduates of predominantly black high schools who did not participate in Intervention Programs.

Group C = Graduates of predominantly white high schools who participated in Interventional Programs.

Group D = Graduates of predominantly white high schools who did not participate in Intervention Programs.

## SUMMARY

Chapter 4 has presented the statistical and descriptive analysis of data. Analysis of variance (ANOVA) and Pearson correlations were the statistical procedures used to investigate research questions for this study.

The primary purpose of this study was to ascertain whether black students at Virginia Tech who had graduated from predominantly black and predominantly white high schools differ on selected variables after their involvement in Intervention Programs from those black students who had graduated from predominantly black and white high schools who did not participate in these programs.

The findings showed that black students who participated in Intervention Programs had significantly lower high school grade point averages and standardized test scores than did those students who did not participate in these programs.

Females had a significant higher mean HGPA average than did males. However, males had higher standardized test scores than females for all of the tests used for this study. In addition females had a slightly higher mean FGPA than males after their freshmen year at Virginia Tech.

There was a significant difference between the mean SATV score as a function of high school graduated. Graduates of predominantly black high schools had a lower mean SATV score than graduates of predominantly white high schools.

For students who participated in Intervention Programs, their high school grade point averages were not good predictors of their college freshmen grade point averages. However, for students who did not participate in these programs, their high school grade point averages were fairly good predictors of their college grade point averages.

Although there were no significant difference among the FGPA by colleges, those colleges which tended to require higher HGPA for entrance had, for the most part, higher mean freshmen grade point averages.

Although there were no significant difference between the mean FGPA as a function of high school graduated and family income, graduates of predominantly black high schools who came from low-income families tended to have higher mean freshmen grade point averages than did graduates of predominantly white high schools who came from low-income families (see Table 14).

In general, students who came from high-income families tended to have higher freshmen grade point averages and students who came from low-income families tended to have lower freshmen grade point averages.

Students who had taken advanced/honors English or computer science courses in high school had significant higher freshmen grade point averages than did those students who had not taken these courses in high school.

Students who had taken more math courses in high school tended to have higher freshmen grade point averages.

Students who received some kind of financial aid had a higher mean FGPA than did students who did not receive any financial aid.

Twenty-five percent of the students in this study were on academic probation at the end of the Spring Quarter of 1985. Seventy-five percent were in academic good standing.

Of the students on probation, 26 percent were graduates of predominantly black high schools who had participated in Intervention Programs and 17 percent were graduates of predominantly black high schools who did not participate in these programs. Twenty-four percent were graduates of predominantly white high schools who had participated in Intervention Programs, and 28 percent were graduates of predominantly white high schools who did not participate in these programs.

In general, students who participated in Intervention Programs fared as well as students who did not participate in these programs, if not better, when compared for academic survival.

## CHAPTER V

### SUMMARY, DISCUSSION, CONCLUSIONS, AND RECOMMENDATIONS

This chapter is organized into 4 major sections: (a) a summary is given in terms of the problem, the sample, and the method and procedure; (b) findings and discussions; (c) conclusions; and (d) the recommendations with regard to recruiting of blacks at predominantly white universities.

#### Problem

The problem of this study was to ascertain whether black students at Virginia Polytechnic Institute and State University Virginia Tech who had graduated from predominantly black or white high schools differed on selective variables, and, after their involvement in Intervention Programs, did they differ from those black students who did not participate in these programs?

The literature review revealed that many black students were admitted with lower scores on standardized tests than what are considered necessary for college matriculation (Chase, 1981; Fleming, 1984; Morris, 1979; Smith, 1980; Stafford & Dolin, 1974).

However, there were research studies which showed that grade point average (GPA) was a better predictor for academic success for blacks than standardized test scores (Chase, 1981; Garvey, 1981; Long & Coggiloa, 1980). Yet Thomas and Stanley (1969) and Sedlack, Lewis, and Brooks (1973) had stated that high school grade point average is a poor predictor of college success for black makes.

Even more important, Robert Newby (1982) stated that black children who attended predominantly black schools did not achieve as well as other children, black or white, who attended predominantly white schools. In this connection, James Coleman (1966), in what is referred to as the "Coleman Paper", stated that while blacks who attended predominantly white schools, do show some gains on achievement tests, black males who attended overwhelmingly white schools scored poorly on achievement tests. However, Crain and Mahard (1978) analyzed data from the National Longitudinal Reported Study of the Senior Class of 1972 and reported that southern black graduates of predominantly white high schools are less likely to attend and survive in college than those from predominantly black schools.

Because of these findings and differences, the author decided to investigate the academic performance of black freshmen graduates of predominantly black and white high schools at Virginia Tech.

### Population

The subjects of this study were 159 black freshmen students who entered Virginia Tech in the Fall of 1984. The subjects were first-time college students. None had attended any college before. There were 60 graduates of predominantly black high schools and 99 graduates of predominantly white high schools. There were 84 females and 75 males. All of the subjects were in-state students, that is, they all graduated from Virginia's high schools. There were 52 students who participated in Intervention Programs and 107 who did not.

### Method and Procedures

The instruments used for measuring the academic performance of these students were as follows: The Scholastic Aptitude Test (SAT), math and verbal; the Test of Standard Written English (TSWE); high school grade point average (HGPA); and the college freshmen grade point average (FGPA).

An Analysis of Variance (ANOVA) was performed to form the 4 groups used for comparison in this study. The 4 groups were as follows: Group A--those black students who had graduated from predominantly black high schools and who had participated in Intervention Programs; Group B--those black students who had graduated from predominantly black high schools and who did not participate in Intervention Programs; Group C--those black students who had graduated from predominantly white schools and who had participated in Intervention Programs; and Group D--those black students who had graduated from predominantly white high schools and did not participate in Intervention Programs.

The Analysis of Variance (ANOVA) and Tukey-B Test were the procedures used to test for significant difference between and among means. The Pearson product moment correlation coefficient (Pearson Correlation) procedure was used to ascertain relationships or association between 2 variables.

### Design

The design was an ex post facto 2x2 ANOVA descriptive analysis of the relationship between participation in Intervention Programs and

non-participation in these programs, and the relationship between attendance of a predominantly black or white high school and academic performance in high school and college as measured by grade point average.

The 4 groups were compared on their mean high school grade point average (HGPA), Scholastic Aptitude Test (SAT) scores, math and verbal; Test of Standard Written English (TSWE) score; freshmen grade point average (FGPA); retention rate of each group; and the sex of the student. In addition, 2 groups comparisons were conducted for graduates of predominantly black or white high schools on variables for courses taken in high school, activities in high school, financial aid received, and family income.

### Findings and Discussions

Research Question 1a. Is there a difference in the mean high school grade point average (HGPA) among the 4 groups? Is there a difference as a function of sex?

The ANOVA revealed that Groups A and C (students who had participated in Intervention Programs and who had graduated from predominantly black and predominantly white high schools, respectively) had significantly lower HGPAs than did Groups B and D (students who did not participate in these programs and who had graduated from predominantly black and predominantly white high schools, respectively). This finding agreed with the findings by Wright (1973) and Romano and Garfield (1980) who reported that students who participated in intervention type programs had lower grade point averages than did students who did not participate in these programs.

Group A's mean HGPA was not significantly different from Group C and Group B's mean HGPA was not significantly different from Group D. However, graduates of predominantly black high schools as a group had a lower mean HGPA than did graduates of predominantly white high schools. Females had a significantly higher HGPA than did males.

Research Question 1b. Is there a difference in the mean Scholastic Attitude Test verbal (SATV) and math (SATM) scores among the 4 groups? Is there a difference as a function of sex?

The ANOVA revealed that Groups A and C (students who had participated in Intervention Programs and who had graduated from predominantly black and predominantly white high schools, respectively) had significantly lower SATV scores than did Groups B and D (students who had not participated in these programs and who had graduated from predominantly black and predominantly white high schools, respectively).

Group A was not significantly different from Group C, and Group B was not significantly different from Group D. There was no significant difference in the SATV score as a function of sex. However, females had a slightly lower mean SATV score than males.

Graduates of predominantly black high schools had a significantly lower mean SATV score than did graduates of predominantly white high schools. This finding appeared to agree with the findings of Newby (1981) and Coleman (1966) that blacks who attended predominantly black high schools do not do as well on achievement test as blacks who attended predominantly white high schools.

On the SATM score, Groups A and C (students who had participated in Intervention Programs and who had graduated from predominantly black and predominantly white high schools, respectively) had significantly lower SATM scores than did Groups B and D (students who had not participated in these programs and who had graduated from predominantly black and predominantly white high schools, respectively). This finding agreed with the findings of Wright (1973) and Romano and Garfield (1980). They found that students who participated in intervention type programs had lower achievement than did those students who did not participate. Group A was not significantly different from Group C, and Group B was not significantly different from Group D.

There was no significant difference as a function of sex on the SATM score. However, males had a slightly higher mean score than did females.

There was a significant difference as a function of high school graduated. Graduates of predominant black high schools had a significantly lower mean SATM score than did graduates of predominantly white schools. This finding agreed with the findings of Newby (1981) and Coleman (1966). They found that black students who attended predominantly white high schools did better on achievement tests than did those black students who attended predominantly black high schools.

There was a significant difference as a function of interaction between sex and involvement in Intervention Programs. Females who participated in these programs had a significantly higher mean SATM score than males. It appeared that females, who were marginal students,

were more inclined to seek help than males. Males who did not participate in these programs had a higher SATM score than did females.

Research Question 1c. Is there a difference in the Test of Standard Written English (TSWE) score among the 4 groups? Is there a difference as a function of sex?

The ANOVA revealed that Groups A and C (students who had participated in Intervention Programs and who had graduated from predominantly black and predominantly white high schools, respectively) had significantly lower TSWE scores than did Groups B and D (students who had not participated in these programs and who had graduated from predominantly black and predominantly white high schools, respectively). Group A was not significantly different from C, and Group B was not significantly different from Group D.

There was no significant difference as a function of sex. However, males had a slightly higher mean TSEW score than did females.

Research Question 2. Is there a difference in the freshmen grade point average (FGPA) among the 4 groups? Is there a difference as a function of sex?

The ANOVA revealed that there was no significant difference in the mean FGPA among the 4 groups.

Although black students who had participated in Intervention Programs (Groups A and C) had initial lower test scores and high school grade point averages than did those black students who did not participate in these programs (Groups B and D), after one year they had freshmen grade point averages which were comparable with those black students who did not participate in these programs.

This finding agreed with Romano and Garfield (1980). They found that students in an intervention type program at the University of Minnesota had lower test scores and lower grade point averages at the beginning of the program than did students who did not participate in these programs. However, after one quarter, students who participated in these programs had grades comparable with the regular students. This finding suggests that Intervention Programs do work at Virginia Tech.

There was no significant difference as a function of high school graduated. Graduates of predominant black high schools had a significantly higher mean FGPA after one year than did graduates of predominantly white schools. Although graduates of predominantly white high schools had higher standardized test scores than did graduates of predominantly black high schools, these higher test scores did not translate into a higher mean FGPA. Therefore, for blacks at Virginia Tech, maybe more emphasis should be placed on high school grade point averages for entrance and less on standardized test scores. This finding appeared to agree with a finding by Hrabowski (1975). He found that black graduates of predominantly black colleges did not differ significantly from black graduates of predominantly white colleges on their graduate grade point averages at the University of Illinois at Urbana. This finding would suggest that since there were only 60 graduates of predominantly black high schools, the University should increase the recruiting effort at predominantly black high schools.

There was no significant difference as a function of sex. However, females had a slightly higher mean FGPA than did males. This higher

grade point average was a trend that black females carried over from high school even though they had slightly lower standardized test scores than males.

Research Question 3. Is there a correlation between the mean high school grade point average (HGPA) and the freshman grade point average (FGPA) for the 4 groups?

A Pearson correlation revealed that there was no significant correlation between AGPA and FGPA for students who participated in Intervention Programs (Groups A and C). However, there was a significant correlation between the HGPA and FGPA for students who did not participate in Intervention Programs (Groups B and D). This finding suggests that HGPA is a good predictor for freshmen success in college except for those students who participate in Intervention Programs. Marginal students can increase their chances for success in college by participating in Intervention Programs.

Research Question 4. Is there a relationship between FGPA and the student's major field of study for the 4 groups? Is there a difference as a function of sex?

Although the ANOVA revealed that there was a significant difference among the mean FGPA by college, the post hoc test of significance did not verify this significance. Because of the small number of students enrolled in the colleges of Agriculture, Education, and Human Resources, the post hoc test of significance showed no difference in means (see Table 11). However, the ANOVA revealed that those colleges which required high grade point averages for admission tended to have higher freshmen grade point averages (see Table 11).

There was no significance as a function of sex.

Research Question 5a. Is there a relationship between FGPA and family income, for the 2 groups, those students who graduated from predominantly black high schools and those students who have graduated from predominantly white high schools?

Students who had graduated from predominantly black high schools and who came from low-income families tended to make better grades than black students who had graduated from predominantly white high schools and who came from low-income families (see Table 14). In general, students who came from high-income families tended to have higher freshman grade point averages than did students from low-income families.

Research Question 5b. Is there a relationship between FGPA and family income for all students, both groups combined?

A Pearson correlation revealed that, in general, as family income increased so did FGPA. Students who came from high income families tended to have higher grade point averages than did students from low-income families.

Research Question 6a. Is there a relationship between the FGPA and the kinds of financial aid received, that is, scholarship, work-study, grant, or loans, for the 2 groups, graduates of predominantly black high schools and graduates of predominantly white high schools?

Of the students who received scholarships, graduates of predominantly black high schools had a slightly higher mean FGPA than did graduates of predominantly white high schools. Students who received scholarships had a significantly higher mean FGPA than did students who did not receive scholarships. However, there was no

differentiation made between scholarship awarded for need and scholarship awarded for merit for this question.

There was no significant difference between students who participated in work-study and students who did not participate and there was no significant difference as a function of high school graduated. However, students who had graduated from predominantly black high schools and participated in work-study had a lower mean FGPA than did students who had graduated from predominantly black high schools and did not participate in work-study. This finding seemed to suggest that black students do better academically without work-study. There was no significant difference as a function of receiving grants by high school graduated.

There was a significant difference between the mean FGPA of students receiving grants and students not receiving grants. Students who received grants had a significantly higher FGPA than students who did not receive grants.

There was no significant difference as a function of receiving loans by high school graduates. However, there was a significant difference between the mean FGPA of students who received loans and students who did not receive loans. Students who received loans had a significantly higher mean FGPA than students who did not receive these loans.

In conclusion, all the financial aid packages seemed to enhance academic achievement except work-study. When putting together a financial aid package for blacks, the university may well be advised that the time used for work-study could be better used for study.

Research Question 6b. Is there a relationship between FGPA and the kinds of financial aid received for all students, both groups combined?

An ANOVA revealed that students who received some kind of financial aid had a significantly higher mean FGPA than did those students who did not receive any kind of financial aid.

Research Question 7a. Is there a relationship between the mean FGPA and the amount of financial aid received for the 2 groups, graduates of predominantly black high schools and graduates of predominantly white high schools?

The ANOVA revealed there was no significant difference as a function of high school graduated. However, there was a significant difference in the mean FGPA for the amount of financial aid received (see Table 18). In general, those students who received the greatest amount of financial aid also had the highest freshmen grade point averages.

Research Question 7b. Is there a relationship between FGPA and the amount of financial aid received for all students, both combined?

A Pearson correlation revealed a positive relationship between FGPA and the amount of financial aid received. Students who tended to receive the greatest amount of financial aid also tended to make the highest freshmen grade point averages.

Research Question 8a. Is there a relationship between the mean FGPA and the type of college directed courses taken in high school for the two groups, graduates of predominantly black or white high schools? With college courses being defined in this study as advanced/honors English, and any course in chemistry, physics and computer science.

An ANOVA procedure revealed that there was significant difference between the mean FGPA of those students who had taken advanced/honors

English or computer science courses in high school and those students who had not taken these courses. It is suggested that future students be advised to take these courses while in high school.

Research Question 8b. Is there a relationship between the mean FGPA and the number of math courses taken in high school beyond Algebra II for the two groups, graduates of predominantly black or white high schools?

The ANOVA procedure revealed that there was no significant difference in the mean FGPA as a function of number of math courses taken in high school beyond Algebra II. Although there was no significant difference among the mean of the 4 groups, those students who had taken more courses tended to have higher freshmen grade point averages (see Appendix B).

Research Question 9a. Is FGPA correlated with citizenship for the two groups, graduates of predominantly black or white high schools? With citizenship being defined for this study as participation in anyone of the following in high school: athletics, clubs or student government.

A Pearson correlation revealed a significant positive relationship between FGPA and citizenship for students who had graduated from predominantly black high schools. In general, it showed that the more students had participated in citizenship activities in high school, the higher their grade point averages.

There was no significant relationship between citizenship and FGPA for students who had graduated from predominantly white high schools.

Research Question 9b. Is FGPA correlated with citizenship for all students, both groups combined?

A Pearson correlation revealed that there was no significant correlation between FGPA and citizenship activities for all students.

Research Question 10. Is there a difference between the status of academic probation for black freshmen who had graduated from predominantly black and predominantly white high schools who participated in Intervention Programs and those black freshmen who had graduated from predominantly black and predominantly white high schools who did not participate in these programs?

The ANOVA revealed that there was no significant mean FGPA difference between those students on academic probation as a function of involvement in Intervention Programs. Students who participated in Intervention Programs did not differ significantly on their mean freshmen grade point average than did those students who did not participate in these programs. However, students who participated in these programs had a slightly higher mean FGPA than did those students who did not participate.

Research Question 11. What is the retention rate for all four groups?

Graduates of predominantly black high schools who participated in Intervention Programs (Group A) had a 74% retention rate; graduates of predominantly black high schools who did not participate in these programs (Group B) had a 83% retention rate. Graduates of predominantly white high schools who participated in Intervention Programs (Group C) had a retention rate of 76%; and graduates of predominantly white high schools who did not participate in these programs (Group D) had a retention rate of only 71%. Graduates of predominantly black high schools who participated in Intervention Programs had a slightly higher retention rate than did graduates of predominantly white high schools who did not participate in these programs. In general, students who

participated in Intervention Programs did as well as students who did not participate in these programs, if not better, when compared for academic survival.

### Conclusions

1. Even though black students who participated in Intervention Programs had significantly lower high school grade point averages and standardized test scores, after 1 year, students who participated in Intervention Programs mean FGPA was not significantly different from those students who did not participate in these programs. Therefore, the findings showed an association between participation in Intervention Programs and improved academic performance .

2. Even though graduates of predominantly white high schools had higher standardized test scores than did graduates of predominantly black high schools, these higher test scores did not translate into a higher mean freshmen grade point average.

3. Females had a higher mean high school grade point average than males and this higher average was continued through the college freshmen grade point average.

4. Black males had slightly higher standardized test scores than females, but these higher test scores did not translate into higher grade point averages.

5. Graduates of predominantly black high schools who came from low-income families did better academically than graduates of predominantly white high schools who came from low-income families.

6. In general, students from high-income families did better academically than did students from low-income families.
7. Students who had taken advanced/honors English or computer science courses in high school had a significantly higher freshmen grade point average than did those students who did not take these courses.
8. Students who had taken more math courses in high school tended to have higher freshmen grade point averages than students who did not.
9. Students who received financial aid had higher freshman grade point averages than did students who did not receive financial aid.
10. All the financial aid packages appeared to enhance black students' academic success except work-study.
11. In general, students who participated in Intervention Programs fared as well as students who did not participate in these programs, if not better, when compared for academic survival.
12. Graduates of predominantly black high schools had a slightly higher mean grade point average, from high school through college, than did graduates of predominantly white high schools.
13. For students who participated in Intervention Programs their high school grade point averages were not good predictors of their college grade point average. However, for students who did not participate in these programs, their high school grade point averages were fairly good predictors of their college grade point averages.

### Recommendations

The findings and conclusions of this study led to 2 types of recommendations. The first type addresses recommendations for future

study. The second type is concerned with the use of the study by administrators for admission and retention of black students.

#### Future Research

1. A study should be conducted with a larger sample and this sample should be randomly selected from the entire states' predominantly white colleges. It is generally accepted that a large random sample is more representative of the population being investigated than is a small sample.

2. A study should be conducted to investigate whether there is a difference between the academic performance of graduates of predominantly black high schools and graduates of predominantly white high schools at a predominantly black college.

3. A study should be conducted to investigate which types of Intervention Programs are more effective for enhancing students' academic performance at Virginia Tech.

4. A follow-up study should be conducted to ascertain whether students who participated in Intervention Programs graduate at the same rate as the regular student population.

5. A survey study should be conducted with Black students who participated in these programs to ascertain which programs they thought helped most to improve their academic performance. Then a comparison can be made among the programs the students thought had the greatest impact upon their academic performance and what the research revealed had the greatest impact upon their academic performance.

6. A study should be conducted to ascertain which types of scholarship aid enhance academic performance. That is, scholarship awarded on the basis of need, merit, or potential.

Use of the Study and Its Findings by Administrators and Counselors

1. Admission counselors also should recruit heavily at predominantly black high schools. No association was found in this study between academic performance of Virginia Tech freshmen and racial mixture of high school attended.

2. Students who are considered marginal by their standardized test scores and high school grade point averages can improve their academic performance through involvement in well designed Intervention Programs. In this study, an association between participation in Intervention Program and maintenance of satisfactory academic performance was found. Therefore, administrators and counselors are encouraged to institute Intervention Programs to enhance the academic performance of marginal prepared students as defined by standardized test scores and high school grade point averages.

3. Administrators and counselors should inform high school counselors of the college-directed courses results. That is, college bound students failing to take advance/honors English and Computer Science courses in high school tended to have lower grade point averages as freshmen at Virginia Tech.

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APPENDIX A

FRESHMEN GRADE POINT AVERAGE (FGPA) BY HISCBW AND NADMATH

Table A.1

Freshmen Grade Point Average (FGPA) by HISCBW and NADMATH

SUMMARY OF ANOVA					
Source of Variation	Sum of Squares	DF	Mean Square	F	Significance of F
MAIN EFFECTS	3.431	5	0.686	2.045	0.076
HISCBW	0.494	1	0.494	1.472	0.227
NADMATH	2.705	1	0.676	2.016	0.096
TWO WAY INTERACTIONS	0.982	3	0.327	0.975	0.406
HISCBW NADMATH	0.982	3	0.327	0.975	0.406
EXPLAINED	4.413	8	0.552	1.644	0.118
RESIDUAL	46.632	139	0.335		
TOTAL	51.045	147	0.347		

159 cases were processed

Note: HISCBW = High school graduated, predominantly black or white

NADMATH = Number of math courses beyond algebra II

APPENDIX B

BLACK FRESHMEN GRADE POINT AVERAGE (FGPA) BY THE NUMBER OF MATH COURSES  
TAKEN BEYOND ALGEBRA II IN HIGH SCHOOL.

Table B.1

Black Freshmen Grade Point Average (FGPA) by the Number of Math Courses Taken Beyond Algebra II in High School

1	2	3	4	5
$\bar{x} = 1.82$	$\bar{x} = 1.89$	$\bar{x} = 1.88$	$\bar{x} = 2.18$	$\bar{x} = 2.23$
$n = 53$	$n = 35$	$n = 26$	$n = 33$	$n = 1$

Note  $\bar{x}$  = Mean of each condition

$n$  = Number of students in each condition

APPENDIX C

FRESHMEN GRADE POINT AVERAGE (FGPA) ON ACADEMIC PROBATION  
BY INTP AND HISCBW

Table C.1

Freshmen Grade Point Average (FGPA) On Academic Probation by INTP and HISCBW

SUMMARY OF ANOVA					
Source of Variation	Sum of Squares	DF	Mean Square	F	Significance of F
MAIN EFFECTS	0.317	2	0.159	1.461	0.246
INTP	0.102	1	0.102	0.936	0.340
HISCBW	0.179	1	0.179	1.652	0.207
TWO WAY INTERACTIONS	0.091	1	0.091	0.839	0.366
HISCBW NADMATH	0.091	1	0.091	0.839	0.366
EXPLAINED	0.408	3	0.136	1.254	0.305
RESIDUAL	3.801	35	0.109		
Total	4.210	38	0.111		

39 cases were processed

Note: INTP = Involvement in Intervention Programs.

HISCBW = High school graduated, predominantly black or white

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