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IDENTIFICATION OF THE POTENTIAL

HIGH SCHOOL DROPOUT

by

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ABSTRACT

IDENTIFICATION OF THE POTENTIAL
HIGH SCHOOL DROPOUT

by

Alan L. Vaughan

Old Dominion University, 1991

This research was conducted to determine a methodology for the early identification of potential dropouts in the Chesapeake Public School System. A review of research literature determined that many discriminating characteristics had been identified as influential in a student's decision to drop out or stay in school. This study sought to be useful in a practical school setting. Therefore, the study limited its scope to those discriminating characteristics available in student records and thus readily accessible to school personnel. The predictor variables listed below are well documented in the research as discriminating characteristics relating to a student dropping out of school. Data was collected on the following characteristics that were available in the student records of the Chesapeake Public School System to be utilized as predictor variables:

1. absences
2. achievement test scores - Reading
3. achievement test scores - English
4. achievement test scores - Mathematics
5. achievement test scores - composite
6. father's education
7. father's occupation
8. grade point average
9. mother's education
10. mother's occupation
11. parent's marital status
12. race
13. retentions
14. school attended
15. sex
16. transfers

In addition, the student's status during the period of study (dropout or nondropout) was available.

A random sample was selected from the 1988-1989 Chesapeake Public School rolls and a number of analyses, primarily discriminant analysis, were conducted. The analyses were replicated with a fresh sample from 1989-1990 school rolls.

The findings of the analyses indicated that potential school dropouts could be identified in the Chesapeake Public School System with between 90 percent and 98 percent accuracy, depending on the methodology employed. The major predictor variables that consistently emerged as most predictive were absences, retentions, transfers, and mother's education. In addition, schools serving populations more urban in nature exhibited higher dropout rates, and the number of absences proved more predictive in those schools.

The study recommends that this methodology be employed in the school system and results monitored longitudinally to determine if the accuracy of the classification of potential dropouts remains consistent over time. Furthermore, the study recommends that appropriate interventions be developed and monitored to maximize the benefits derived from the early identification of potential dropouts.

ACKNOWLEDGEMENTS

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Most of all, I would be very unwise not to acknowledge my greatest source of strength, wisdom, and guidance. I have sent many, many prayers heavenward during the course of this program and none went unanswered. It is to God that I unashamedly give all the credit for this project. I would not have been able to complete it without Him.

TABLE OF CONTENTS

iv

v

LIST OF TABLES

vi

CHAPTER I

INTRODUCTION

The importance of a basic education for all was fundamental to such educational forefathers as Jefferson,[1] Mann,[2] and Dewey.[3] That importance has increased in today's society where a high school diploma has come to symbolize a minimum basic education. Students that drop out of school before achieving a high school diploma have been a source of consternation for well over one hundred years. W. T. Harris advanced his views on the causes and remedies relating to dropouts in an 1872 address to the National Education Association.[4] Contemporary education leaders and national leaders alike share the consternation of those educational forefathers concerning those who do not achieve that basic education. The authors of Megatrends,[5] The Paideia Proposal,[6] and A Nation at Risk: The Imperative for Educational Reform[7] all attest to the importance of attaining a high school diploma and the problems arising related to school dropouts. Former Secretary of Education Terrel H. Bell related the significance of the dropout problem when he stated,

> The ability of state education systems to attract and hold teenagers in schools through high school graduation is critical to a nation committed to equal educational opportunity, full employment, and individual fulfillment.[8]

Graduation rates have steadily improved during the past ninety years, rising from 17 percent in 1900 to 75 percent in 1980. However, many studies indicate that while that quantity has increased, quality has decreased. One of the most frequently cited studies on school dropouts, conducted by the United States General Accounting Office, points out, "There is evidence that in the late 1960s and in the 1970s, there was a considerable decline in high school students'

1

achievement levels."[9] In addition, while some studies show that the
dropout rate has remained fairly stable during the past ten years,[10]
others indicate the rate has increased.[11] In fact, the GAO cited
research supporting both viewpoints in its first study on dropouts.[12]
Factors compounding the problem include higher accreditation,
curriculum, and graduation requirements, widespread underreporting of
actual dropout rates, and a rapidly advancing technological work force
that is increasingly less able to assimilate the large number of
undereducated dropouts. Another problem often noted by researchers is a
lack of consistency in the definition of dropouts and the collection of
data. In Morrow's analysis of the methods used to calculate dropout
rates, he reports,

> Differences in defining the target population (dropouts), computing
> a summary statistic (dropout rate), and collecting and coding
> primary data create research results and school reports that are
> incompatible if not misleading. The Illinois State Task Force on
> Hispanic Student Dropouts recently stated that, "the lack of
> uniformity in a definition has kept policy and lawmakers from
> understanding the nature, scope, and dimension of the dropout
> problem."[13]

Despite the progress made during this century, many dropout
statistics paint a bleak picture. The scope of the problem prompted
Hahn to call 1987 "the year of the dropout."[14] Hardy calls students at
risk of dropping out the "cause-celebre" (concern of the moment) of
education.[15] The dropout rate is generally reported somewhere between
13 percent and 30 percent, with most major studies concentrating around
25 percent. Estimates for the actual number of students range from
800,000 to 1,000,000 per year, or about 5,000 per day.

While the effects of the school dropout problem appear to be
experienced nearly universally, the problem seems to be intensified in
urban areas. In large urban areas, the dropout rate may easily double
the national average. Hahn found dropout rates ranging from 40-60
percent in Boston, Chicago, Los Angeles, Detroit, and other major
cities. He also found the urban dropout rates consistently high among
all students: 38 percent for whites, 56 percent for blacks, and 57

percent for Hispanics.[16] While the studies may at times report statistics that seem to be in conflict, the vast majority of studies all arrive at the same conclusion--the rate is simply too high, causing great concern and often far-reaching ramifications. Caliste stated that the problem has reached epidemic proportions[17] and Griffin laments over the terrible waste of human potential the problem creates.[18] Justiz calls it, "an education failure of gigantic proportions" that gravely diminishes the quality of life in this country. He notes that any business that consistently exhibited this sort of failure rate would not remain in business long.[19] Kunisawa feels that the dropout problem is causing, "the loss of the heart and soul of our nation," and the elimination of dropouts in America would enable the United States to wipe out the entire national debt.[20]

The significance of the problem becomes even more apparent when viewed in terms of the cost to the individual and to society as well. The cost to both groups is extensive. The October 1985, ERS Bulletin titled, "Cost of Dropouts" noted that in 1981, the average high school graduate not going to college could expect to earn $260,000 more over his lifetime than the average dropout. Considering those who finish high school could go further in education and thus elevate their likely earnings, a more appropriate overall estimate of the costs to society for each dropout in terms of lost national income is about $360,000 per dropout. This totals to $228 billion.[21] A 1972 report released by the Senate Select Committee on Equal Educational Opportunity puts the figure at $78 billion lost annually in taxes, welfare and unemployment payments, and increased crime costs.[22] Lowery and Griffin both noted additional costs in reduced political participation, poorer health, adverse motivation, vandalism, and burglary attributed to out of school youth. In addition to the original losses due to crime, the costs for judicial and penal services are tremendous.[23] Figures for the annual cost of housing each inmate range from $15,000 to $24,000, which is

roughly the tuition for Harvard, Yale, or Stanford.[24] That results in a huge expense for the state of Virginia, where Griffin found that 96.9 percent of the inmates at the Harrisonburg Correctional Unit and 80.3 percent of the inmates at the Mecklenburg Correctional Center are dropouts.[25] The education and business communities express an appropriate concern over unskilled dropouts in view of the increasing demand for technologically trained individuals, the shrinking supply of these skilled individuals, and the resulting effects on the nation's economy. Any steps that can be taken to address this immense dropout issue could be most beneficial.

Basis for Study

As might be expected, such a monumental problem has resulted in numerous studies investigating various aspects of the dropout phenomenon. Many of these studies have attempted to identify one or more factors that seem to influence a student's propensity to drop out. Black,[26] Carnes,[27] Rumberger,[28] and Lowery[29] are among the researchers identifying certain characteristics that may be related to a student dropping out of school. The High School and Beyond study identified sixteen reasons cited by dropouts as influencing their decision. In the second of two major studies, the United States General Accounting Office surveyed 479 dropout programs and noted many contributing, often interrelated factors.[30] As logic would seem to dictate, when a student at risk of dropping out can be identified and appropriate interventions conducted, the student's chances of remaining in school rise dramatically. Literally dozens of dropout programs point to early identification of potential dropouts as a key to success, and Middleton is among those researchers that have conducted hard research to prove this to be true.[31]

Early Identification of Dropouts

Much is known about those components necessary for a successful dropout prevention program. The research points to many suggested solutions for the dropout problem. Nearly all studies list counselling as a major component. Counselling programs are in place nationwide to help pregnant, minority, disadvantaged, and disaffected youth. All claim some degree of success. In addition to counselling, other programs ranked as successful incorporated vocational courses, remedial classes, career education, work-study programs, part-time jobs, parental contact, the involvement of caring adults, and survival skills.

However, many of the successful programs lament that the at-risk students too often remain unidentified until the problems experienced by the potential dropout are too great to surmount. Mizell agrees, commenting that, not only are the necessary resources needed by at-risk children not available, but

> Nor is there a system in most schools designed to identify and track these students across grades--including the evolving nature of their problems and the efforts to address them--so that at any given point school officials and other professionals have access to an accurate, up-to-date data base to identify students who are troubled, withdrawn, or unmotivated.[32]

There is much strong evidence pointing to the importance of early identification of the potential dropout. The cutting edge of dropout research currently centers on the early identification of students at risk of dropping out. By identifying these at-risk students before they actually drop out, they can be channelled into dropout prevention programs before too much damage has been done. By monitoring students from elementary school through the junior and senior high years, at-risk students can be identified at each level for age-appropriate intervention. Computer programs can be utilized to identify these patterns and to track student progress, thus enabling at-risk students to receive appropriate intervention aids as needed. School systems already utilizing such computer tracking programs for the purposes of early identification have reported positive results:

The Dade County, Florida, public schools use computers to keep tabs on the district's approximately 100,000 7th through 12th graders. School officials enter a wide range of information into computers, some of which enables them to identify students at risk of dropping out. For instance, students' grades and standardized test scores are tracked. So are student conferences with teachers or counselors to discuss academic or behavioral problems, tardiness, legal problems (robberies or assaults, for example), and attendance information—both overall and by class. "In the past, we would have recorded all this information somewhere," explained Ray Turner, assistant superintendent for Educational Accountability. "But it was never all in one place, so it was hard for us to get a comprehensive picture of the student." With the new system, which began 2 years ago, students can be tracked as they move from school to school. Only administrators and counselors in a student's current school have access to records. Attorneys reviewed the information system to make certain it was legally sound.[33]

Early identification is also much more practical since elementary school teachers are able to work a great deal more closely with students. As students move through junior high and high school, they often become lost in the bureaucracy of a system that grows more subject-centered as opposed to the student-centered orientation of elementary school.

The Urban Superintendents Network also calls for early identification:

Some children have mastered their ABC's and recited nursery rhymes long before they enter kindergarten. Others—most often those from economically disadvantaged homes—are not prepared for school. These children may not use standard English comfortably and may not express themselves well. Their social, cognitive, or motor skill development may not match the expected behaviors of entering kindergartners. They may even have health problems that interfere. Such difficulties are of great concern to urban school superintendents. They recognize that without special help early in their development, underprivileged youngsters may never compete on equal terms with privileged ones. Research shows that students who drop out display academic problems as early as the third grade. The superintendents also recognize that the earlier they intervene— preferably in the preschool years and with the involvement of parents—the greater the dividends. The recent report from the Committee on Economic Development urges, among other things, preschool programs for all disadvantaged 3- and 4-year-olds and calls for the "earliest possible intervention with at-risk families for reasons of both compassion and cost effectiveness."

Because a large percentage of those who drop out do so in high school, a tendency exists to view the dropout problem as falling solely within the high schools' domain. This attitude is changing, however, as educators develop more sophisticated ways to identify behavioral, attitudinal, and cognitive problems—not just in junior high or grade school, but even before a child starts formal schooling. Thus Albuquerque Superintendent Lillian Barnes notes:

"Intervention programs during the formative years can well be the key to [dropout] prevention. Building self-confidence and

parent support are more attainable goals during the preschool years."

The urban public school superintendents believe that early intervention makes great sense in light of current knowledge about the cumulative process that leads to dropping out. The downward spiral often begins with early family experiences. Children who grow up in stressful, indifferent, or hostile environments are more apt to become insecure, anxious about learning, and distrustful of adults. Children from healthy home environments enter school with their natural curiosity, their interest in learning, and their sense of well-being intact. An at-risk youth's background can be the precursor of school experiences that add to his alienation and poor self-image. Without self-confidence, these children will never become avid learners or fulfill their potential. Special attention from educators or a non-school source may be needed to make this happen.[34]

In his overview of the dropout picture, Rumberger also lauds early identification, citing accurate and timely identification of students with a high risk of dropping out as crucial to a successful strategy for dropout prevention. He points to a study by Olsen and Edwards of California dropouts that indicated that half of the dropouts interviewed did not discuss their decision with anyone at school before they left. His studies found:

> Timely identification is equally as important. The earlier a student with a high risk of dropping out is identified, the more likely it is that a sustained effort at dropout prevention will be successful. Research has shown that some dropouts begin showing signs of academic failure and disengagement in school in the early elementary grades (Lloyd, 1978; Stroup & Robins, 1972). Successful identification of high-risk students in elementary and junior high school would provide more time to intervene and address the needs of these kids at an early age. If students with a high risk of dropping out can be identified at an early age, prevention programs should be started at an early age as well. Even if accurate, early identification is not possible, it still makes sense to initiate early interventions for disadvantaged kids who generally have a high probability of dropping out. A recent evaluation of one preschool program for the disadvantaged found that it reduced the incidence of dropping out (Schweinhart et al., 1985).[35]

Commenting on the advantages of early intervention, Butler writes,

> Intervention in the earliest years is the most cost-effective way to improve the prospects of disadvantaged (at-risk) children. Research shows that the earlier you start, the better. Long term studies of children in the Perry Preschool Program in Ypsilanti, Michigan, and the Harlem Head Start program in New York City have found that high-quality preschool education for three- and four-year-olds helped reduce by about half later dropout behavior. . . . Strictly from an investment standpoint, early prevention programs will pay the biggest dividends for our nation.[36]

Cardenas also recommends early identification,

> Research should be conducted at the upper elementary school level to
> identify and intervene with high risk students early in the school
> year, perhaps during the first three weeks because the cumulative
> academic and social deficits of these students are massive by the
> time they enter secondary schools.[37]

Additionally, the March 1986, ERS Bulletin cites findings from a
study by the Oregon School Study Council which states,

> One characteristic of effective student retention programs is that
> they identify potential dropouts early in their academic careers.
> Some studies have suggested that, by third grade, discernible
> patterns of academic success or failure become ingrained in a child.
> Successful high school retention programs establish and maintain
> close contact with elementary and middle schools. Most school
> districts have neither the staff nor the funds to assemble detailed
> background information on each student; however, teachers,
> counselors, and administrators can monitor certain patterns that are
> linked to dropping out, such as high absenteeism, low grades, and
> low cumulative credits. Many large districts are using computers to
> analyze student records and identify potential dropouts.[38]

Several studies have found it possible to predict dropouts using
statistical data. In 59 percent of the cases, Nichols was able to
predict dropouts from college based on SAT scores, date of application,
and amount of first year tuition costs that were unmet by the student.[39]
Morris was able to collect and utilize twenty-six characteristics to
accurately predict dropouts and nondropouts for over 90 percent of the
subjects.[40] Wilcynski was able to account for 50 percent of the
variation between dropouts and nondropouts as early as the sixth grade
utilizing eighteen selected characteristics.[41] Lowery was able to
accurately predict dropouts in 78.55 percent of the cases using nine
characteristics as predictors in a rural school system in Georgia.[42]

Fortenberry and White are among many who point to the cost-
effectiveness of early identification and subsequent intervention for
potential dropouts.[43] Quinones agrees, commenting on the success of
early identification and intervention in the New York City program,

> The cost of providing AIDP services to each at-risk student was
> approximately $1,000, a sum that compares favorably with the
> estimated $400,000 difference in lifetime earnings of high school
> graduates vs. high school dropouts.[44]

Chesapeake Public Schools

The dropout situation is an important concern of school systems
throughout the country, including school systems in the Tidewater region
of Virginia. While the first in a series of 1991 Virginian-Pilot
newspaper articles reported the "good news" that, "for the first time,
no school system in the state has a double-digit dropout rate,"[45]
subsequent articles lamented much higher dropout rates,[46] padded
attendance rolls, gross underreporting of actual dropout rates, and non-
graduation rates (the percentage of high school graduates each year in
relation to the number of ninth-grade students three years earlier) of
up to 69 percent.[47] Since "dropout" is only one of a number of
categories cited for leaving school, and because already overworked
guidance counselors simply do not have the time or resources to track
down "no-shows" (those students who never formally drop out of school
but do not return for school in September), Chesapeake's dropout rate
may also be significantly underreported and is a concern expressed by
educational, political, and community leaders. In 1985, Chesapeake
Public Schools Superintendent, Dr. C. Fred Bateman, authored an article
published in the American School Board Journal expressing his concern
over the dropout dilemma and encouraging school systems not to let the
excellence movement exacerbate the problem. He suggested that part of
the building principal's evaluation be based on efforts to strengthen
the school's holding power on potential dropouts.[48] Beginning with the
1986-87 school year, the reduction of dropouts has been a stated goal of
the Chesapeake Public School System. In fact, specialized dropout
counselling in the ninth and tenth grades has been introduced.

Chesapeake's dropout problem has mirrored the national tendency to
be a more urban issue. Research provided by Dr. Robert A. Cowden,
Director of Research, Testing, and Student Activities, confirms that the
dropout rate in Chesapeake has been two to three times higher in the two
high schools which serve more urban populations (Indian River and Oscar

Smith High Schools) than the dropout rates in the other three high schools which serve more suburban populations. Chesapeake Public Schools desires to identify potential dropouts for the purpose of providing appropriate interventions for these students. Therefore, this study was undertaken.

Implications for Study

The dropout problem described in this research is a concern of great importance, not just to educators charged with the responsibility of educating our youth to the fullest extent, but to political leaders, community leaders, and parents as well. The grave consequences previously noted in this paper may well have a great future impact on society. Experts in the field praise early identification as a viable method to decrease the number of dropouts. The Chesapeake Public School System is actively seeking to reduce the number of dropouts. Because this research is designed to provide a systematic methodology for the identification of potential dropouts, the results of this study can be useful in addressing the situation.

Lowery points out that one advantage of this type of study is that it does not come from a particular educational, economic, or sociological viewpoint. The data examined are not confined to a particular discipline, but instead come from a variety of educational, economic, and sociological characteristics.[49] Another advantage is that no special testing of students is required since all data is obtained from school records. Further, this study updates previous studies that were conducted before recent changes in demographics as well as mandated changes in the reporting of dropout statistics, thus supplementing and enriching the existing literature. This study also avoids difficulties encountered in previous studies by utilizing a consistent definition for dropouts and a consistent method of data collection.

This study is of particular use in planning for the prevention of dropouts in the Chesapeake Public School System since a prediction

equation was obtained utilizing data obtained from Chesapeake student records, thus providing for the different demographics and nuances of that system's population. Because Chesapeake's demographics include some schools that serve more urban populations than others, this study goes a step further than previous studies by comparing the results of schools serving more urban populations with those of schools serving less urban populations. Since the methodology employed in this study allows for the demographic differences occurring in different school systems, this study may also have implications for educational policy makers in other school systems as well. A combination of planning for the early identification of potential dropouts and incorporating appropriate interventions can be instrumental in lowering the dropout rate.

Statement of Problem

The research problem is one of determining a useful methodology for the identification of potential dropouts. Factors that have been identified as having a bearing on a student's likelihood of dropping out of school were determined through an exhaustive review of the literature. Those factors available from Chesapeake Public School student records were utilized as predictor variables in the formulation of the prediction equation. A random sampling of 305 students was selected from those students enrolled in grades nine through twelve at the beginning of the 1988-1989 school year for data collection.

The procedure was repeated utilizing the 1989-1990 student population for the purpose of cross validation.

Specific Research Questions

To investigate the problem, the following research questions were addressed:

1. What academic and nonacademic characteristics discriminate between high school students in Chesapeake Public Schools who drop out of school and those students who stay in school?

2. How accurately can data from these selected discriminating characteristics available in the Chesapeake Public School System student records be utilized to identify potential dropouts prior to leaving school?

3. Do differences exist between those discriminating characteristics utilized to identify potential dropouts in Chesapeake Public Schools serving populations more urban in nature than those discriminating characteristics utilized to identify potential dropouts in those schools serving populations less urban in nature?

In addition, utilizing the information obtained in answering these questions, this study wishes to provide recommendations for policy changes that may be effective in reducing the dropout rate.

Definition of Terms

Terms relevant to this research are defined below.

1. Criterion Variable - The factor that determines the student classification. For the purposes of this study, students were classified as dropout or nondropout.

2. Dropout - Those students that leave school during the time of the study without transferring to another educational institution.

3. Nondropout - Those students that remain in school or transfer to another educational institution during the time of the study.

4. Predictor Variable - Those identified characteristics that can be utilized to predict a student's likelihood of dropping out.

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CHAPTER II

REVIEW OF RELATED LITERATURE

The purpose of this chapter is to provide a review of the
literature pertinent to this study and to establish a theoretical
framework for conducting the research presented. The review first
addresses the factors associated with dropping out of school as reported
in the literature. The section cites several prominent studies in
providing an overview of the factors related to dropping out, followed
by a thematic approach to the large volume of data available concerning
factors related to dropping out of school.

Factors Associated With Dropping Out of School

As might be expected when dealing with a problem of this
magnitude, a tremendous number of studies have been conducted and
articles written listing various reasons for students dropping out of
school. Subsequently, a very large number of factors have been
identified. For example, in a survey of seventeen major school
districts, Barber and McClellan compiled a sampling of sixty-two
different factors school systems used to categorize dropouts, stressing
that the sixty-two were just a sampling and not a complete listing.
They identified the following factors (listed in rank order from most
commonly cited to the least-often mentioned) given by school systems as
reasons students cited for leaving school:

1. student had attendance problems
2. student lacked interest in school
3. student was bored with school
4. student had academic problems or poor grades
5. student had problems with teachers
6. student had family problems or responsibilities
7. student had problems with assigned school
8. student disliked a particular course
9. student had problems with school administrators

16

10. student disliked everything
11. student had problems with counselors
12. student had problems with other students
13. student had discipline problems and was suspended
14. student felt too old for school
15. student had financial problems
16. student was ill
17. school lacked desired program or course
18. miscellaneous reasons
19. student was pregnant
20. student had conflicts with employment
21. student got married
22. student had enough education to work
23. illness in student's family
24. student disliked discipline and rules
25. student had transportation problems
26. student entered military service
27. student moved and entered another school
28. student had achieved educational goals
29. parents demanded that student leave school
30. don't know
31. couldn't speak English
32. student disliked some physical feature of school
33. student left because of gangs or racial problems[1]

Caliste echoed many of the above cited factors in his survey of students, and even found that,

> Computer (video) games that were housed in various businesses near the school provided the potential dropout with an attractive, nonacademic outlet. Many students indicated in counselling sessions that the attraction lured them away.[2]

In the first of two major studies on dropouts commissioned by Congress, the General Accounting Office cited the following correlates of dropping out:

1. being two or more years behind grade level
2. being pregnant
3. coming from a household where the mother or father were not in the home when the youth was age fourteen
4. coming from a household where the father dropped out of school
5. having relatively little knowledge of the labor market[3]

In the second major study, after surveying over one thousand dropout programs, the General Accounting Office reported:

> The causes of youth dropping out are often difficult to isolate and classify, because the factors associated with dropping out are usually interrelated. But the program officials indicated that the problem youth were principally in two broad categories (with some in both): over half had problems of truancy or excessive absence. Also, nearly 40 percent displayed troublesome behavior (disruptive, withdrawn). Other problems included pregnancy or early parenthood, and limited English facility.
> A somewhat similar picture of problems of dropout youth is seen in data from national surveys. For example, following are data from the High School and Beyond survey on selected reasons for

dropping out of school and the percentage of dropouts who reported each reason. (Some youth reported more than one reason.)

1. had poor grades (66 percent)
2. school was not for me (66 percent)
3. could not get along with teachers (31 percent)
4. expelled or suspended (18 percent)
5. married or plans to marry (38 percent)
6. was pregnant (23 percent)
7. offered job and chose to work (38 percent)[4]

A "call to action" by the OERI Urban Superintendents Network

stated:

The dropouts themselves provide telling insights. In one U.S. Department of Education survey of students from the class of 1980, the largest number of dropouts said they left school because of poor grades. Other key reasons, in this order, were that they didn't like school, preferred to work, got married or planned to, could not get along with their teachers, got pregnant, had to support families, or were expelled.

Dropouts surveyed last year in San Diego described school-related factors that lead to their decision. Their responses are typical of what one hears from dropouts throughout the nation:

1. I left because of overall boredom. I wanted to get on with my life.
2. The teachers and counselors told me I was stupid.
3. not much individual help
4. I needed more challenging classes.
5. I didn't like [the school]. I hated it there. It felt like a dummy zoo.

The dropouts also suggested what the district could have done to

retain them in school:

1. more understanding by teachers
2. Teachers could have been more helpful.
3. needed more support from teachers
4. work at my own speed
5. Classes are too big.
6. [School] should be set up to help the student prepare for their future. Get a good job.
7. Have stronger discipline--more consistent.[5]

Barber and McClellan's studies provided additional insights into

the nature of the dropout:

Our analysis of the reports produced several additional findings. Students tend to drop out in the months of February and March or in the summer following the 10th grade. One district analyzed the reasons students gave when they dropped out and characterized several types of dropouts. The "classic" dropout exhibited poor attitudes towards school, was likely to be failing, was behind in academic progress, had a lower grade-point average, and was probably male. More than half of the dropouts in this district, however, fit into another category: the "work-oriented dropout." They were more likely to be male, to have slightly better than average grades, and to have slightly higher than the average number of credits. They were also less likely to leave

school at age 16. In some ways, the female counterparts of these work-oriented dropouts were "homemakers." These were girls whose grade-point averages were above passing but who did not perceive school as necessary to accomplish their goals of setting up households and raising families. Another group of students, the "intellectual elite," also saw school as irrelevant. These were students who "renounced the system" despite their ability to succeed in it. They were the oldest and closest to completing their academic requirements. Often they came from large families of low socioeconomic status. For two other groups of students, leaving school was not an entirely voluntary decision. Students characterized as "family supporters" were perceived to be unusually responsible and aware of the need for education. But their parents felt that the children had an obligation to help the family economically. For another group, the "cultural isolates," school was probably not a pleasant place because of language problems and social distance from other students. While these students were behind their peers in accumulated credits, they tended to have done well in the courses they completed. Examining the Entitlement Projects, the researchers found that, for low-income youth, the characteristic most strongly correlated with the greatest probability of not completing school by age 20 was being 1 year or more behind expected grade level at ages 16.5 to 17.5 years. Analyzing data from the Transition Project, the researchers found that in addition to such factors as low classroom grades, grade failure, and negative school attitudes, delinquent behavior in the junior high school years was a powerful predictor of dropping out.[6]

Determining the true cause(s) for a student dropping out is especially difficult, not only because so many different factors have been identified, but because the related factors are often so closely associated. The Congressional Research Service issue brief on dropouts emphasizes that no single cause can be found. In addition, the report noted the interrelationship of factors associated with dropping out and that these factors may be symptoms, not causes. The report states, "For example, to what extent should the reasons for dropping out of high school be traced back to difficulties in elementary school, which in turn may have stemmed from problems in youth's homes?"[7]

The benchmark studies on dropouts conducted by the Government Accounting Office not only included the findings of many significant studies, but also cited youth's self-reported reasons for dropping out as well:

> Youth who drop out report the following reasons for leaving school: poor grades, not liking school, marriage or marriage plans, pregnancy, and preference or need for work. Self-reporting, however, is affected by youth's perceptions of their circumstances, and they may report inaccurately. Thus, it also is valuable to measure the circumstances that surround decisions for dropping out;

for example, analyzing data on characteristics of youth's family background, school experience, and personal characteristics.[8]

Lowery also uses similar categories by dividing the characteristics into factors related to the family, factors related to school achievement, and factors related to the student.[9] In order to take a thematic approach to the large volume of data, this study will employ similar categories, examining school-related factors, family-related factors, and individual-related factors.

School-Related Factors

Narrowing the topic from factors associated with dropping out of school to those factors solely related to the school still yields a tremendous amount of information. Great expenditures of time and resources have been devoted to isolating and influencing those factors related to the school, with varying degrees of reported success. Rumberger found that,

> School-level dropout rates vary even controlling for differences in student populations; this further suggests that school-related factors exert a powerful influence on students' decisions to leave schools.[10]

The Government Accounting Office reports:

> Although at-risk youth may respond to and benefit from social services and employment assistance, such aid alone does not automatically translate into success in school. Nor may the addition of just minor educational efforts be adequate. The Public Education Association evaluation of one of New York City's dropout programs concluded that the program would have to devote more attention to strengthening the academic component. The program undertook educational alternatives (e.g., course enrichment activities), but, the evaluation concluded, "few [of the schools] developed academic interventions with sufficient potency fundamentally to affect students' classroom performance." In addition, at-risk students well behind in grade level need positive (academic) evidence that they can make it to graduation.
> Dropout programs may be affected by basic inadequacies in some schools, so that improvement in school settings may often be needed if special efforts to keep at-risk youth in school are to make effective headway. In some troubled urban schools, for example, "Students . . . often jam into battered buildings. . . . Neighboring residents complain of noise, vandalism, and drugs. . . . Once inside the classroom, students pay little attention to the teachers, who, in turn, expect little from the students." The Public Education Association evaluation of the New York City dropout programs concluded that the difficulties of dropout prevention were "aggravated by several school-wide conditions [notably], the immense size of the schools, the large proportion of

below-grade-level students, the bewildering array of academic
programs which flow from these [circumstances, and] the glaring
inadequacy of space for programs in school buildings." It added,
"Ironically, the introduction of dropout prevention programs into
the schools worsens these conditions," and the stress of handling
returning truants and new program staff members in overcrowded
schools is a "powerful countervailing incentive" not to accommodate
such additions. Dropout prevention must be pursued in concert with
general school improvement, the report stated, since the
effectiveness of dropout prevention "is ultimately dependent on the
schools' directing resources and attention to their overall
instructional policies and considering how these policies interact
with their specific dropout prevention programs. . . ." If the at-
risk are to succeed in mainstreamed academic programs, a host of
issues from school and class size, admissions, credit, and security
policies, to the focus on instruction and quality of staff
development must be addressed.[11]

Due to the importance placed on these areas in the research

literature, the following topics will be addressed in relation to

factors related to the school: attendance, factors related to the

individual school building or school system, academic achievement and

retention, and behavior.

Attendance

Attendance problems are consistently cited as factors related to

dropping out, and lack of attendance is a principal component utilized

to identify potential at-risk students in most dropout prevention

programs. Many other factors relate to or impact upon attendance.

Pregnant or parenting teens have a high rate of absence for medical

attention or child care. Students working often miss school to be on

the job. Students with many transfers often have high absenteeism.

Students with severe discipline problems often miss many days due to

suspensions. Baldwin,[12] DeRidder,[13] and DeBlois[14] all cite lack of

attendance as a major factor often resulting in dropping out and promote

systems of rewards or curriculums designed to promote attendance.

Reducing absenteeism was a primary objective in 331 of the 479 dropout

programs surveyed by the GAO.[15] The OERI Urban Superintendents Network

also stresses the importance of attendance:

> Attendance standards are a major concern to urban school
> districts because a child who is not in class clearly cannot
> develop the skills required for school success. When a student

regularly cuts class or fails to show up for the entire day, this should alert educators that the student might not view the school as a friendly place to learn and socialize. When a school's overall attendance rate is low, this may signal that some of its practices and policies do not respond to the students' needs.[16]

The Individual School Building or School System

A great many factors have been identified and researched relating to the school, perhaps because factors related to the school are much easier to manipulate than factors related to the individual or family, or because society tends to direct both its blame and its efforts at change towards the schools. Opinions seem to vary greatly as to the impact of the school itself on the potential dropout, and even as to which element(s) of the school improve or worsen the problem. Rumberger found that almost half of all dropouts and more than half of white and black males cite school-related reasons for leaving school.[17] Fine advanced that greater attention needs to be given to the basic make-up of the school:

> Little attention has been given to the influences of schools themselves--their organization, leadership, teachers--on students' decisions to drop out. Yet many dropouts attend schools with very poor facilities and inadequate teaching staffs, conditions that could affect their performance in school and ultimately their decision to leave.[18]

Regarding the issue of instruction, another study, observing eight high schools in Chicago, has documented that some schools are short-changing students on instructional time. The researchers found in each school,

> a "culture of cutting," a clear pattern of skipping early morning and late afternoon classes. Toleration of this pattern "trains young people to be irresponsible," results in their falling further behind in their school work, and makes them unprepared for demands for regular attendance in later employment, the researchers said. The study also found students assigned to "fictional" study halls--nonexistent rooms to which assignment meant that students were not really expected to attend at that time. The researchers urged that "study periods" not be used simply as time fillers; that they be in a place conducive to learning; and that arrangements be made to maintain order, have monitors who can help the students with their work, and have teachers take attendance. Finally, the researchers estimated that the average student received less than 10 minutes a day of individual attention from their instructors.[19]

Burg's study of dropouts' perceptions of why they left school
found that dropouts did not feel their problems in school were related
to their domestic lives. Instead, they perceived school to be the
problem. She writes:

> The kids were turned off by the curriculum that seemed so
> removed from their daily lives. Many were living harsh realities,
> and it was hard to be inspired when school seemed so impractical.
> Furthermore, school confronted them with some unsettling enigmas.
> Questions such as, "How am I going to do my homework when I have no
> working space at home?", "How can I worry about history or math
> when I have to worry about getting beaten up by my father?", or
> "How is reading a book going to protect me from drugs and gangs?",
> became daily dilemmas. In short, most of the kids we talked with
> had wanted to stay in school. But somehow they felt that because
> it was so unaccommodating, school just didn't want them.[20]

Firestone also places a major portion of the blame on the lack of
relevancy of the school curriculum in relation to the lives of those
students at risk of dropping out.[21] Fortenberry and White agree,
noting,

> Educational reform, while needed should not overlook an equally
> necessary concern for motivating students to stay in school because
> they like it there; they see its usefulness and experience some
> form of success and achievement.[22]

Hahn cites research showing a correlation between teacher/pupil
ratio and the incidence of dropping out. He also found that attendance
laws were enforced more often than not to channel potential dropouts out
of school.[23] Another oft-cited concern related to the dropout problem
is inadequate or disproportionate funding. Inadequate funding is
generally a primary cause of higher teacher/pupil ratios. Cardenas and
First noted the difficulty in obtaining adequate financing for public
education when 90 percent of our nation's children attend public schools
and only 27 percent of American adults have children in the public
schools. They traced dropout rate differences back to vast disparities
in per-pupil expenditures among states, among school districts inside
states, and among school buildings inside districts.[24] The situation
will only worsen as our population's median age continues to rise.

Much concern has been expressed that the recent heightening of
academic standards stemming from the excellence/back-to-basics movement

will serve only to exacerbate the problem. Work by Rumberger,[25] Mizell,[26] and many others has noted the association between tougher requirements and exit exams inspired by the excellence movement which serve to widen the gap between stay-ins and potential dropouts. Mirga observed that the reform movement has demanded more skill of everyone instantly, without taking into consideration that the youths who have already been behind need time, and more importantly, help, in catching up.[27]

In addition, Bateman comments that the reality of the situation may be that, despite all the dialogue concerning schools' impact on dropouts and the devastating consequences of dropping out, dropouts simply take a back seat to many other issues. Unfortunately, the building principal has too many other problems that he has a better chance of solving. Bateman writes:

> He'd (the principal) like very much to save these troublesome students, but he is also besieged by pressures and priorities that put such kids relatively low on the list. He knows you expect school administrators to run a tight ship, raise scores on standardized tests, and bring up grade-point averages. He knows he won't get much credit if his school's dropout rate is reduced and that few will take much notice if it increases. Indeed, if the low-achieving students were gone, he'd probably garner more kudos when the school's test scores went up as a result . . . and with the calls from the public (not to mention your state legislature) for more homework, more demanding courses, and longer school days, it will be increasingly difficult to meet these goals without adding to the frustration of struggling, ready to give up students.[28]

Achievement and Retention

Achievement is the most often cited factor relating to dropouts. Specific areas relating to achievement are low grade point average (GPA), low test scores, especially in math and reading, and retention, which tends to be higher when achievement is low. Improving academic performance was the primary objective mentioned most often (374 out of 479 programs surveyed) in the GAO survey of dropout programs.[29] Citing specific programs, the GAO reported,

> A study of Chicago dropouts found that the most important factors determining the dropout rate at individual high schools were the

numbers of students who were over age or reading below normal as entering freshman. . . . High-risk youth often have substantial educational difficulties (and related problems, such as high absentee rates) when they reach high school. For example, in New York City's Attendance Improvement/Dropout Prevention Program in 1985-86, among the 5,800 youth targeted in 26 high schools, 85 percent had failed at least three courses the prior year and at least half were reading at least two years below grade level. Also, almost 60 percent of the 4,300 middle school youth targeted in New York's Dropout Prevention Program failed two or more courses the preceding year.[30]

The Urban Superintendents' Network report concurs on the impact of

achievement, finding,

Poor academic performance is the single best predictor of who drops out. D and F students are more apt to leave than those earning A's and B's. Students who have repeated a grade stand a far greater chance of leaving school than those who proceed from grade to grade on schedule. Teens in the vocational and general tracks are more inclined to drop out than those in the academic track. Teens who hold time-consuming jobs are more likely to drop out than those who work fewer hours or not at all.[31]

In his review, Rumberger also cites studies by Borus and

Carpenter; Ekstrom, Goertz, Pollack, and Rock; Wehlage and Rutter; and

others documenting that poor academic achievement, as measured by

grades, test scores, and grade retention, is associated with dropping

out.[32] Ekstrom, Goertz, Pollack, and Rock concur, stating,

Low academic achievement, as indicated by low test scores and low grades, has also been consistently associated with high school attrition. Academic failure, as indicated by low grades, is also consistently related to dropping out.

In their analysis of the High School and Beyond study, they determined

that dropouts exhibited these behaviors, having lower grades and lower

test scores and doing less homework.[33] However, intelligence does not

seem to be the primary issue when considering academic achievement.

Studies tend to conclude that dropouts generally have sufficient mental

abilities to meet academic requirements and that IQ scores of the

majority of dropouts fall within the average or above average range.

While studies generally find that dropouts possess the mental ability to

master the curriculum, studies also indicate that IQ scores of

nondropouts are as high or higher than those of dropouts.

The Institute for Educational Leadership reports:

By and large, dropouts are underachievers who do not fare well academically in the school environment. That dropouts do not perform to the level of academic achievement they are capable of is shown clearly by the High School and Beyond survey, which indicates that their tested achievement ranks 7 to 12 percentiles higher than their grades. Dropouts' grades average in the 16th percentile, although their tested achievement ranks in the 23rd-28th percentile.[34]

Lowery's review cites the work of Varner, Mink and Kaplan, Cervantes, and Fuller and Friedrich indicating that intelligence is not in itself a critical factor in the dropout's decision to leave school.

The studies concluded that the dropout's application of his ability to do school work was often deficient and that a lack of motivation, drive, or initiative were the contributing factors to dropping out of school.[35]

Little's report states that most at-risk youth have the intelligence to succeed, but they lack important skills, family support, self-discipline, and motivation.[36]

As previously stated, low achievement results in higher retention rates. Being one or more years behind in grade level has been a powerful predictor in a number of studies. Hahn found that students who have repeated one or more years are up to four times as likely to dropout as students who are working at grade level.[37] Cervantes research indicated that 53 percent of dropouts were two or more years behind grade level and 85 percent were one year behind grade level.[38] Doyle reported students that fail first or second grade face an eight in ten chance of not graduating.[39] Retention is used as a criterion for placement in a number of dropout prevention programs such as the New York City program where having failed three or more major subjects in the final marking period or being behind in grade level are primary factors for placement in the program.[40]

Behavior

Behavior problems have long been viewed as being related to dropping out. In fact, until recently, secondary schools often "counselled" extremely disruptive students into pursuing options other than traditional schooling. The Urban Superintendents Network reports

that, "Misbehavior while in school can signal trouble. Students who have been suspended, are chronically truant, or have been in conflict with the law have a higher than average chance of dropping out."[41] Studies by Ekstrom, Goertz, Pollack, and Rock,[42] Griffin,[43] Hahn,[44] and Morrow[45] show definite strong correlations between absenteeism, discipline problems, and dropping out, but other studies have shown these negative behaviors to stem from low self-esteem, problems in the home, and other outside factors. Most research in school-related factors has focused on students' behavior and performance in school.

In summary, many factors have been noted as affecting a student's decision to drop out or stay in school. Attendance, retention, achievement as measured by GPA and standardized test scores, the individual school building or school system, and behavior problems are among those factors most often cited. The number of transfers was also cited, particularly as it relates to increasing absenteeism.

Statistics for attendance, retention, achievement as measured by GPA and standardized test scores, number of transfers, and the individual school attended are included in student permanent records of Chesapeake Public Schools and will be included in the analyses conducted within this paper. Behavior records are also generally available within each school, but both the assignment of discipline and the accompanying record keeping related to discipline are not standardized throughout the school system. Therefore, behavior was not included as a characteristic under study in this research.

Family-Related Factors

While society may often tend to place much of the blame for the dropout problem on the schools, many researchers place the bulk of the blame on factors related directly to the family. These researchers feel that the problems surfacing in the schools are merely reflections of or reactions to the problems at home.

Factors are hard to distinguish or delineate from related factors that often affect each other in various ways. Lowery writes,

> The complex problem of the dropout seems to contain many problems that originate in or are attributable to the family or home life of the dropout. The problems in the home contribute to the problems in the school and together they form a larger, truer picture of the student who will drop out of school.[46]

Since any child is vastly affected by experiences with the family and within the home, it seems logical that these factors would influence much in a child's life, including the propensity to drop out or stay in school.

Rumberger found that,

> Particular family-related factors associated with dropping out include low educational and occupational attainment level of parents, low family income, speaking a language other than English in the home, single-parent families, and the absence of learning materials and opportunities in the home. . . . Family background can have a powerful, cumulative influence on school achievement through its effects on such things as kinds of schools children attend, their attitudes about school, and learning that takes place in the home. These influences affect a student's achievement at an early age, which in turn, influences subsequent attitudes and performance in school.[47]

Socioeconomic status, finances, the decline of the family and the resulting effects are often cited as factors contributing greatly to a student's decision to leave school. Two factors, ethnicity and teenage pregnancy/parenting, are often included in studies both under factors related to the family and factors related to the individual. Because ethnicity and socioeconomic status are so closely related, this research will include ethnicity under factors related to the family. Teenage pregnancy/parenting will be included under factors related to the individual.

The Urban Superintendents Network provided a comprehensive description of some of the factors related to the family in its 1987 report:

> Adolescents whose parents lack a high school diploma are at greater risk than those from better educated families. Urban students are more apt to drop out than rural or suburban students. Teens from homes where activities are not monitored and with fewer study aids and opportunities for nonschool learning are less apt to graduate. Students from one-parent homes drop out more often than

those with both parents present. Students are more apt to drop out
if they lack consistent support and encouragement from family and
community members who share common values and standards. Teenage
mothers (and fathers) leave school far more often than adolescents
without children.

But poverty is the overwhelming demographic predictor of who
will drop out; students from the bottom third in family income
stand a far greater chance of leaving school than teens from middle
class or affluent families. And when socioeconomic factors are
controlled, the differences across racial, ethnic, geographic, and
other demographic lines blur. Manford Byrd, Jr., general
superintendent of the Chicago Public Schools, observes, "If you're
really talking about what would reduce the dropout rate the most,
it would be getting daddies of our kids a job."[48]

Little adds:

Finding a workable solution is far from easy, considering the
social milieu in which many at-risk youth live. Fewer than half of
all young people today live with both biological parents. The
majority of at-risk youth have experimented with drugs and alcohol,
and most feel alienated both from school and the larger society.
Most importantly, at-risk people do not experience the kind of
caring, concern, and nurturing that fuels motivation. Little
points out that Hodginkinson's demographic research clearly
indicates that the numbers of at-risk youth will continue to rise
prompting a subsequent rise in the dropout rate. Indicators
include:

1. More children from single-parent families will be entering school.
2. A smaller percentage will have participated in Head Start or
   similar programs.
3. A larger percentage will be born prematurely, leading to more
   learning difficulties in school.
4. There will be an increase in children--now twelve of every
   hundred--whose parents are not married.
5. There will be more latch-key children and children from blended
   families.
6. More children will be born to teenage mothers.
7. The number of high school graduates, particularly in the
   northeastern states, will continue to drop.[49]

Ethnicity

Study after study finds the dropout rate as much as two to five

times higher among various ethnic groups. In a 1985 study, Cardenas and

First found that 63 percent of America's school children still attend

predominantly minority schools. The study found that, compared with

white students:

1. Black students are three times more likely to be suspended from
   high school, often for trivial reasons.
2. Black students are three times more likely to be placed in classes
   for the mildly mentally handicapped.
3. Black students drop out of school at a rate more than twice that of
   white students.[50]

The first benchmark study on dropouts, published by the GAO in June 1986, reported research findings that show higher dropout rates for Hispanics and blacks, as well as youth from households of lower socioeconomic status among all ethnic groups.[51] The second GAO study, a survey of dropout prevention programs, found a slight majority of the youth in surveyed programs were from minority groups:

> About 34 percent were black, 17 percent Hispanic, and 4 percent from other racial/ethnic groups. The remaining youth served, about 45 percent, were white. Relatedly, data from national surveys show relatively high dropout rates for black and Hispanic youth. For example, among young men and women age 18 during the period 1979-82, 15 percent of whites, 17 percent of blacks, and 31 percent of Hispanics failed to complete high school or obtain a General Educational Development (GED) certificate. For youth age 21, the comparable percentages for whites, blacks, and Hispanics were 12 percent, 23 percent, and 36 percent, respectively. Data from High School and Beyond show that about 14 percent of public high school sophomores in spring 1980 dropped out before their expected graduation in 1982. Thirteen percent of the white youth, 17 percent of the black youth, and 19 percent of the Hispanics dropped out.
>
> According to the High School and Beyond data, dropout rates for white youth from public schools were higher in the Southern and Western regions of the United States than in the Northeast or North Central regions. For blacks, however, dropout rates were higher in the latter regions; among Hispanics, regional differences were small. For each race/ethnic group, dropout rates were higher than in suburbs and rural areas. [Because some youth drop out before the second half of their sophomore year, the estimates from High School and Beyond understate the dropout rate.][52]

The second GAO study later provided further insight into the plight of Hispanic students, stating,

> The dropout rate is higher among Hispanic youth than among other major ethnic/racial groups. As noted previously, national survey data indicate that 31 percent of Hispanic 18-year-olds had not completed high school or obtained a GED certificate, compared to 17 percent for blacks and fifteen percent for whites. Research findings show that many Hispanic youth come from low socioeconomic status families, have limited facility in English, and experience academic failure in school--all powerful predictors of dropping out. In addition, 86 percent of the Hispanic program youth were from low socioeconomic status families compared to 76 percent in all the surveyed [dropout prevention] programs.[53]

Data from the National Longitudinal Surveys of Labor Market Experience, which included a nationally representative sample of over twelve thousand young men and women who were age fourteen to twenty-one when first interviewed in 1979, also found ethnicity to be a factor. The data show that among youth age eighteen during the period 1979-82,

about 15 percent of whites, 17 percent of blacks, and 31 percent of Hispanics failed to complete high school. For slightly older youth, the dropout rate was 12 percent for whites, 23 percent for blacks, and 36 percent for Hispanics.[54]

Kunisawa,[55] Mizell,[56] and Griffin[57] are among those tracing likelihood of dropping out to coming from a minority household, particularly when English is not the primary language spoken in the home. A study by Cardenas and First determined that less than 3 percent of teachers are adequately prepared to instruct limited-English-proficient students, although 25 percent of all teachers have such children in their classrooms.[58] Research by Quinones looked at limited proficiency in English, finding that students who have been in an English language school system for four years and have not scored at the twentieth percentile or above on the Language Assessment Battery test were likely to drop out.[59] Kunisawa notes that the ten states with the highest dropout rates all have ethnic minorities that exceed 25 percent and the ten states with the lowest dropout rates all have less than 20 percent ethnic minorities and six of the ten have under 10 percent.[60] While statistics are sometimes in conflict, Hispanics generally have a higher dropout rate than blacks, and blacks dropout more often than whites. While Justiz and Kameen reported that blacks and Hispanics have a dropout rate twice that of whites,[61] Rumberger found that family background strongly influenced the propensity to drop out of school and accounted for virtually all of the racial differences in dropout rates.[62]

Socioeconomic Factors

Rumberger found that 20 percent of all dropouts, but almost 40 percent of Hispanic males, cite economic reasons for leaving school. He also cites data showing dropout rates of 8.9 percent for students from the highest socioeconomic levels and 22.3 percent for students from the lowest socioeconomic levels. His review of studies found that dropout

rates are higher for students from families of low socioeconomic status, no matter what particular factors are used to measure socioeconomic status.[63]

Findings from a 1988 survey commissioned by a joint committee of the North Carolina legislature to study dropouts indicated that half of the juniors in high school were employed and that 67 percent of these students were employed twenty or more hours per week. The interviews conducted indicated that the students working the most number of hours were the ones most likely to dropout. Interviews conducted with students that had already dropped out indicated that most were working a high number of hours at the time of dropping out.[64]

Cardenas and First's study reported,

> The income level of a child's family is still the major determinant of the quality and quantity of the education a child receives. The average child from a bottom quarter income family receives four fewer years of education than a child from a top quarter income family.

In addition, they found:

1. Many districts allocate fewer resources to schools in poor neighborhoods than to schools that serve primarily middle- and upper-income level students.
2. Only half of the almost ten million children eligible to receive Chapter 1 services actually receive those services.
3. Teachers often alter expectations on the basis of student's social class.[65]

Most major studies include socioeconomic status as one of the most influential factors. In the 1987 GAO survey of dropout prevention programs, more than three-fourths of the youth were from families of low socioeconomic status, but about one-fifth came from middle-class families, and 4 percent from families of high socioeconomic status. This conforms with information from national surveys. For example, data from the Current Population Survey shows that the dropout rate for youth from low socioeconomic households was about three times larger than for youth from high socioeconomic households. Similarly, data from the High School and Beyond data also shows that the dropout rate for youth from households with low-income, low-skill wage earners and limited

educational backgrounds was about three times the rate of those from the
highest end of the socioeconomic scale (22 percent vs. 7 percent).[66]

Other Factors Related to the Family

Broken homes, a lack of study aids in the home, parents and
siblings with a low level of educational attainment, and parents that do
not support the academic endeavors of their children are other major
factors often cited in relation to the families of dropouts. Some
research indicates that coming from a single-parent family can have a
tremendous bearing on the odds of a student remaining in school.[67]
Other research indicates that the educational level of the parents may
be the most significant factor. Lowery found that parents with six
years or less of education had the highest dropout rates among their
children. In addition, dropouts usually come from a family where older
brothers and sisters had already dropped out. Lowery cites a Maryland
survey where 79 percent of the mothers and 80 percent of the fathers of
dropouts were dropouts themselves. This situation often perpetuates
itself into a cycle of one generation dropping out after another.[68]

Walberg's research found the influence of the home on academic
success to be more significant than that of socioeconomic status:

> The curriculum of the home, including parent/child conversations
> about school and everyday events, encouragement and discussion of
> leisure reading, critical analysis of television, expression of
> support and affection, interest in the child's classroom progress,
> is twice as predictive of learning as the family's socioeconomic
> success.[69]

In their analysis of the High School and Beyond study, Ekstrom, Goertz,
Pollack, and Rock concluded:

> Dropouts tended to come from homes with a weaker educational

support system. Compared with stayers, dropouts:

1. had fewer study aids present in their homes
2. had less opportunity for non-school related learning
3. were less likely to have both natural parents living at home
4. had mothers with lower levels of education
5. had mothers with lower educational expectations for their offspring
6. had mothers who were more likely to be working
7. had parents who were less likely to be interested in or to monitor
   both in-school and out-of-school activities[70]

In conclusion, as with the factors related to the school, many factors related to the family have also been cited in the research literature as contributing to a student dropping out of school. Among those factors most often cited are the parents' marital status, the level of parents' occupation and education, ethnicity, socioeconomic status, the lack of study aids in the home and the value parents place on educational attainment.

The marital status of the parents, race of the student, the level of educational attainment of the parents, and the occupation of the parents were available from Chesapeake Public School student records and were therefore included in the analyses conducted within this research.

Individual-Related Factors

The longest list of causes is the one related to the students themselves. Once again, the same basic factors are mentioned in most research, but different studies rate some factors as having more or less influence than others. Bennett and Miller state that adolescent pregnancy is the single greatest cause of female students dropping out of school in America.[71] Kunisawa noted that 87 percent of the pregnant teenage females are high school dropouts.[72] Pollock writes:

> In 1983, the National Center for Education Statistics surveyed 30,000 sophomore students. A follow-up study was completed two years later. Of the more than 2,200 students in the study who dropped out of school before graduation, 62 percent of the females and about 21 percent of the males listed family-related items (marriage, pregnancy, family to support) as the reason they left school. . . . Although it is illegal according to Title IX of the 1972 Educational Amendments Act to exclude pregnant or parenting teens from school, many young parents fail to return to school because of problems with school attendance, child care, transportation, lack of support at home, or lack of money. Mott and Maxwell found that over half (56 percent) of the white female dropouts cited marriage or pregnancy as their reason for leaving school. Other research supported these findings. Morrison, in a Rand Corporation Study for the National Institute of Education, reported that pregnancy and motherhood are major reasons for leaving school, amounting to a substantial percentage of all dropouts among female students. Many such dropouts report concrete and realistic pre-pregnancy educational aspirations. It seems plausible that they would be in school were it not for an early first birth. . . . As has been already stated by Mott and Maxwell, Morrison, and Wallis, the research is clear on the causal relationship of dropouts for females who are pregnant or who need

child care facilities. However, causes for students to drop out depend on the personal characteristics in her home-school-community environment.[73]

Schools are not equipped with the flexibility or accommodations often required by pregnant females or teenage mothers. Cardenas and First noted a high degree of discrimination (resulting in higher numbers of dropouts) against female students in general and pregnant students in particular:

> Female students experience lowered expectations in public schools and by high school often function well behind male students in reading, science, social studies, and mathematics. Vocational education programs are often segregated by sex, with females clustered in programs that prepare them for the lowest paying jobs.
> Pregnant and parenting teens are the young women most discriminated against in schools. Of the one million teens who become pregnant each year, ten thousand are under age fifteen. A disproportionate number of these young women are dropout students. Teens who are also parents are much more likely to drop out of school than are teens who are not.[74]

With teenage pregnancy rates continuing to rise, one unfortunate consequence will be a subsequent increase in the dropout rate. Bennett and Miller found:

> Nearly one million—one out of 10—adolescents aged 15 to 19 become pregnant each year in the United States. Two-thirds of these are accidental, out-of-wedlock pregnancies. If present trends continue, 40 percent of today's 14-year-old girls will be pregnant before the age of 20. All too frequently, teen parents quit school. Adolescent pregnancy is the single greatest cause of school dropouts among teenage women in America. Twice as many women leave school because of pregnancy than for all other physical or medical conditions combined. The limited education of the young parent reduces opportunities to compete in society. Typically, the teenage mother remains on welfare longer than other single parents and is economically poor, educationally limited, and locked into low paying jobs.[75]

In contrast, the May 1987, ERS Bulletin reports that 60 percent of girls who drop out do so for reasons unrelated to pregnancy and that teen pregnancy may be symptomatic of already existing problems, such as low self-esteem, poor academic achievement, and, more generally, a lack of options. Further, the report found the following to be contributors to the female dropout problem:

1. Socialization - Girls are taught to be unassertive and to expect that a man will take financial care of them in the future.

2. Cognitive Differences - The teaching structure of most secondary school classrooms reflects a bias towards the way boys learn, placing girls at a disadvantage.
3. Teacher Interaction - Teachers' responses to students favor male academic development, confidence, and independence.
4. Curricular Choices - Girls often limit their potential by the courses they select. They may also choose vocational training for traditionally female jobs with lower pay and prestige.[76]

Rumberger found that a third of all female dropouts report personal reasons for leaving school, such as pregnancy or marriage.[77]

Attitudes

Poor student attitudes, often branching from low self-esteem, are also frequently cited factors. Ekstrom, Goertz, Pollack, and Rock found that 33 percent of dropouts did so simply because they did not like school.[78] These negative feelings also are witnessed in the number of times the word "alienation" surfaces in these studies. Students at risk of dropping out are often one or more grades behind. This, combined with the fact that potential dropouts already may feel placed in a setting where they may have little or no hope of success, certainly could help promote strong feelings of alienation. Firestone calls it a "cycle of alienation" and concurred that alienation had a devastating effect on the at-risk student.[79] Lowery found alienation, inadequacy, and non-participation in extracurricular activities to be characteristic of a typical dropout.[80]

Peer perceptions also have an impact on the decision to drop out or stay in school. The report by the Urban Superintendents Network noted several cases reporting peer pressure as influential in the dropout decision:

> A survey of Detroit dropouts suggests that peer pressure may push at-risk students out the schoolhouse door: One-half of those who dropped out reported that one or more of their close friends had also left school prematurely. Other research shows that long before students decide to drop out, peers often discourage them from succeeding academically. Lillian Kyser, a Detroit student who cochairs the district's student effort on dropout prevention, explains: "I was an honor roll student who was an active participant in class--did well on tests, did my homework. This bothered some of the students who were not successful, and they tried to get me to join them. When I didn't, they called me a 'nerd.' I was so angry and hurt, but they made me more determined

to participate and succeed. . . . I know there are other students out there who are being influenced by this negative peer pressure." Peer pressure to do poorly in school appears to be particularly acute among black males. One recent study reported that some masked academic strides to avoid being accused of "acting white."[81]

While no hard research has been conducted in this area, Kunisawa advances an interesting viewpoint as to a possible cause for the higher dropout rate that may be related to an attitude the individual student "inherits" from society. He observes that, in today's society, it is becoming increasingly acceptable to drop out. The negative connotations related to dropping out have faded. Stress management is in vogue today. People become "burned out" and drop out to "find themselves." He cites the divorce rate and church attendance as examples of society's trend towards dropping out and feels that today's young people are simply following society's example. He writes,

> The inability of the family and the community to teach its children traditional values is a leading contributor to the social decay we face at the end of the twentieth century. We have failed to teach many of today's youth the critical importance of responsibility, . . . and commitment. Many youngsters, regardless of gender, color, or income, come to school woefully unprepared for the rigors of learning and the frustrations of accompanying setbacks. When the effects of economic inequity, racism, sexism, or class rivalry are added, then one sees a clearer and more complete picture of what today's educational experience is like for low-income, ethnic minority and female students. Moreover, the larger society--and not just schools--has destroyed its credibility by breaking treaties, contracts, codes of ethics, and laws for human and civil rights. Consequently, youth, especially ethnic minority youth, have little confidence in the deferred gratification that education promises, or the mythical guarantee that a diploma translates into equitable career/employment opportunities. . . . How can schools be solely responsible for reducing the dropout rate when the incentives they are selling seem to be mere illusions--"pie in the sky?"[82]

Rumberger[83] and Woodring[84] concur that forcing a potential dropout to remain in school may actually be detrimental by placing a student with an already lowered self-esteem in a situation where he has no hope of success, thus lowering self-esteem even more.

In summary, many factors relating to the individual have been noted in research literature. Among those that most often come under scrutiny are sex, teenage pregnancy and parenting, the influence of peers, poor student attitudes, alienation and poor self-esteem. The sex

of the student was the only factor related to the individual that was consistently present in Chesapeake Public Schools student records, and was therefore included in the analyses performed.

Summary

The review of the literature indicated that a large number of factors have been documented as influencing a student's decision to drop out of school. The factors are often closely related and sometimes delineating between factors and symptoms of other factors is very difficult. In general, the factors can be grouped into three categories in relation to the school, the family, and the individual. The following identified factors were available from the Chesapeake Public School System records and were therefore selected for this study:

1. absences
2. achievement test scores - Reading
3. achievement test scores - English
4. achievement test scores - Mathematics
5. achievement test scores - composite
6. father's education
7. father's occupation
8. grade point average
9. mother's education
10. mother's occupation
11. parent's marital status
12. race
13. retentions
14. school attended
15. sex
16. transfers

In addition, the review found sufficient evidence that potential dropouts can be identified prior to dropping out and that such efforts are deemed beneficial.

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CHAPTER III

METHODOLOGY

This chapter provides an explanation of the methodology employed for this study. The chapter describes the purpose of the study, the design of the study, and the data collection process utilized. Furthermore, the chapter cites the method of data analysis and concludes with a brief summary statement.

Purpose

The purpose of this study was to determine if there were certain discriminating characteristics that affect a student's decision to drop out or remain in school. The review of the literature indicates that there is no single cause that can be identified as influencing a student to drop out. However, a variety of discriminating characteristics exist which, according to the literature review, can be identified as influential in a student's decision to drop out of school. The causes are often complex and interwoven.

Additionally, the study was designed to determine if certain discriminating characteristics found in the student records of the Chesapeake Public School System could be utilized for early identification of potential high school dropouts. Also, the study sought to discover how accurately those potential dropouts could be identified. The goal of the study was to determine a useful methodology that could be employed in actual school settings in the city of Chesapeake to identify potential dropouts.

44

Design of Study

As noted in the review of related literature, numerous factors
have been identified as contributing to a student's decision to drop out
or to remain in school. Chesapeake Public School student records were
examined to determine which of those characteristics identified through
the literature were available for the identification of potential
dropouts. This study wishes to be useful in a practical school setting.
Therefore, the study has limited its scope to those discriminating
characteristics available in student records and thus readily accessible
to school personnel. The predictor variables listed below are well
documented in the research as discriminating characteristics relating to
a student dropping out of school. Data was collected on the following
characteristics that were available in the student records of the
Chesapeake Public School System to be utilized as predictor variables:

1. absences
2. achievement test scores - Reading
3. achievement test scores - English
4. achievement test scores - Mathematics
5. achievement test scores - composite
6. father's education
7. father's occupation
8. grade point average
9. mother's education
10. mother's occupation
11. parent's marital status
12. race
13. retentions
14. school attended
15. sex
16. transfers

In addition, the student's status during the period of study
(dropout or nondropout) was available.

The focus of the study was to identify these discriminating
characteristics and to determine a useful methodology to utilize the
data for the identification and prediction of potential dropouts.
Therefore, the data was collected pertaining to these variables and then
statistical procedures were employed to ascertain whether potential
dropouts could be identified.

Data Collection Procedures

Selection of Subjects

The subjects for this study were randomly selected by computer from the total school system enrollment in grades nine through twelve. A total of 305 students were selected from the total school system enrollment from the 1988-1989 school year. Based on Borg and Gall's recommendation that sample size must be increased by fifteen subjects for each variable introduced,[1] a sample of 305 students was judged sufficient for the sixteen predictor variables included in the study. Records for three students were unavailable. Five students were excluded from the study due to their enrollment in special education programs, leaving a total sample of 297 students. The process was repeated for the purpose of cross validation using student records from the 1989-1990 school year. A total of 305 students were again selected. One record could not be located and two students were enrolled in special education, leaving a total of 302 students in the sample.

Predictor Variables

The permanent records of students identified in the sample were examined and data for the predictor variables listed below was recorded and coded. When possible, data missing from records was collected through telephone calls to the parents of students involved in the study.

Achievement Test Results

Test scores were recorded from the permanent record of each student. In the majority of student folders, Science Research Associates (SRA) achievement test scores were available from the second, fifth, and sixth grades, and Iowa Test of Basic Skills (ITBS) achievement test scores were available from the eleventh grade for those students that had completed eleventh grade. Because the school system switched from the SRA to the ITBS achievement test during the 1986-1987

school year, some students in the sample had eighth-grade SRA scores and others had eighth-grade ITBS scores, depending on the grade level of the student in the sample. Therefore, it was necessary to use sixth-grade SRA test scores since this was the most recent measurement available for all students in the sample. Raw scores for Reading, English, Mathematics, and composite test scores were recorded.

Attendance

Each school records daily attendance for every student. School attendance records were utilized to record the number of days absent during the school year under study for each student in the sample.

Educational Level of Father and Mother

Student records were utilized to determine the educational level of the father and mother. In most cases, this information was provided directly by the parent and was recorded when the student entered school, and only sporadically updated if at all. Those parents who did not complete high school were assigned the code "0." Those parents who graduated from high school were assigned the code "1." Those parents who received a college diploma were assigned the code "2." Less than 1 percent of the parents had obtained graduate degrees, and therefore were not counted as a separate group.

Grade Point Average

Grade point averages were derived for students involved in the study using the same criteria employed by Chesapeake Public Schools. Grades received while the student was enrolled in grades nine through twelve were assigned a numerical equivalent based on the following scale:

A = 4.0

B = 3.0

C = 2.0

D = 1.0

E = 0.0 (Failing)

Chesapeake utilizes a weighted grading system in which certain
advanced courses carry slightly more weight in determining grade point
averages. Therefore, it is possible for a student to obtain a grade
point average slightly higher than 4.0. Grade point averages were
calculated by adding the numerical equivalent for each grade earned and
then dividing by the total number of grades.

Marital Status

Student records provided information as to the parents' marital
status. This information was generally supplied by the parent and
recorded at the time the student entered the school, and updated when
the student changed schools or when guidance personnel learned of
changes in marital status. When the record indicated that the parents
were married, the code "0" was assigned. Divorced parents were assigned
the code "1." Those parents that listed themselves as single were
assigned the code "2."

Number of Withdrawals and Entries

Chesapeake Public School student records were utilized to obtain
the number of times a student had transferred to or from another school.
When a student began in a Chesapeake Public School and followed the
normal progression of schools for the students' attendance zone, the
student was considered to have no transfers. If a student transferred
to another Chesapeake school in a different attendance zone, or
transferred to another system, this was recorded as a school transfer.
Each additional transfer, either back to the original school or to a
different attendance zone or school system, was recorded. The total
number of school transfers during the academic career of the student was
recorded for analysis.

Occupational Level of Father and Mother

Occupations for both father and mother were available for both father and mother in the student permanent records. This information was generally supplied by the parent at the time the student enrolled in school. The Dictionary of Occupational Titles[2] was utilized to determine a code for each parent as listed below:

1 = Professional, Technical, and Managerial Occupations

2 = Clerical and Sales Occupations

3 = Service Occupations

4 = Agriculture, Fishery, Forestry, and Related Occupations

5 = Processing Occupations

6 = Machine Trades Occupations

7 = Benchwork Occupations

8 = Structural Work Occupations

The code "0" was assigned to those parents that were unemployed.

Race

Certain ethnic data was available from student records. White students were assigned the code "0." Nonwhite students were assigned the code "1." Black students made up 96.33 percent of the nonwhite students in the total sample. The remaining 3.67 percent of nonwhite students were composed of Asian, Native American, and Pacific Islander students with no particular ethnic group comprising a majority.

Retentions

Chesapeake Public School records were utilized to determine the number of grades retained during each student's academic career. The total number of years retained from first grade through graduation was recorded. If the student had not graduated at the time the study was conducted, the number of retentions in grade from first grade up to that point was recorded.

School

Each of the five high schools involved in the study was assigned a code as listed below:

0 = Western Branch High School

1 = Great Bridge High School

2 = Deep Creek High School

3 = Indian River High School

4 = Oscar Smith High School

Sex

The code "0" was assigned to male students in the sample and the code "1" was assigned to female students.

Criterion Variable

The criterion (dependent) variable was the status of the student. Students who had left the Chesapeake Public School System during the time of the study and had not transferred to another accredited educational institution were classified as dropouts and assigned the code "0." Graduates and students still enrolled in school were classified as nondropouts and assigned a code of "1."

Data collection for both the predictor and criterion variables was performed by visiting the school attended by the student identified in the random sample and examining the permanent record file of each student. Several problems were encountered in the collection of the data. Records were misfiled at times and had to be located. Students had often transferred from the school identified as the home school of the student, and those students had to be tracked down. Sixth-grade SRA test scores were often partially or completely missing. The marital status, occupation, and education of the parents were recorded when the student began in Chesapeake Public Schools, which may or may not have been in the first grade. This information may or may not have been updated, depending on the record keeping practices of the individual

school or personnel involved. In addition, the three factors cited
above were quite often not present at all in student records. In those
instances, the researcher contacted the parent by telephone to obtain
the missing information. While most parents were cooperative in
providing information, there was a small number who were not comfortable
with providing the information. Approximately 5 to 10 percent of
students that failed a grade level were listed as "placed" in the next
grade, which could not be recorded as an actual retention under the
definition employed by this study. The number of absences for a dropout
was often higher than the actual number of absences recorded, since a
student that dropped out in October would only have absences recorded up
to the date of dropping out.

Method of Analysis of Data

The focus of this research was to determine if characteristics
available in student permanent records could be utilized to identify
potential dropouts. Because this study sought to determine whether a
relationship indeed existed between certain characteristics and the
likelihood of dropping out of school, and utilized the data to determine
a correlation coefficient, this study falls under Borg and Gall's
definition of a correlational study.[3] Further evidence of the
appropriateness of correlational methodology lies in the fact that the
study involves two or more predictor variables on a single criterion
variable which is based on the subject's group membership. This
situation calls for discriminant analysis, a statistical technique
utilized in correlational studies. Klecka recommended discriminant
analysis as, "a powerful technique for examining two or more groups with
respect to several variables simultaneously," which can be used for,
"interpreting the group differences and employed to classify cases in
the identified groups."[4] Kachigan echoes, "the discriminant function
uses a weighted combination of those predictor variables to classify an
object into one of the criterion variable groups."[5] Kachigan even lists

"dropouts vs. nondropouts" as an example of research calling for discriminant analysis.[6] Borg and Gall point out that, because educational processes typically reflect complex interactions between numerous variables, correlational statistics are relied on a great deal in educational research.[7]

The data for the predictor variables was collected and discriminant analysis utilized to determine a prediction equation that could be utilized for the classification of students as dropouts or nondropouts using data available from school records. Klecka refers to discriminant analysis as, "a rather robust technique which can tolerate some deviation from these assumptions", referring to assumptions such as, "a multivariate normal distribution on the discriminating variables and equal group covariance matrices."[8] In order to determine whether, and to what extent, the predictor variables were useful in the prediction of dropouts, a stepwise procedure was also utilized. Klecka[9] and Kachigan[10] point out that this procedure allows for selection of variables which have proven to provide the greatest discrimination. To verify the accuracy of discrimination, Wilks' Lambda (Kachigan[11] and Lowery[12]) was utilized. Kachigan recommends the validation of the discriminant function by testing a fresh sample of subjects;[13] therefore, the process was repeated with data collected from the second sample.

A number of different analyses were conducted to maximize the utility of the research and confirm the accuracy. One-way frequencies were compiled for each variable to determine the overall makeup of the data. This analysis provides the total number of times each component of each variable occurred and the percentage that total represented. For example, this method of analysis found that, for the 1988-1989 data set, 45 (15.5 percent) of the fathers had been high school dropouts, 173 (59.5 percent) had completed high school, and 73 (25.1 percent) had graduated from college. The frequencies were also determined for each of

the five individual high schools to illustrate any differences between
individual schools as well as differences between more urban and less
urban schools. The criteria for determining the schools that served
populations more or less urban in nature was based on the intensity of
residential use, the amount of land utilized for agriculture, the amount
of land available and utilized for new residential development, and
census tracks. The frequencies provide information such as the number
and percentage of dropouts from each school, and the number and
percentage of parents married, divorced, or single from each school.
Two-way frequencies were then determined by status of the student
(dropout or nondropout) for each variable for the entire data set, and
then again broken down for each individual school. This provided
information such as whether the parents of nondropouts tended to be
married more often than the parents of dropouts, have higher levels of
education, and the like. Simple statistics (mean, variance, standard
deviation, and range) were derived for each variable for the entire data
set, and broken down by status of the student (dropout vs. nondropout),
and broken down by individual school as well.

The SAS statistical program package[14] was utilized to perform data
analysis. This program provides a number of options for data analysis
that were employed by this study. These methods of analysis are
discussed below.

Discriminant Analysis

The subprogram DISCRIM[15] was employed to determine how accurately
the predictor variables could be utilized to classify the data as to
dropout or nondropout status. The program initially tests the two
status groups, dropouts and nondropouts, for covariance. If the test
indicates that the covariance of the two groups is significantly
different, a quadratic discriminant analysis will be performed.
Quadratic discriminant analysis is the preferred method when the group
covariances are different. Quadratic discriminant analysis provides a

better fit of the model to an individual data set, but may not be as predictive over a period of time as the linear discriminant analysis.

A linear discriminant analysis was also performed to determine if the results obtained would be different from the quadratic analysis, and to provide a prediction equation that could be used in an actual school setting to identify potential dropouts. In addition, a prediction equation was obtained for the schools serving populations more urban in nature and a separate prediction was obtained for those schools serving populations relatively less urban in nature to examine differences between the more and less urban settings.

Regression

In order to determine if some variables contributed more than others and to what extent, the regression (REG)[16] subprogram was utilized, exercising the RSQUARE, BACKWARD, FORWARD, and STEPWISE model-selection options.

The REG procedure in the SAS statistical program package "fits linear regression models by least-squares. Subsets of independent variables that `best' predict the dependent or response variable can be determined by various model-selection methods."[17] This procedure allows for the identification of those predictor variables which impact most on the criterion variable, and provides the relative discrimination for the predictor variables involved. Several options of the REG procedure were employed to ensure the accuracy of the results.

RSQUARE Selection of Variables

The RSQUARE option utilizes linear regression to find subsets of the predictor variables that best predict the criterion variable. The procedure identifies the best model for the given sample. The main difference between this procedure and the others employed is that RSQUARE identifies the model with the largest R^2.

Forward Selection of Variables

This process adds variables, one at a time, to the model and calculates the F statistic that reflects the variable's relative contribution to the model, including the variable in the model if it adds to the predictability. This methodology continues to recalculate the F values of the remaining variables and adds the variable that has the largest F statistic, repeating the process until there are no remaining variables that produce a significant F value.

Backward Selection of Variables

This process begins with all variables in the model and removes variables one at a time. At each step, the process removes the variable that makes the smallest contribution to the model until all variables are significant at the .1 level. The process was employed for both data sets, both with and without test scores.

Stepwise Selection of Variables

This process is very similar to the forward selection of variables with one main difference. In the forward selection of variables, once a variable is entered into the model, it stays in the model. With the stepwise selection of variables, the program continues to add and remove variables from the model until the best combination is selected. The STEPDISC[18] subprogram was also utilized to perform a stepwise selection of variables. The STEPDISC option follows the same procedures as the REG stepwise subprogram, but STEPDISC has a greater capacity to verify the accuracy of the classifications, providing Wilks' Lambda, a statistical tool used to verify the accuracy of discrimination. Lambda is an inverse statistic, which means that the smaller the value of Lambda, the greater the degree of discrimination.

Because sixth-grade SRA test scores were unavailable or incomplete for 125 of the subjects in the 1988-1989 data set, and 120 were missing

or incomplete for the 1989-1990 data set, all procedures were run both with and without test scores.

Summary

The review of the literature indicated that discriminating characteristics were available for the identification of potential dropouts. A review of Chesapeake Public School System student records indicated that sixteen factors were available to be utilized as predictor variables. Data was gathered and coded for these variables for a sample set of 305 students in grades nine through twelve randomly selected from the 1988-1989 school rolls. The data was analyzed utilizing the SAS statistical program package, employing the subprograms DISCRIM, REG, RSQUARE, FORWARD, BACKWARD, STEPWISE, and STEPDISC. The procedure was repeated with a sample set of 305 students from the 1989-1990 school rolls for the purpose of cross validation.

NOTES

1. Walter R. Borg and Meredith G. Gall, <u>Educational Research: An Introduction</u> (New York: Longman, Inc., 1983), 603.

2. U.S. Department of Labor. <u>Dictionary of Occupational Titles</u> (Washington, D.C.: U.S. Government Printing Office, 1977, Supplement, 1986.)

3. Borg and Gall, 573.

4. W. R. Klecka, <u>Discriminant Analysis</u> (Beverly Hills, CA: Sage Publications, 1982), 5.

5. Sam Kash Kachigan, <u>Statistical Analysis</u> (New York: Radius Press, 1986), 360.

6. Ibid., 357.

7. Borg and Gall, 603.

8. Klecka, 61.

9. Ibid., 126.

10. Kachigan, 231.

11. Ibid., 371.

12. Donella Lowery, "Identification of the Potential School Dropout" (Ph.D. diss., University of Georgia, 1985), 45.

13. Kachigan, 373.

14. SAS Institute Inc., <u>SAS/STAT User's Guide, Version 6, Fourth Edition, Volume 1</u> (Cary, N.C.: SAS Institute), 1989.

15. Ibid., 676-780.

16. Ibid., 1352-1456.

17. SAS Institute, Inc., <u>SAS/STAT User's Guide, Version 6, Fourth Edition, Volume 2</u> (Cary, N.C.: SAS Institute), 1989, 1352.

18. Ibid., 1493-1509.

CHAPTER IV

PRESENTATION AND ANALYSIS OF DATA

This chapter provides a discussion of the findings of the study
and the first research question was, "What academic and nonacademic
characteristics discriminate between high school students in Chesapeake
Public Schools who drop out of school and those students who stay in
school?" The review of the literature provided in chapter II indicated
that numerous characteristics have been identified within dropout
research. For ease of classification, various researchers have
subdivided the characteristics into three categories: factors related
to the school, factors related to the family, and factors related to the
individual.

School-related factors include attendance, achievement as measured
by test scores and as measured by grade point average, behavior
problems, class size, increasing academic requirements, overcrowding in
the school, relevancy of the curriculum, retentions, school size, and
number of transfers. Family-related factors include increasing numbers
of single-parent families, education of the father, mother, and
siblings, ethnicity, the occupation of the father and mother, the
marital status of the parents, socioeconomic factors, speaking English
as a second language, presence or lack of study aids in the home, and
the value that parents place on education. Individual-related factors
include feelings of alienation, pregnancy and teenage parenting, low
self-esteem, student attitudes, and the influence of peers.

Once it was established that discriminating characteristics had
indeed been identified in the literature, the second research question
was addressed. The second research question posed, "How accurately can

58

data from these selected discriminating characteristics available in the
Chesapeake Public School System student records be utilized to identify
potential dropouts prior to leaving school?" First, it was necessary to
determine which, if any, of these discriminating characteristics were
available from Chesapeake Public School System student records. In
order for the prediction equation to be of practical value in an actual
school setting, the information must be readily available to school
personnel. The permanent record of the student was judged to be the
best source of such information. Upon examination, the following
characteristics were identified as discriminating in the research
literature and contained in Chesapeake Public Schools student records:

1. absences
2. achievement test scores - Reading
3. achievement test scores - English
4. achievement test scores - Mathematics
5. achievement test scores - composite
6. father's education
7. father's occupation
8. grade point average
9. mother's education
10. mother's occupation
11. parent's marital status
12. race
13. retentions
14. school attended
15. sex
16. transfers

Therefore, data was collected on these sixteen variables for analysis.

Because this study wished to maximize its utility in actual school
settings, the data was examined in several ways. Data frequencies and
group means were calculated for both the 1988-1989 and 1989-1990 data
sets. Frequencies for the 1988-1989 data set were calculated, providing
frequencies both by the individual school and by the student status,
dropout or nondropout as well as the same information for the 1989-1990
data set. A summary of the findings provided in the frequency analyses
is provided below.

1988-1989 Data

The data indicates that forty-one students dropped out during the time of the study, which amounts to 13.80 percent of the total random sample of 297 students. The remaining 256 students remained in school, comprising 86.20 percent of the sample. Examining individual schools showed that 14.5 percent of the total sample came from Oscar Smith High School, 18.5 percent came from Indian River High School, 21.2 percent came from Deep Creek High School, 27.9 percent came from Great Bridge High School, and 17.8 percent came from Western Branch High School. In comparison, 34.15 percent of the dropouts in the sample and 11.33 percent of the nondropouts came from Oscar Smith High School, 14.63 percent of the dropouts and 19.14 percent of the nondropouts came from Indian River High School, 14.63 percent of the dropouts and 22.27 percent of the nondropouts came from Deep Creek High School, 24.39 percent of the dropouts and 28.52 percent of the nondropouts came from Great Bridge High School, and 12.20 percent of the dropouts and 18.75 percent of the nondropouts came from Western Branch High School. The school serving the population most urban in nature, Oscar Smith High School, had the highest percentage of dropouts (34.15 percent), while having the lowest percentage of students represented in the sample (14.5 percent). In addition, the two schools serving relatively more urban populations, Oscar Smith and Indian River High Schools, contained 48.78 percent of the dropouts while comprising only 35.70 percent of the total sample.

A comparison of dropouts and nondropouts overall by sex indicates that twenty-three (56.10 percent) of the dropouts were male and eighteen (43.90 percent) were female. For nondropouts, 119 (46.48 percent) were male and 137 (53.52 percent) were female. This compares with 142 (47.81 percent) of the total sample being comprised of males and 155 (52.19 percent) of the total sample being females.

A comparison by race indicates that twenty-three (56.10 percent) of the dropouts were white and eighteen (43.90 percent) of the dropouts were nonwhite. For nondropouts, 165 (64.45 percent) were white and ninety-one (35.55 percent) were nonwhite. This compares to 188 (63.30 percent) of the total sample being white and 109 (36.70 percent) of the total sample being nonwhite.

An examination of parent's occupation found that fourteen (36.84 percent) of the dropouts had an unemployed father, and two (00.82 percent) of the nondropouts had an unemployed father. In addition, twenty-two (53.66 percent) of the dropouts had an unemployed mother, and ninety-eight (38.28 percent) of the nondropouts had an unemployed mother.

The marital status of the parents was also examined. For dropouts, thirteen (31.71 percent) had married parents, twenty-seven (65.85 percent) had divorced parents, and one (2.44 percent) had a single parent. For nondropouts, 187 (73.05 percent) had married parents, sixty-three (24.61 percent) had divorced parents, and six (2.34 percent) had a single parent.

Information on parent's education showed that, for dropouts, twenty-five (60.98 percent) had a father who was a high school dropout, fourteen (34.15 percent) had a father who was a high school graduate, and two (4.88 percent) had a father who was a college graduate. This compares with twenty (8.00 percent) of the nondropouts having a father who was a dropout, 159 (63.60 percent) having a father that graduated from high school, and seventy-one (28.40 percent) having a father that graduated from college. Similarly, twenty-six (63.41 percent) of the dropouts had a mother who was a high school dropout, thirteen (31.71 percent) had a mother who graduated from high school, and two (4.88 percent) had a mother who graduated from college. For nondropouts, twenty-six (10.20 percent) had a mother who dropped out of high school,

164 (64.31 percent) had a mother who graduated from high school, and sixty-five (25.49 percent) had a mother who graduated from college.

An examination of retention indicated that ten (24.39 percent) of the dropouts had never been retained, fourteen (34.15 percent) had been retained one year, eight (19.51 percent) had been retained two years, seven (17.07 percent) had been retained three years, and two (4.88 percent) had been retained four years. For nondropouts, 222 (86.72 percent) had never been retained, twenty-eight (10.94 percent) had been retained one year, and six (2.34 percent) had been retained two years. No student in this category had been retained more than two years.

The number of school transfers and absences was also examined. The mean number of transfers for dropouts was 3.22, comparing with 0.84 for nondropouts. The mean number of absences for dropouts was 28.63, comparing with 8.57 for nondropouts.

Additionally, grade point averages and test scores were recorded. The mean GPA for dropouts was 1.04, comparing with 2.32 for nondropouts. Sixth-grade SRA test scores indicated a mean score of 303.82 for Reading, 299.05 for English, 327.14 for Mathematics, and a composite mean score of 331.73 for dropouts. Nondropouts had mean scores of 341.06 for Reading, 341.20 for English, 372.14 for Mathematics, and a composite mean score of 397.61.

1989-1990 Data

The frequencies and group means for the data analyzed from the 1989-1990 data set were similar in nature to the 1988-1989 data set. The data indicates that forty-five students dropped out during the time of the study, which amounts to 14.9 percent of the total random sample of 302 students. The remaining 257 remained in school, constituting 85.15 percent of the sample. In this sample, 9.9 percent of the students were from Oscar Smith High School, 23.2 percent were from Indian River High School, 18.9 percent of the students were from Deep Creek High School, 32.8 percent of the students were from Great Bridge

High School, and 15.2 percent of the sample came from Western Branch High School. Examining dropouts by school indicated that 13.33 percent of the dropouts came from Oscar Smith High School, 28.89 percent came from Indian River High School, 22.22 percent came from Deep Creek High School, 28.89 percent came from Great Bridge High School, and 6.67 percent were from Western Branch High School. The high schools serving more urban populations continue to demonstrate relatively higher dropout rates, although not as dramatically as in the 1988-1989 data set.

The 1989-1990 data set indicates a more pronounced difference in examining dropouts and nondropouts by sex, finding that thirty (66.67 percent) of the dropouts were male and fifteen (33.33 percent) were female. For nondropouts, 118 (45.91 percent) were male and 139 (54.09 percent) were female. The total sample had 148 (49.01 percent) males and 154 (50.99 percent) females.

A comparison by race indicates that twenty-five (55.56 percent) of the dropouts were white and twenty (44.44 percent) were nonwhite. For nondropouts, 168 (65.37 percent) were white and 89 (34.63 percent) were nonwhite. This compares with 193 (63.91 percent) of the sample being white and 109 (36.09 percent) of the sample being nonwhite.

An examination of parent's occupation showed that thirteen (28.89 percent) of the dropouts had an unemployed father, and five (1.98 percent) of the nondropouts had an unemployed father. For mother's occupation, twenty-two (48.89 percent) of the dropouts had an unemployed mother while 108 (42.02 percent) of the nondropouts had an unemployed mother.

The recorded data on marital status of the parents indicated that twenty (44.44 percent) of the dropouts had married parents and twenty-five (55.56 percent) had divorced parents. For nondropouts, 191 (74.32 percent) had married parents, sixty-five (25.29 percent) had divorced parents, and one (0.39 percent) had a parent that had never been married.

Information on the education of the parents indicated that thirty-one (68.89 percent) of the dropouts had a father that did not complete high school, thirteen (28.89 percent) had a father who was a high school graduate, and one (2.22 percent) dropout had a father that graduated from college. This compares with twenty-one (8.27 percent) of the nondropouts had a father that dropped out of high school, 176 (68.48 percent) had a father who graduated from high school, and sixty-two (24.12 percent) had a father that graduated from college. In addition, twenty-nine (64.44 percent) of the dropouts had a mother that did not complete high school, fourteen (31.11 percent) had a mother who did complete high school, and two (4.44 percent) had a mother that graduated from college. For nondropouts, nineteen (7.39 percent) had a mother that dropped out of high school, 176 (68.48 percent) had a mother that completed high school, and sixty-two (24.12 percent) had a mother that completed college.

Information on retention indicated that seven (15.56 percent) dropouts had never been retained, eighteen (40.00 percent) had been retained one year, eighteen (40.00 percent) had been retained two years, and two (4.44 percent) had been retained three years. For nondropouts, 203 (78.99 percent) had never been retained, thirty-nine (15.18 percent) had been retained one year, fourteen (5.45 percent) had been retained two years, and one student (.39 percent) had been retained three years.

The group means for transfers and absences remained notably similar between the two samples. The mean number of school transfers for dropouts was 3.67 and for nondropouts was 0.90. The mean number of absences for dropouts was 26.07 and 8.33 for nondropouts.

Additionally, differences in GPA and test scores remained stable from the 1988-1989 to the 1989-1990 data set. For dropouts, the mean GPA was 1.13 in contrast to 2.25 for nondropouts. Test scores for dropouts yielded 312.10 for Reading, 298.57 for English, 330.24 for Mathematics, and a composite score of 340.52. Nondropouts scored a mean

of 339.43 in Reading, 341.88 in English, 371.96 in Mathematics, and a composite score of 398.69.

One goal of this study was to provide a methodology to systematically identify potential dropouts prior to dropping out. While the information provided through the frequency tables and group means is informative and illustrates a number of patterns and associations within the data, the interrelationships of many of the variables with each other may cloud the interpretation. Therefore, statistical techniques were employed which would provide some means for prediction while taking into account the interrelationships among the variables.

Regression

The REG procedure in the SAS statistical program package allows for the identification of those predictor variables which impact most on the criterion variable, and provides the relative discrimination for the predictor variables involved. Several options of the REG procedure were employed to ensure the accuracy of the results.

RSQUARE Selection of Variables

The RSQUARE option utilizes linear regression to find subsets of the predictor variables that best predict the criterion variable, based on yielding the model with the largest value of R^2. A summary of the results obtained is provided below, including the value of R^2 and the measure of total squared error, $C(p)$.

1988-1989 Data Summary

Because test scores were missing for 125 of the 297 subjects in the sample, the analysis was performed both with and without test scores. The order of entry (based on the level of R^2) is provided in table 1 for the data including test scores. Table 2 provides the results without test scores included.

TABLE 1.--RSQUARE Selection of Variables for 1988-1989 Data Including Test Scores

Variable	Rsquare	C(p)
Retentions	.43	93.09
Absences	.57	26.42
Transfers	.60	12.73
Mother's Education	.62	7.01
Father's Occupation	.62	6.10
Father's Education	.63	5.18

Introduction of additional variables increased Rsquare < .005

TABLE 2.--RSQUARE Selection of Variables for 1988-1989 Data Without the Inclusion of Test Scores

Variable	Rsquare	C(p)
Retentions	.38	171.7
Absences	.52	69.61
Transfers	.57	37.42
Father's Education	.60	16.00
Mother's Education	.61	12.40
Father's Occupation	.62	9.25

Introduction of additional variables increased Rsquare < .005

1989-1990 Data Summary

Table 3 provides the order of entry into the model based on the level of R^2 for the 1989-1990 data including test scores. Table 4 provides the order without the inclusion of test scores.

TABLE 3.--RSQUARE Selection of Variables for 1989-1990 Data Including Test Scores

Variable	Rsquare	C(p)
Absences	.33	64.75
Retentions	.40	39.50
Transfers	.45	26.31
Mother's Education	.47	18.86
Race	.49	15.08
Mother's Occupation	.51	10.58
Sex	.52	8.14
Reading Test Scores	.53	7.71

Introduction of additional variables increased Rsquare < .005

TABLE 4.--RSQUARE Selection of Variables for 1989-1990 Data Without the Inclusion of Test Scores

Variable	Rsquare	C(p)
Absences	.39	148.9
Retentions	.49	80.95
Transfers	.54	44.87
Mother's Education	.57	25.66
Race	.58	19.86
Mother's Occupation	.59	16.70
Father's Education	.59	14.76
Father's Occupation	.60	12.07

Introduction of additional variables increased Rsquare < .005

Absences, retentions, transfers, and mother's education were the top four variables in three of the analyses and four of the top five in the remaining analysis.

Forward Selection of Variables

This process adds variables, one at a time, to the model and calculates the F statistic that reflects the variable's relative contribution to the model, including the variable in the model if it adds to the predictability. The summary table of the step by step selection process is provided in appendix A for both data sets, with and without test scores. The findings paralleled the RSQUARE method with absences, retentions, and transfers being the most discriminating variables (prob > F = .0001). Mother's education was the fourth variable entered in three of the analyses, and the fifth variable entered in the remaining analysis.

Backward Selection of Variables

This process begins with all variables in the model and removes variables one at a time. The process was employed for both data sets, both with and without test scores. The summary table of the step by step selection process is provided in appendix B. Absences, retentions, and transfers proved to be the most discriminating variables, followed by mother's education.

Stepwise Selection of Variables

This process continues to select different combinations of variables until the best combination is obtained. Appendix C provides the summary table of the selection process for both sets of data with and without test scores. As in the RSQUARE, forward, and backward methods, absences, retentions, and transfers continued to be the three most significant variables (Prob > F = .0001), closely followed by mother's education.

STEPDISC

The SAS program also has a separate stepwise subprogram, STEPDISC. The subprogram follows the same procedures as the REG stepwise subprogram, but STEPDISC has a greater capacity to verify the accuracy

of the classifications, providing Wilks' Lambda, a statistical tool used
to verify the accuracy of discrimination.

Appendix D contains the summary of findings for the 1988-1989 and
1989-1990 data sets both with and without test scores. This process
also indicated that absences, retentions, and transfers were again
significant at the .0001 level while also yielding a minimal Lambda
value (Prob < Lambda = .0001). Mother's education was again the next
most significant variable, also yielding a minimal value for Lambda
(Prob < Lambda = .0001).

Discriminant Analysis

The subprogram DISCRIM was employed to determine how accurately
the predictor variables could be utilized to classify the data as to
dropout or nondropout status. The program initially tests the two
status groups, dropouts and nondropouts, for covariance. The test
indicated that the covariance of the two groups was significantly
different; therefore, quadratic discriminant analysis was performed.
Quadratic discriminant analysis is the preferred method when the group
covariances are different. Table 5 provides the correlation matrices
for the 1988-1989 and 1989-1990 data sets.

Table 5.—Discriminant Analysis Within-Class Correlation Coefficients 1988-1989 Data for Dropouts   n = 41

Variable	SCHOOL	SEX	RACE	ABS	GPA	READING	ENGLISH	MATH	COMP	FATHOCC	MOTHOCC	MARITAL	FATHED	MOTHED	RET	TRANS
SCHOOL	1.00	0.46	0.11	0.54	-0.25	-0.11	-0.15	-0.03	-0.13	0.10	-0.36	0.29	-0.59	-0.58	0.37	-0.06
	0.00	0.03	0.64	0.01	0.27	0.64	0.49	0.88	0.57	0.66	0.10	0.20	0.00	0.00	0.09	0.80
SEX	0.46	1.00	-0.09	0.63	-0.06	-0.14	-0.03	0.11	-0.16	-0.03	-0.11	0.08	-0.28	-0.62	0.00	-0.14
	0.03	0.00	0.68	0.00	0.80	0.55	0.88	0.62	0.44	0.91	0.64	0.72	0.21	0.00	1.00	0.54
RACE	0.11	-0.09	1.00	-0.09	0.42	-0.54	-0.41	-0.38	-0.40	-0.51	-0.30	0.14	-0.32	-0.17	0.02	-0.25
	0.64	0.68	0.00	0.68	0.05	0.01	0.06	0.08	0.06	0.02	0.17	0.52	0.15	0.44	0.92	0.26
ABS	0.54	0.63	-0.09	1.00	-0.27	-0.00	-0.05	0.06	-0.16	0.04	-0.30	0.42	-0.12	-0.41	0.05	0.11
	0.01	0.00	0.68	0.00	0.22	0.99	0.81	0.79	0.46	0.84	0.18	0.05	0.60	0.06	0.83	0.63
GPA	-0.25	-0.06	0.42	-0.27	1.00	-0.10	-0.15	-0.19	-0.17	-0.31	-0.20	-0.17	-0.01	-0.18	-0.22	-0.15
	0.27	0.80	0.05	0.22	0.00	0.66	0.49	0.41	0.46	0.16	0.37	0.44	0.98	0.42	0.34	0.51
READING	-0.11	-0.14	-0.54	-0.00	-0.10	1.00	0.79	0.74	0.88	0.26	0.25	0.15	0.37	0.21	0.00	0.43
	0.64	0.55	0.01	0.99	0.66	0.00	0.00	0.00	0.00	0.24	0.26	0.51	0.09	0.34	1.00	0.05
ENGLISH	-0.15	-0.03	-0.41	-0.05	-0.15	0.79	1.00	0.85	0.87	0.02	0.24	-0.01	0.24	0.25	-0.13	0.06
	0.49	0.88	0.06	0.81	0.49	0.00	0.00	0.00	0.00	0.92	0.27	0.96	0.29	0.27	0.56	0.81
MATH	-0.03	0.11	-0.38	0.06	-0.19	0.74	0.85	1.00	0.87	0.16	0.24	0.23	0.10	0.07	-0.28	0.26
	0.88	0.62	0.08	0.79	0.41	0.00	0.00	0.00	0.00	0.48	0.28	0.30	0.65	0.74	0.20	0.23
COMP	-0.13	-0.16	-0.40	-0.16	-0.17	0.88	0.87	0.86	1.00	0.29	0.34	0.12	0.28	0.32	-0.16	0.26
	0.57	0.47	0.06	0.46	0.46	0.00	0.00	0.00	0.00	0.19	0.11	0.61	0.20	0.14	0.46	0.24
FATHOCC	0.10	-0.03	-0.51	0.04	-0.31	0.26	0.02	0.16	0.29	1.00	0.16	-0.01	0.03	0.30	-0.00	0.17
	0.66	0.91	0.01	0.84	0.16	0.24	0.92	0.48	0.19	0.00	0.47	0.97	0.89	0.18	0.99	0.45
MOTHOCC	-0.36	-0.11	-0.30	-0.30	-0.20	0.25	0.24	0.24	0.35	0.16	1.00	0.06	0.56	0.46	-0.03	0.20
	0.10	0.64	0.17	0.18	0.37	0.26	0.27	0.28	0.11	0.47	0.00	0.79	0.01	0.03	0.90	0.37
MARITAL	0.29	0.08	0.14	0.42	-0.17	0.15	-0.01	0.23	0.12	-0.01	0.06	1.00	-0.19	-0.26	-0.04	0.59
	0.20	0.72	0.52	0.05	0.44	0.51	0.96	0.30	0.61	0.97	0.79	0.00	0.40	0.25	0.86	0.00
FATHED	-0.59	-0.28	-0.32	-0.12	-0.01	0.37	0.24	0.10	0.28	0.03	0.56	-0.19	1.00	0.62	-0.30	0.23
	0.00	0.21	0.15	0.60	0.98	0.09	0.29	0.65	0.20	0.89	0.01	0.40	0.00	0.00	0.18	0.30
MOTHED	-0.58	-0.62	-0.17	-0.41	-0.18	0.21	0.25	0.07	0.32	0.30	0.46	-0.26	0.62	1.00	-0.16	0.10
	0.00	0.00	0.44	0.06	0.42	0.34	0.27	0.74	0.14	0.18	0.03	0.25	0.00	0.00	0.48	0.67
RET	0.37	0.00	0.02	0.05	-0.22	0.00	-0.13	-0.28	-0.16	-0.00	-0.03	-0.04	-0.30	-0.16	1.00	0.01
	0.09	1.00	0.92	0.83	0.34	1.00	0.56	0.20	0.46	0.99	0.90	0.86	0.18	0.48	0.00	0.97
TRANS	-0.06	-0.14	-0.25	0.11	-0.15	0.43	0.06	0.26	0.26	0.17	0.20	0.59	0.23	0.10	0.01	1.00
	0.80	0.54	0.26	0.63	0.51	0.05	0.81	0.23	0.24	0.45	0.37	0.00	0.30	0.67	0.97	0.00

ABS = absences   COMP = composite test score   MOTHOCC = mother's occupation   MOTHED = mother's education   TRANS = transfers
GPA = grade point average   FATHOCC = father's occupation   FATHED = father's education   RET = retentions

70

Table 6.--Discriminant Analysis Within-Class Correlation Coefficients 1988-1989 Data for Nondropouts n = 256

Variable	SCHOOL	SEX	RACE	ABS	GPA	READING	ENGLISH	MATH	COMP	FATHOCC	MOTHOCC	MARITAL	FATHED	MOTHED	RET	TRANS
SCHOOL	1.00	-0.04	0.26	-0.10	-0.20	-0.19	-0.16	-0.30	-0.25	0.07	0.17	0.27	-0.21	-0.20	0.00	0.09
	0.00	0.65	0.00	0.21	0.01	0.01	0.03	0.00	0.00	0.43	0.02	0.00	0.01	0.01	0.95	0.26
SEX	-0.04	1.00	-0.11	0.18	0.25	0.10	0.23	0.12	0.18	0.00	-0.06	-0.03	-0.01	0.09	-0.09	0.10
	0.64	0.00	0.14	0.02	0.00	0.20	0.00	0.12	0.02	0.96	0.47	0.69	0.89	0.24	0.22	0.19
RACE	0.26	-0.11	1.00	-0.16	-0.19	-0.27	-0.16	-0.23	-0.26	0.01	0.23	0.21	-0.07	-0.00	0.01	-0.01
	0.00	0.14	0.00	0.03	0.01	0.00	0.04	0.00	0.00	0.95	0.00	0.01	0.33	0.99	0.87	0.93
ABS	-0.10	0.18	-0.16	1.00	-0.33	-0.18	-0.18	-0.12	-0.17	-0.04	-0.03	0.07	0.04	-0.02	0.07	0.18
	0.21	0.01	0.03	0.00	0.00	0.02	0.02	0.13	0.02	0.57	0.66	0.36	0.58	0.76	0.33	0.02
GPA	-0.20	-0.25	-0.19	-0.33	1.00	0.45	0.55	0.55	0.59	-0.12	-0.10	-0.17	0.36	0.25	-0.26	-0.21
	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.19	0.02	0.00	0.00	0.00	0.00
READING	-0.19	0.10	-0.27	-0.18	0.45	1.00	0.76	0.59	0.85	-0.05	-0.03	-0.14	0.17	0.12	-0.24	-0.05
	0.01	0.20	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.49	0.67	0.08	0.02	0.11	0.00	0.51
ENGLISH	-0.16	0.23	-0.16	-0.18	0.55	0.76	1.00	0.71	0.91	-0.09	-0.02	-0.13	0.20	0.18	-0.27	-0.03
	0.03	0.00	0.04	0.02	0.00	0.00	0.00	0.00	0.00	0.25	0.82	0.10	0.01	0.02	0.00	0.69
MATH	-0.30	0.12	-0.23	-0.12	0.55	0.59	0.71	1.00	0.85	-0.10	0.01	-0.19	0.28	0.14	-0.23	-0.03
	0.00	0.12	0.00	0.13	0.00	0.00	0.00	0.00	0.00	0.18	0.94	0.01	0.00	0.07	0.00	0.72
COMP	-0.25	0.18	-0.26	-0.17	0.59	0.85	0.91	0.85	1.00	-0.09	-0.03	-0.18	0.22	0.17	-0.27	-0.03
	0.00	0.02	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.25	0.69	0.02	0.00	0.03	0.00	0.67
FATHOCC	0.06	0.00	0.01	-0.04	-0.12	-0.05	-0.09	-0.10	-0.09	1.00	-0.06	-0.02	-0.30	-0.18	0.13	-0.01
	0.43	0.96	0.95	0.57	0.13	0.49	0.25	0.18	0.25	0.00	0.42	0.78	0.00	0.02	0.10	0.86
MOTHOCC	0.17	-0.06	0.23	-0.03	-0.10	-0.03	-0.02	0.01	-0.03	-0.06	1.00	0.09	0.05	0.03	-0.07	-0.00
	0.02	0.47	0.00	0.66	0.19	0.67	0.82	0.94	0.69	0.42	0.00	0.24	0.54	0.66	0.35	0.96
MARITAL	0.27	-0.03	0.21	0.07	-0.17	-0.14	-0.13	-0.19	-0.18	-0.02	0.09	1.00	-0.19	-0.05	0.26	0.05
	0.00	0.69	0.01	0.36	0.02	0.08	0.10	0.01	0.02	0.78	0.24	0.00	0.01	0.55	0.00	0.52
FATHED	-0.21	-0.01	-0.07	0.04	0.36	0.17	0.20	0.28	0.22	-0.30	0.05	-0.19	1.00	0.42	-0.20	-0.11
	0.01	0.89	0.33	0.58	0.00	0.02	0.01	0.00	0.00	0.00	0.54	0.01	0.00	0.00	0.01	0.14
MOTHED	-0.20	0.09	-0.00	-0.02	0.25	0.12	0.18	0.14	0.17	-0.18	0.03	-0.05	0.42	1.00	0.03	0.11
	0.01	0.24	0.99	0.76	0.00	0.11	0.02	0.07	0.03	0.02	0.66	0.55	0.00	0.00	0.74	0.14
RET	0.00	-0.09	0.01	0.07	-0.26	-0.24	-0.27	-0.23	-0.27	0.13	-0.07	0.26	-0.20	0.03	1.00	0.12
	0.95	0.22	0.87	0.33	0.00	0.00	0.00	0.20	0.00	0.10	0.35	0.00	0.01	0.74	0.00	0.10
TRANS	0.09	0.10	-0.01	0.18	-0.21	-0.05	-0.03	-0.03	-0.03	-0.01	-0.00	0.05	-0.11	0.11	0.12	1.00
	0.26	0.19	0.93	0.02	0.00	0.51	0.69	0.72	0.67	0.86	0.96	0.52	0.14	0.14	0.10	0.00

ABS = absences
GPA = grade point average
COMP = composite test score
FATHOCC = father's occupation
MOTHOCC = mother's occupation
FATHED = father's education
MOTHED = mother's education
RET = retentions
TRANS = transfers

71

Table 7.--Discriminant Analysis Within-Class Correlation Coefficients 1989-1990 Data for Dropouts

n = 45

Variable	SCHOOL	SEX	RACE	ABS	GPA	FATHOCC	MOTHOCC	MARITAL	FATHED	MOTHED	RET	TRANS
SCHOOL	1.00	0.16	0.25	-0.15	0.20	-0.21	-0.03	0.22	-0.04	-0.31	-0.05	-0.04
	0.00	0.29	0.10	0.32	0.19	0.16	0.81	0.15	0.81	0.04	0.75	0.80
SEX	0.16	1.00	0.13	-0.18	0.34	-0.10	0.05	-0.13	-0.09	-0.08	-0.30	0.04
	0.29	0.00	0.41	0.25	0.02	0.50	0.73	0.41	0.55	0.59	0.05	0.79
RACE	0.25	0.13	1.00	-0.31	0.24	-0.31	0.17	-0.02	-0.02	-0.24	-0.33	-0.28
	0.10	0.41	0.00	0.04	0.12	0.04	0.26	0.92	0.88	0.12	0.03	0.06
ABS	-0.15	-0.18	-0.31	1.00	-0.22	-0.03	0.14	0.17	-0.16	0.05	0.16	0.18
	0.32	0.25	0.04	0.00	0.15	0.83	0.35	0.26	0.30	0.72	0.31	0.25
GPA	0.20	0.34	0.24	-0.22	1.00	-0.01	0.11	-0.00	0.17	0.11	-0.38	0.18
	0.20	0.02	0.12	0.15	0.00	0.97	0.49	0.99	0.26	0.48	0.01	0.23
FATHOCC	-0.21	-0.10	-0.31	-0.03	-0.01	1.00	-0.01	0.06	0.20	0.10	0.06	0.14
	0.16	0.50	0.04	0.83	0.97	0.00	0.95	0.71	0.18	0.53	0.69	0.36
MOTHOCC	-0.03	0.05	0.17	0.14	0.11	-0.01	1.00	-0.08	-0.01	0.08	0.01	0.21
	0.85	0.73	0.26	0.35	0.49	0.95	0.00	0.62	0.95	0.61	0.93	0.17
MARITAL	0.22	-0.13	-0.02	0.17	-0.00	0.06	-0.08	1.00	-0.29	0.00	0.04	0.17
	0.15	0.41	0.92	0.26	0.99	0.71	0.62	0.00	0.05	1.00	0.81	0.27
FATHED	-0.04	-0.09	-0.02	-0.16	0.17	0.20	-0.01	-0.29	1.00	0.23	-0.22	-0.10
	0.81	0.55	0.88	0.30	0.26	0.18	0.5	0.05	0.00	0.14	0.15	0.52
MOTHED	-0.31	-0.08	-0.24	0.05	0.11	0.10	0.08	0.00	0.23	1.00	-0.15	0.43
	0.04	0.59	0.12	0.72	0.48	0.53	0.61	1.00	0.14	0.00	0.33	0.00
RET	-0.05	-0.30	-0.33	0.16	-0.38	0.06	0.01	0.04	-0.22	-0.15	1.00	0.13
	0.75	0.05	0.03	0.31	0.01	0.69	0.93	0.81	0.15	0.33	0.00	0.40
TRANS	-0.04	0.04	-0.28	0.18	0.18	0.14	0.21	0.17	-0.10	0.43	0.13	1.00
	0.80	0.79	0.06	0.25	0.23	0.36	0.17	0.27	0.52	0.00	0.40	0.00

ABS = absence
GPA = grade point average
COMP = composite test score

FATHOCC = father's occupation
MOTHOCC = mother's occupation
FATHED = father's education

MOTHED = mother's education
RET = retentions
TRANS = transfers

72

Table 8.--Discriminant Analysis Within-Class Correlation Coefficients 1989-1990 Data for Nondropouts

n = 257

Variable	SCHOOL	SEX	RACE	ABS	GPA	FATHOCC	MOTHOCC	MARITAL	FATHED	MOTHED	RET	TRANS
SCHOOL	1.00	0.03	0.36	-0.09	-0.19	0.06	0.13	0.22	-0.27	-0.18	0.28	-0.09
	0.00	0.63	0.00	0.13	0.00	0.34	0.04	0.00	0.00	0.00	0.00	0.16
SEX	0.03	1.00	0.06	0.08	0.15	0.02	0.05	0.06	-0.00	-0.04	-0.12	0.05
	0.63	0.00	0.33	0.20	0.01	0.74	0.44	0.31	0.96	0.53	0.06	0.40
RACE	0.36	0.06	1.00	-0.14	-0.22	0.06	0.16	0.06	-0.07	-0.02	0.16	0.02
	0.00	0.33	0.00	0.03	0.00	0.38	0.01	0.31	0.28	0.80	0.01	0.74
ABS	-0.09	0.08	-0.14	1.00	-0.19	0.08	0.05	0.13	-0.19	-0.18	0.11	0.14
	0.13	0.20	0.03	0.00	0.00	0.18	0.40	0.04	0.00	0.00	0.07	0.02
GPA	-0.19	0.15	-0.22	-0.19	1.00	-0.12	-0.13	-0.17	0.17	0.25	-0.37	-0.11
	0.00	0.01	0.00	0.00	0.00	0.06	0.03	0.01	0.01	0.00	0.00	0.07
FATHOCC	0.06	0.02	0.06	0.08	-0.12	1.00	0.04	0.03	-0.28	-0.27	0.15	-0.07
	0.34	0.74	0.38	0.18	0.06	0.00	0.48	0.63	0.00	0.00	0.01	0.24
MOTHOCC	0.13	0.05	0.16	0.05	-0.13	0.04	1.00	0.17	-0.16	-0.14	0.06	0.08
	0.04	0.44	0.01	0.40	0.03	0.48	0.00	0.01	0.01	0.02	0.34	0.22
MARITAL	0.22	0.06	0.06	0.13	-0.17	0.03	0.17	1.00	-0.18	-0.16	0.26	0.22
	0.00	0.31	0.31	0.04	0.01	0.63	0.01	0.00	0.00	0.01	0.00	0.00
FATHED	-0.27	0.00	-0.07	-0.19	0.17	-0.28	-0.16	-0.18	1.00	0.44	-0.27	0.02
	0.00	0.96	0.28	0.00	0.01	0.00	0.1	0.00	0.00	0.00	0.00	0.70
MOTHED	-0.19	-0.04	-0.16	-0.18	0.25	-0.27	-0.14	-0.16	0.44	1.00	-0.24	-0.01
	0.00	0.53	0.80	0.00	0.00	0.00	0.02	0.01	0.00	0.00	0.00	0.85
RET	0.28	-0.12	0.16	0.11	-0.37	0.15	0.06	0.26	-0.27	-0.24	1.00	-0.04
	0.00	0.06	0.01	0.07	0.00	0.01	0.34	0.00	0.00	0.00	0.00	0.50
TRANS	-0.09	0.05	0.02	0.14	-0.11	-0.07	0.08	0.22	0.02	-0.01	-0.04	1.00
	0.16	0.40	0.74	0.02	0.07	0.24	0.22	0.00	0.70	0.85	0.50	0.00

ABS = absence
GPA = grade point average
COMP = composite test score

FATHOCC = father's occupation
MOTHOCC = mother's occupation
FATHED = father's education

MOTHED = mother's education
RET = retentions
TRANS = transfers

73

For the 1988-1989 data with test scores included, twenty-one (95.45 percent) of the twenty-two dropouts were correctly classified as dropouts. One dropout (4.55 percent) was misclassified as a nondropout. One of the nondropouts (00.58 percent) was misclassified as a dropout. The remaining 171 (99.42 percent) nondropouts were correctly classified.

The percentage of misclassifications increased slightly when test scores were not included in the analysis. When test scores were not included, thirty-six (94.74 percent) of the thirty-eight dropouts were correctly classified as dropouts. The remaining two (5.26 percent) dropouts were misclassified as nondropouts. For nondropouts, 11 (4.51 percent) were misclassified as dropouts and 233 (95.49 percent) were correctly classified as nondropouts.

Data utilized from the 1989-1990 sample for the purpose of cross validation yielded similar results. When test scores were included, twenty (95.24 percent) of the twenty-one dropouts were correctly predicted to be dropouts. The remaining one (4.76 percent) dropout was misclassified as a nondropout. For nondropouts, 2 (1.28 percent) were misclassified as dropouts, and the remaining 154 (98.72 percent) were correctly predicted to be dropouts.

When test scores were not included, forty-two (93.33 percent) of the forty-five dropouts were correctly classified, and three (6.67 percent) were misclassified as nondropouts. For the nondropouts, 16 (6.35 percent) were misclassified as dropouts, and the remaining 235 (93.65 percent) were correctly predicted to be nondropouts. Some accuracy of classification is sacrificed when test scores are not included in the analysis.

The program also provides a case-by-case listing of the classifications, highlighting those that were misclassified. An examination of the student records for those cases that were misclassified indicated that, in the vast majority of cases, additional information was available that could be used by school personnel to

reduce the number of misclassifications even further. This additional information pertains to factors beyond the scope of this study, such as pregnancy, problems with the criminal justice system, prolonged illnesses that resulted in homebound instruction, and other anecdotal information.

A major goal of this study was to determine a useful methodology to identify potential dropouts prior to dropping out of school. In order to be of practical use in a typical school setting, the methodology needs to be relatively simple. Many guidance counselors or school building administrators may lack the expertise, facilities, or software to run SAS or other statistical programs to identify potential dropouts. A prediction equation was available through quadratic discriminant analysis. However, the prediction equation, taking into account the effects of the individual variables on each other, had 136 terms plus the constant. This equation was judged too unwieldy for use by an individual school. Therefore, computer programs were written (see appendix E) which take advantage of the accuracy of classification supplied by this methodology. The programs were written using the combined 1988-1989 and 1989-1990 data sets to establish the model, capitalizing on the largest sample set possible to further increase the accuracy of prediction. A program was written to be utilized when test scores are available, and a separate program was written to be utilized when test scores are not available.

Linear Discriminant Analysis

In order to obtain a simpler prediction equation, a linear discriminant analysis was also performed. For the 1988-1989 and 1989-1990 data sets, the most discriminating variables were again absences, retentions, and transfers (Prob > T = .0001), followed closely by mother's education. The linear discriminant analysis utilizes the data set to determine a prediction equation, then reruns the data from the original sample or for each subsequent case through the prediction

equation to obtain a final numerical score to be used for prediction.
The program was set up so that a score of "0" would denote a dropout and
a score of "1" would denote a nondropout. Originally, a cut score of .5
was employed for prediction. Students with scores falling below .5 were
classified as dropouts and students with scores falling above .5 were
classified as nondropouts. However, this method increased the number of
misclassifications (approximately 20 percent were misclassified) because
the group variance of scores for the nondropouts was approximately six
times that of the dropouts. Therefore, the program was adjusted to
calculate the group means and utilize the midpoint between the group
means as the cut score. Using this methodology, the program obtained
the results reported in tables 9 and 10.

TABLE 9.--Linear Discriminant Analysis Results 1988-1989 Data

	Test Scores Included	Test Scores Not Included
Dropouts correctly classified as dropouts	9.8%	12.1%
Dropouts misclassified as nondropouts	1.5%	1.4%
Nondropouts correctly classified as nondropouts	87.6%	84.8%
Nondropouts misclassified as dropouts	1.0%	1.8%
Total percentage correctly classified	97.4%	96.9%
Total percentage misclassified	2.5%	3.2%

TABLE 10.--Linear Discriminant Analysis Results 1989-1990 Data

	Test Scores Included	Test Scores Not Included
Dropouts correctly classified as dropouts	10.7%	13.8%
Dropouts misclassified as nondropouts	1.1%	1.3%
Nondropouts correctly classified as nondropouts	85.9%	81.5%
Nondropouts misclassified as dropouts	2.3%	3.4%
Total percentage correctly classified	96.6%	95.3%
Total percentage misclassified	3.4%	4.7%

There was again a slight decrease in accuracy when test scores were not available. The accuracy of prediction remains relatively stable from one data set to the next. Another measure that seems to validate the methodology from one data set to the next is the stability of the cut point. The cut point for the 1988-1989 data without test scores was .63595. The cut point for the 1989-1990 data without test scores was .63683. This fact would seem to indicate that the methodology could be utilized from one year to the next while maintaining a similar degree of accuracy. One advantage of this methodology is that the program could be rerun for any new data set to determine a new prediction equation and cut point if a change in the population data was perceived.

Prediction equations were obtained both with and without test scores. The 1988-1989 and 1989-1990 data sets were both incorporated for formulation of the prediction equations to utilize a larger sample, increasing the accuracy of prediction.

The prediction equation utilizing test scores is as follows:

$$y' = .837863 + .006455x_1 + .049574x_2 - .045977x_3 - .009844x_4$$

$$+ \ .028294x_5 \ + \ .000092x_6 \ + \ .000384x_7 \ + \ .000635x_8$$

$$- \ .001062x_9 \ + \ .011153x_{10} \ + \ .009311x_{11} \ + \ .045834x_{12}$$

$$+ \ .045041x_{13} \ + \ .064201x_{14} \ - \ .136066x_{15} \ - \ .044223x_{16}$$

The cut score for this equation = .66.

The prediction equation employed when test scores are not available is as follows:

$$y' \ = \ .763761 \ + \ .013572x_1 \ + \ .032978x_2 \ - \ .032341x_3 \ - \ .009754x_4$$

$$+ \ .029876x_5 \ + \ .011371x_{10} \ + \ .009502x_{11} \ + \ .008504x_{12}$$

$$+ \ .074653x_{13} \ + \ .073619x_{14} \ - \ .115935x_{15} \ - \ .047605x_{16}$$

The cut score for this equation = .64.

The first term in each equation is the constant. The scores of a student to be classified would be substituted for the variables as follows:

x_1 = school attended

x_2 = sex

x_3 = race

x_4 = absences

x_5 = GPA

x_6 = Reading test scores

x_7 = English test scores

x_8 = Mathematics test scores

x_9 = composite test scores

x_{10} = father's occupation

x_{11} = mother's occupation

x_{12} = parent's marital status

x_{13} = father's education

x_{14} = mother's education

x_{15} = retentions

x_{16} = transfers

The prediction equations given above could easily be incorporated into a simple computer program which would calculate the prediction score, compare the prediction score to the cut score, and classify the case as dropout or nondropout. Utilizing a hand calculator, the process would be somewhat tedious, but still reasonable for guidance counselors or building administrators to employ. However, to increase the utility of the process, the possibility of a simplified equation that would still maintain acceptable accuracy was explored.

In every analyses performed, absences, retentions, and transfers were the three most discriminating variables, usually closely followed by mother's education.

Therefore, the linear discriminant analysis was performed, eliminating all variables except absences, retentions, transfers, and mother's education. The accuracy for this analysis is reported in table 11.

TABLE 11.—Linear Discriminant Analysis Results Using Absences, Retentions, Transfers, and Mother's Education

	1988-1989 Data	1989-1990 Data
Dropouts correctly classified as dropouts	11.1%	11.9%
Dropouts misclassified as nondropouts	2.7%	3.0%
Nondropouts correctly classified as nondropouts	84.1%	81.5%
Nondropouts misclassified as dropouts	2.0%	3.6%
Total percentage correctly classified	95.2%	93.4%
Total percentage misclassified	4.7%	6.6%

The rate of misclassification increased when the number of variables was reduced, but in comparison, for example, to Lowery's study

where the misclassification rate was nearly 22 percent using seven

variables,[1] the results seem acceptable. The prediction equation

obtained using these four variables with the combined data set is as

follows:

$y' = .977225 - .010615x_1 - .135145x_2 - .050607x_3 + .106675x_4$,

where x_1 = absences, x_2 = retentions, x_3 = transfers, and x_4 = mother's

education. The cut score for this equation = .65.

The model was then reduced to three variables, absences,

retentions, and transfers, producing the results reported in table 12.

TABLE 12.--Linear Discriminant Analysis Results Using Absences,
Retentions, and Transfers

	1988-1989 Data	1989-1990 Data
Dropouts correctly classified as dropouts	10.1%	12.3%
Dropouts misclassified as nondropouts	3.7%	2.6%
Nondropouts correctly classified as nondropouts	82.8%	81.1%
Nondropouts misclassified as dropouts	3.4%	4.0%
Total percentage correctly classified	92.9%	93.4%
Total percentage misclassified	7.1%	6.6%

Some accuracy was lost in the 1988-1989 data set when mother's

education was dropped from the model, while accuracy remained stable in

the 1989-1990 data set.

The prediction equation for the combined data set utilizing

absences, retentions, and transfers is as follows:

$y' = 1.111443 - .011768x_1 - .160306x_2 - .050271x_3$

where x_1 = absences, x_2 = retentions, and x_3 = transfers. The cut score

for this equation = .66. Using this prediction equation would not

require the encoding of any data as the actual raw scores are

substituted into the equation for absences, retentions, and transfers.

A final reduction of the equation was made, eliminating the

transfer variable from the model. The results are provided in

table 13.

TABLE 13.--Linear Discriminant Analysis Results Using Absences and
Retentions

	1988-1989 Data	1989-1990 Data
Dropouts correctly classified as dropouts	10.8%	12.6%
Dropouts misclassified as nondropouts	3.0%	2.3%
Nondropouts correctly classified as nondropouts	82.2%	78.5%
Nondropouts misclassified as dropouts	4.0%	6.6%
Total percentage correctly classified	93.0%	91.1%
Total percentage misclassified	7.0%	8.9%

The prediction equation for the combined data set utilizing

absences and transfers is as follows:

$y' = 1.085481 - .014162x_1 - .185860x_2$, where x_1 = absences, x =

retentions, and the cut point = .68.

While the amount of misclassification increased slightly again for the

1989-1990 data set, the accuracy of classifications still remains well

over 90 percent using linear discriminant analysis with the predictor

variables absences and retentions.

The final research question was, "Do differences exist between

those discriminating characteristics utilized to identify potential

dropouts in Chesapeake Public Schools serving populations more urban in

nature than those discriminating characteristics utilized to identify

potential dropouts in those schools serving populations less urban in nature?" The data from the frequency analyses reported earlier in this chapter would seem to indicate that differences do indeed exist. Oscar Smith High School serves the population most urban in nature, and Indian River High School also serves a relatively more urban population. The remaining three high schools, Deep Creek High School, Great Bridge High School, and Western Branch High School, serve populations more suburban or rural in nature. The 1988-1989 data indicated that 34.15 percent of the dropouts and 11.33 percent of the nondropouts came from Oscar Smith High School, 14.63 percent of the dropouts and 19.14 percent of the nondropouts came from Indian River High School, 14.63 percent of the dropouts and 22.27 percent of the nondropouts came from Deep Creek High School, 24.39 percent of the dropouts and 28.52 percent of the nondropouts came from Great Bridge High School, and 12.20 percent of the dropouts and 18.75 percent of the nondropouts came from Western Branch High School. The school serving the population most urban in nature, Oscar Smith High School, had the highest percentage of dropouts (34.15 percent), while having the lowest percentage of students represented in the sample (14.5 percent). In addition, the two schools serving relatively more urban populations, Oscar Smith and Indian River High Schools, contained 48.78 percent of the dropouts while comprising only 35.70 percent of the total sample. The 1989-1990 data also found higher percentages of dropouts in the more urban schools.

An examination of frequencies for the combined data sets for each school indicates that the two schools serving populations more urban in nature exhibit certain tendencies, especially in the school serving the most urban population, Oscar Smith High School. As indicated in table 14 below, Oscar Smith High School has a greater number of minority students. The students generally have lower test scores, lower grade point averages, and are absent more often, and are more likely to have been retained than students in the schools serving less urban

populations. Parents of students at Oscar Smith High School have higher
divorce rates, lower levels of educational attainment, and the fathers
have higher rates of unemployment.

In order to determine the possible effects of the differences
between the two groups, schools serving more urban populations and
schools serving relatively less urban populations, a separate prediction
equation was formulated and selection of variables procedures were
conducted for each individual school. In addition, a prediction
equation was derived and selection of variables analyses were performed
for the three schools serving populations relatively less urban in
nature (Western Branch, Great Bridge, and Deep Creek High Schools), and
a separate prediction equation derived and selection of variables
performed for the two schools serving more urban populations. Summary
tables by school for these findings are reported in appendix F.
Appendix G provides the summary tables for more urban schools versus
less urban schools.

As might be expected, deriving a separate prediction equation for
each school increased the accuracy of classification since smaller,
often more homogenous groups were utilized with a fairly large number of
predictor variables. While slight variations were evident, generally
the prediction equations for each school were consistent with the
overall prediction equations obtained earlier for the total sample, with
absences, retentions, transfers, and mother's education continuing to
prove the most predictive variables. A comparison of the prediction
equations for the group of schools serving less urban populations and
the two schools serving more urban populations also provided similar
results. The cut points were different (.59 for Oscar Smith and Deep
Creek High Schools combined data and .67 for Western Branch, Great
Bridge, and Deep Creek High Schools combined data), but this follows the
findings provided in table 14 that indicate group means are different

TABLE 14.--Frequencies for Each School Represented in the Study

	Less Urban Schools			More Urban Schools	
	WBHS	GBHS	DCHS	IRHS	OSHS
SEX					
Male	44.4%	52.2%	45.8%	52.0%	42.5%
Female	55.6%	47.8%	54.2%	48.0%	57.5%
RACE					
White	75.8%	85.7%	52.5%	48.0%	37.0%
Nonwhite	24.2%	14.3%	47.5%	52.0%	63.0%
FATHER					
Unemployed	2.1%	2.8%	3.4%	7.6%	20.9%
Employed	97.9%	97.2%	96.6%	92.4%	79.1%
College	34.3%	33.3%	18.6%	23.6%	7.1%
High School	55.6%	58.3%	70.3%	59.2%	52.9%
Dropout	10.1%	8.3%	11.0%	18.4%	40.0%
MOTHER					
Unemployed	47.5%	40.7%	48.3%	31.2%	43.8%
Employed	52.5%	59.3%	51.7%	69.8%	56.2%
College	33.3%	25.4%	15.0%	22.4%	8.2%
High School	55.6%	68.5%	67.5%	59.2%	45.2%
Dropout	11.1%	6.1%	17.5%	18.4%	46.6%
MARITAL					
Married	83.8%	77.5%	71.7%	55.2%	43.8%
Divorced	15.2%	22.5%	26.7%	44.0%	50.7%
Single	1.0%	-0-	1.7%	0.8%	5.5%
RETENTIONS					
mean	.18	.27	.32	.82	.82
ABSENCES					
mean	10.79	11.58	9.83	9.51	15.59
TRANSFERS					
mean	.78	1.59	.79	1.54	1.23
GPA					
mean	2.22	2.35	1.99	2.04	1.70
TEST SCORES					
READING					
mean	344.81	362.96	328.11	319.02	314.51
ENGLISH					
mean	340.76	359.74	324.59	331.83	312.13
MATHEMATICS					
mean	388.59	388.12	351.38	362.72	331.2
COMPOSITE					
mean	409.83	427.06	370.77	379.53	346.16

for the more urban and less urban schools, and the cut points are
derived from group means.

The RSQUARE and Stepwise selection of variables conducted
indicated some differences in the discrimination of certain variables in
relation to the individual school, although absences, retentions, and
transfers continue to be the most discriminating variables. Perhaps the
most notable difference evident in analyzing the predictor variables by
school is that the variable "absences" was not found significant for the
two schools serving populations less urban in nature and generally the
most affluent populations in the study. One possible explanation might
be that students absent in the less urban schools are provided with more
incentives and/or resources to make up the work missed. This may be
due, in part, to the relatively higher level of affluence present in
these schools. The order of variables selected was the same for the
RSQUARE analysis and the Stepwise analysis. Table 15 provides the order
of selection for those variables of most interest with Prob > F up to
the .05 level.

Table 15.--Stepwise Selection of Variables by School

WBHS	GBHS	DCHS	IRHS	OSHS
*Retentions	*Transfers	*Retentions	*Absences	*Absences
Reading	*Race	Absences	*Retentions	Retentions
Sex	Retentions	Mothed	Transfers	Fathed
Fathocc	Mothed		Marital	

*Significant at the .0001 level.

All variables left in the model are significant at the .05 level.

FATHOCC = father's occupation
FATHED = father's education
MOTHED = mother's education

Table 16 provides the most significant variables selected when
grouping the schools by the nature of the school population. Western

Branch High School, Great Bridge High School, and Deep Creek High School are the schools serving populations relatively less urban in nature. Indian River High School and Oscar Smith High School serve the populations relatively more urban in nature. While absences, retentions, and transfers remain the top three variables, the order is not consistent for both groups. The fact that absences is the third variable selected for the less urban schools and the first variable selected for the more urban schools suggests that the number of absences is more critical in predicting potential dropouts in the more urban schools in Chesapeake than in the less urban schools. Absences were more likely to be "excused" in the schools serving more suburban populations, occurring for reasons such as illness, field trips, or family trips. Absences in the schools serving more urban populations were more likely to be "unexcused," often due to increased numbers of students cutting school, than those schools serving populations less urban in nature. This may partially account for the difference in the order of variables between more and less urban schools.

Table 16.--Stepwise Selection of Variables for Schools Serving More
Urban Populations vs. Less Urban Populations

WBHS, GBHS, & DCHS (Less Urban)	IRHS & OSHS (More Urban)
*Retentions	*Absences
*Transfers	*Retentions
*Absences	Transfers
Mother's education	
Race	

*Significant at the .0001 level.

All variables left in the model are significant at the .01 level.

While using separate prediction equations for schools serving populations more and less urban in nature yielded a slightly higher

degree of accuracy, the difference was not judged worthy of formulating separate equations in this school setting. The difference between the two equations also may be due, at least partially, to using smaller data sets.

Summary

The review of the literature indicated that a number of discriminating characteristics had been identified as influential on a student's decision to drop out or stay in school. An examination of Chesapeake Public School student records found that sixteen of these discriminating characteristics were available for use as potential predictor variables. Data was collected and encoded for an initial random sample of 305 students. The frequencies for all variables were determined and statistical analyses were performed utilizing regression and discriminant analysis subprograms of the statistical computer program package SAS. The analyses determined that a prediction equation could be obtained utilizing the sample data. The relative contribution of each variable to the prediction equation was also obtained, with absences, retentions, transfers, and mother's education contributing the highest amounts. Computer programs were provided to use for prediction, as well as simplified equations that could be tabulated by hand. With all variables in the equation, the accuracy of classification was well over 95 percent, and it was determined that the number of predictor variables could be reduced to absences and retentions while maintaining over 90 percent accuracy of classifications. The process was replicated with a sample of 305 students from 1989-1990 school rolls, yielding similar results.

An analysis of the data for the schools serving more urban populations and the schools serving relatively less urban populations indicated differences in rural and urban populations and an overall higher dropout rate in the more urban schools. The number of absences appeared to be more predictive in the more urban schools.

NOTES

1. Donella Lowery, "Identification of the Potential School Dropout" (Ph.D. diss., University of Georgia, 1985), 62.

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

This chapter provides a summary of the study, conclusions drawn from the study, the limitations of the study, and recommendations for further study.

Summary of the Study

This study examined the early identification of potential high school dropouts. Three research questions were addressed to investigate this problem.

1. What academic and nonacademic characteristics discriminate between high school students who drop out of school and those students who stay in school?

2. How accurately can data from these selected discriminating characteristics available in the Chesapeake Public School System student records be utilized to identify potential dropouts prior to leaving school?

3. Do differences exist among those discriminating characteristics utilized to identify potential dropouts in Chesapeake Public Schools serving populations more urban in nature than those discriminating characteristics utilized to identify potential dropouts in those schools serving populations less urban in nature?

The review of the literature found a number of discriminating characteristics had been identified as relating to a student's decision to drop out or stay in school. The large number of characteristics is often grouped into factors related to the school, factors related to the family, and factors related to the student.

An examination of student records in the Chesapeake Public School System indicated that the following characteristics had been identified as discriminating in the literature and were available for the prediction of potential dropouts:

1. absences
2. achievement test scores - Reading
3. achievement test scores - English
4. achievement test scores - Mathematics
5. achievement test scores - composite
6. father's education
7. father's occupation
8. grade point average
9. mother's education
10. mother's occupation
11. parent's marital status
12. race
13. retentions
14. school attended
15. sex
16. transfers

In addition, the criterion variable, student's status during the period of study (dropout or nondropout), was available.

Regression procedures, RSQUARE, forward, backward, and stepwise selection of variables, as well as discriminant analysis procedures all indicated that a relationship could be identified and measured between the sixteen predictor variables and the criterion variable. Absences, retentions, and transfers were found to be the most discriminating variables in each analysis, generally followed by mother's education. The schools serving relatively more urban populations exhibited higher dropout rates and the number of absences appears to be especially critical in influencing potential dropouts in those schools.

A quadratic discriminant analysis was performed on the data by the statistical program, which correctly classified students as dropouts or nondropouts in over 95 percent of the sample. The prediction equation formulated through this methodology was judged too complex to be performed manually. Therefore, computer programs were written to allow this process to be used by the school system or individual schools possessing the capabilities and expertise.

In order to formulate a useful prediction equation that could be readily utilized by school personnel in the individual school buildings, a linear discriminant analysis was performed on the data, yielding a prediction equation with seventeen terms, and maintaining an accuracy of classification rate of over 95 percent. It was determined that the prediction equation could be reduced to two terms and still maintain an accuracy of classification rate of over 90 percent. Prediction equations were formed with sixteen, twelve, four, three, and two variables. The results achieved with the random sample derived from the 1988-1989 student rolls remained consistent with the results obtained when the analyses were performed with the 1989-1990 data for the purpose of replication.

Conclusions Drawn from the Study

Utilizing the information obtained in answering the research questions, this study sought to provide recommendations for policy changes that could possibly reduce the dropout rate. The conclusions drawn from this study lend themselves directly to the policy recommendation(s) that follow each conclusion.

1. **The research literature has adequately identified discriminating characteristics that can be utilized for the early identification of potential dropouts.** As noted in chapter II, the research has identified numerous discriminating characteristics that can be utilized for the early identification of potential dropouts. In addition, researchers in the field praise the early identification of potential dropouts, those children "at risk" of dropping out early, as a viable method of reducing the dropout rate and the subsequent devastating consequences to the individual and society. Therefore, enlightened school systems must take advantage of this information and adopt policies and programs designed to provide for the early identification of potential dropouts.

2. **Discriminating characteristics are available in the Chesapeake Public School System student records for the identification of potential dropouts.** Utilizing sixteen of the discriminating characteristics identified in the literature, a satisfactory prediction equation was obtained. As noted previously, in most of the cases in which dropouts were misclassified as nondropouts, additional discriminating characteristics were available in student records which would allow a guidance counselor or school administrator to improve upon the accuracy of the prediction equation utilized. Examples of additional characteristics available in student records are pregnancies, housing in correctional institutions or involvement with law enforcement agencies, periods of homebound instruction, diagnosis of hyperactivity or attention deficit disorder, or living out of the attendance zone. Therefore, data for these characteristics should be collected, updated, and maintained as accurately as possible. Computer programs are available which would allow the school system or individual school to maintain the data and make it readily available for analysis. Involving guidance counselors or other appropriate school personnel in the identification of potential dropouts would, in all likelihood, sensitize those personnel to the need for accurate, up-to-date information. Many of the records utilized for this study contained incomplete information or certain information that had not been updated since the student's entry into first grade. Involving the guidance counselors, who are required to review student files annually, in the prediction process would keep those personnel cognizant of the information that needs to be maintained in student records.

3. **By utilizing data available from Chesapeake Public School System student records, a useful prediction equation can be derived for the early identification of potential dropouts.** The accuracy of

classification ranged from over 90 percent, when the variables absences and retentions were utilized, to as much as 98 percent when all sixteen variables were utilized. Therefore, Chesapeake Public Schools would benefit from the utilization of this methodology for the early identification of potential dropouts. These students could then be channelled into appropriate interventions/programs designed to aid these students in remaining in school. In addition, other school systems may benefit from the utilization of this methodology as well. The prediction equations derived in this study were formulated from data pertaining to students within the Chesapeake Public School System. The methodologies employed in this study should be useful to other school systems employing the same methodologies. The utilization of these methodologies would allow other systems to determine if the same four dominant factors, absences, retentions, transfers, and mother's education, continue to be the most predictive variables. (Other factors, such as gender, race, and GPA, may prove to be more predictive in other systems. In Chesapeake, the high correlation between these variables and absences, retentions, and transfers may have caused the variables such as race, gender, and GPA, to appear less predictive.) Subsequent prediction equations for other school systems would be derived utilizing data from the student records of that system.

Limitations of the Study

The following limitations apply to this study:

1. The prediction equations obtained from this study may not retain the high level of accuracy over time. As demographics change over time and the predictor variables become more or less discriminating, the equation may need to be updated with more current data sets.

2. The sample utilized to formulate the prediction equation came from the student population of Chesapeake Public Schools and the equation derived may not be generalizable to other school systems.

Recommendations for Further Investigation

1. An improved scaling system for the classification of parent occupation may improve the degree of prediction available from that variable. The classifications used in the <u>Dictionary of Occupational Titles</u> are well documented in research, but do not allow for a true scaling of job levels. For example, a college professor would be classified as a "1," a clerk in a convenience store would be classified as a "2," and a general in the military would be classified as a "3." The relative contribution of a predictor variable can be determined more effectively if a scale rating the variable's value from lowest to highest is available. Other instances where the variable classification system could be improved include delineating between a mother who is unemployed and receiving Aid to Dependent Children and a mother who is upper middle class and unemployed by choice, and delineating between a parent that has been divorced multiple times and one that has been divorced once.

2. Further consideration should be given to conducting this analysis as a longitudinal study, beginning with students in kindergarten or first grade, and following their progress through the grade levels. This may maximize the benefits through earlier identification.

3. This study should be conducted in other school systems to determine if the same accuracy of prediction can be achieved in other settings.

4. The actual classification of students as dropouts or nondropouts should be conducted at the building level when possible. Guidance counselors may be able to identify potential dropouts quite accurately when combining the results of the prediction equation

with the other information available in student records. In addition, implementing this process at the building level would focus the attention of those involved on potential dropouts and may prevent those students from "slipping through the cracks" and going undetected until the students actually drop out.

5. Current interventions for potential dropouts must be strengthened and new interventions must be developed to assist those students in order to derive the maximum benefits possible from early identification.

6. The results achieved with quadratic discriminant analysis and linear discriminant analysis should be compared longitudinally to determine if either methodology yields a greater degree of prediction over time.

7. Research should be conducted to determine if significantly increased benefits can be obtained by utilizing separate prediction equations for individual schools or for different types of schools (urban vs. rural, for example).

8. Relatively higher numbers of days missed, retentions, and transfers should be seen as warning signals for potential dropouts by Chesapeake Public Schools personnel.

9. Research should be conducted to determine the effects of early identification with this methodology and subsequent interventions provided to determine whether the percentage of dropouts actually decreases.

APPENDICES

APPENDIX A
FORWARD SELECTION OF VARIABLES

TABLE 17.--Summary of Forward Selection Procedure for 1988-1989 Data
Without Test Scores

Step	Variable Entered	Number In	Partial R**2	Model R**2	C(p)	F	Prob>F
1	RET	1	0.38	0.38	171.70	169.99	0.0001
2	ABS	2	0.14	0.52	69.61	84.03	0.0001
3	TRANS	3	0.15	0.57	37.42	30.52	0.0001
4	FATHED	4	0.03	0.60	16.00	22.52	0.0001
5	MOTHED	5	0.01	0.61	12.40	5.48	0.0200
6	FATHOCC	6	0.01	0.62	9.25	5.11	0.0246
7	SCHOOL	7	*	0.62	8.37	2.88	0.0911
8	SEX	8	*	0.62	7.94	2.43	0.1200
9	GPA	9	*	0.63	8.83	1.11	0.2920
10	MARITAL	10	*	0.63	9.79	1.05	0.3066
11	MOTHOCC	11	*	0.63	11.17	0.62	0.4325

* values < .01

No other variable met the 0.50 significance level for entry into the
model.

ABS = absences   FATHED = father's education
GPA = grade point average   MOTHED = mother's education
FATHOCC = father's occupation   RET = retentions
MOTHOCC = mother's occupation   TRANS = transfers

TABLE 18.—Summary of Forward Selection Procedure for 1988-1989 Data
With Test Scores

Step	Variable Entered	Number In	Partial R**2	Model R**2	C(p)	F	Prob>F
1	RET	1	0.43	0.43	93.09	147.47	0.0001
2	ABS	2	0.14	0.57	26.43	61.16	0.0001
3	TRANS	3	0.03	0.60	12.73	15.00	0.0001
4	MOTHED	4	0.01	0.61	7.01	7.64	0.0063
5	FATHOCC	5	0.01	0.62	6.10	2.91	0.0899
6	FATHED	6	0.01	0.63	5.17	2.95	0.0873
7	SEX	7	*	0.63	5.12	2.09	0.1501
8	ENGLISH	8	*	0.64	5.84	1.30	0.2554
9	MOTHOCC	9	*	0.64	6.58	1.29	0.2581
10	MARITAL	10	*	0.64	7.92	0.67	0.4134
11	READING	11	*	0.64	9.23	0.70	0.4054
12	MATH	12	*	0.64	10.69	0.55	0.4586
13	COMP	13	*	0.65	11.67	1.03	0.3124

* values < .01

No other variable met the 0.50 significance level for entry into the
model.

ABS = absences   FATHED = father's education
COMP = composite test score   MOTHED = mother's education
FATHOCC = father's occupation   RET = retentions
MOTHOCC = mother's occupation   TRANS = transfers

TABLE 19.--Summary of Forward Selection Procedure for 1989-1990 Data Without Test Scores

Step	Variable Entered	Number In	Partial R**2	Model R**2	C(p)	F	Prob>F
1	ABS	1	0.39	0.39	148.89	187.85	0.0001
2	RET	2	0.10	0.49	80.95	55.29	0.0001
3	TRANS	3	0.05	0.54	44.87	33.42	0.0001
4	MOTHED	4	0.03	0.57	25.66	19.81	0.0001
5	RACE	5	0.01	0.58	19.86	7.45	0.0067
6	MOTHOCC	6	0.01	0.59	16.69	5.00	0.0261
7	FATHED	7	0.01	0.59	14.75	3.85	0.0507
8	FATHOCC	8	0.01	0.60	12.07	4.64	0.0322
9	GPA	9	*	0.60	10.65	3.41	0.0656
10	SEX	10	*	0.60	10.78	1.87	0.1723
11	MARITAL	11	*	0.61	11.34	1.44	0.2307

* values < .01

No other variable met the 0.50 significance level for entry into the model.

ABS = absences   FATHED = father's education
GPA = grade point average   MOTHED = mother's education
FATHOCC = father's occupation   RET = retentions
MOTHOCC = mother's occupation   TRANS = transfers

TABLE 20.--Summary of Forward Selection Procedure for 1989-1990 Data With Test Scores

Step	Variable Entered	Number In	Partial R**2	Model R**2	C(p)	F	Prob>F
1	ABS	1	0.33	0.33	64.75	84.85	0.0001
2	RET	2	0.08	0.40	39.50	22.52	0.0001
3	TRANS	3	0.04	0.45	26.30	13.46	0.0003
4	MOTHED	4	0.03	0.47	18.86	8.74	0.0036
5	RACE	5	0.02	0.49	15.08	5.49	0.0203
6	MOTHOCC	6	0.02	0.51	10.58	6.36	0.0126
7	SEX	7	0.01	0.52	8.14	4.44	0.0366
8	READING	8	0.01	0.53	7.71	2.45	0.1191
9	ENGLISH	9	0.01	0.53	7.88	1.85	0.1754
10	FATHOCC	10	*	0.54	8.37	1.54	0.2169
11	MARITAL	11	*	0.54	9.26	1.13	0.2900
12	FATHED	12	*	0.54	10.02	1.26	0.2636
13	GPA	13	*	0.55	11.49	0.54	0.4645

* values < .01

No other variable met the 0.50 significance level for entry into the model.

ABS = absences	FATHED = father's education
GPA = grade point average	MOTHED = mother's education
FATHOCC = father's occupation	RET = retentions
MOTHOCC = mother's occupation	TRANS = transfers

APPENDIX B
BACKWARD ELIMINATION OF VARIABLES

TABLE 21.--Summary of Backward Elimination Procedure for 1988-1989 Data Without Test Scores

Step	Variable Entered	Number In	Partial R**2	Model R**2	C(p)	F	Prob>F
1	RACE	11	*	0.63	11.17	0.17	0.68
2	MOTHOCC	10	*	0.63	9.79	0.62	0.43
3	MARITAL	9	*	0.63	8.83	1.05	0.31
4	GPA	8	*	0.62	7.94	1.11	0.29
5	SEX	7	*	0.62	8.37	2.43	0.12

Summary of Variables Remaining in Model

Variable	F	Prob>F
SCHOOL	2.88	0.0911
ABS	57.95	0.0001
FATHOCC	4.71	0.0308
FATHED	15.20	0.0001
MOTHED	6.38	0.0121
RET	46.79	0.0001
TRANS	31.36	0.0001

* values < .01

All variables left in the model are significant at the 0.10 level.

ABS = absences	FATHED = father's education
GPA = grade point average	MOTHED = mother's education
FATHOCC = father's occupation	RET = retentions
MOTHOCC = mother's occupation	TRANS = transfers

TABLE 22.--Summary of Backward Elimination Procedure for 1988-1989 Data With Test Scores

Step	Variable Entered	Number In	Partial R**2	Model R**2	C(p)	F	Prob>F
1	GPA	15	*	0.65	15.08	0.08	0.77
2	ENGLISH	14	*	0.65	13.36	0.27	0.60
3	SCHOOL	13	*	0.65	11.66	0.31	0.58
4	RACE	12	*	0.64	10.00	0.34	0.56
5	MARITAL	11	*	0.64	8.65	0.66	0.42
6	MOTHOCC	10	*	0.64	7.96	1.33	0.25
7	READING	9	*	0.64	7.68	1.76	0.19
8	MATH	8	*	0.64	6.40	0.73	0.40
9	COMP	7	*	0.63	5.12	0.73	0.39
10	SEX	6	*	0.63	5.17	2.09	0.15

Summary of Variables Remaining in Model

Variable	F	Prob>F
ABS	34.38	0.0001
FATHOCC	4.11	0.0441
FATHED	2.95	0.0873
MOTHED	3.28	0.0718
RET	50.13	0.0001
TRANS	16.09	0.0001

* values < .01

All variables left in the model are significant at the 0.10 level.

ABS = absences
GPA = grade point average
COMP = composite test score
FATHOCC = father's occupation
MOTHOCC = mother's occupation

FATHED = father's education
MOTHED = mother's education
RET = retentions
TRANS = transfers

TABLE 23.—Summary of Backward Elimination Procedure for 1989-1990 Data Without Test Scores

Step	Variable Entered	Number In	Partial R**2	Model R**2	C(p)	F	Prob>F
1	SCHOOL	11	*	0.61	11.34	0.34	0.56
2	MARITAL	10	*	0.60	10.78	1.44	0.23
3	SEX	9	*	0.60	10.65	1.87	0.17

Summary of Variables Remaining in Model

Variable	F	Prob>F
RACE	5.99	0.0150
ABS	43.53	0.0001
GPA	3.41	0.0656
FATHOCC	4.82	0.0290
MOTHOCC	5.62	0.0184
FATHED	4.73	0.0305
MOTHED	10.12	0.0016
RET	14.38	0.0002
TRANS	41.16	0.0001

* values < .01

All variables left in the model are significant at the 0.10 level.

ABS = absences	FATHED = father's education
GPA = grade point average	MOTHED = mother's education
COMP = composite test score	RET = retentions
FATHOCC = father's occupation	TRANS = transfers
MOTHOCC = mother's occupation	

TABLE 24.--Summary of Backward Elimination Procedure for 1989-1990 Data With Test Scores

Step	Variable Entered	Number In	Partial R**2	Model R**2	C(p)	F	Prob>F
1	MATH	15	*	0.55	15.10	0.10	0.76
2	SCHOOL	14	*	0.55	13.20	0.11	0.74
3	COMP	13	*	0.55	11.49	0.29	0.59
4	GPA	12	*	0.54	10.02	0.54	0.46
5	FATHED	11	*	0.54	9.26	1.26	0.26
6	MARITAL	10	*	0.54	8.37	1.13	0.29
7	FATHOCC	9	*	0.53	7.88	1.54	0.22
8	ENGLISH	8	0.01	0.53	7.71	1.85	0.18
9	READING	7	0.01	0.52	8.14	2.45	0.12

Summary of Variables Remaining in Model

Variable	F	Prob>F
SEX	4.44	0.0366
RACE	8.37	0.0043
ABS	35.49	0.0001
MOTHOCC	6.70	0.0105
MOTHED	9.80	0.0021
RET	5.73	0.0178
TRANS	19.50	0.0001

* values < .01

All variables left in the model are significant at the 0.10 level.

ABS = absences	FATHED = father's education
GPA = grade point average	MOTHED = mother's education
COMP = composite test score	RET = retentions
FATHOCC = father's occupation	TRANS = transfers
MOTHOCC = mother's occupation	

APPENDIX C
REG STEPWISE SELECTION OF VARIABLES

TABLE 25.--Summary of Stepwise Procedure for 1988-1989 Data Without Test Scores

Step	Variable Entered	Number In	Partial R**2	Model R**2	C(p)	F	Prob>F
1	RET	1	0.38	0.38	171.70	169.99	0.0001
2	ABS	2	0.14	0.52	69.61	84.03	0.0001
3	TRANS	3	0.05	0.57	37.42	30.52	0.0001
4	FATHED	4	0.03	0.60	16.00	22.52	0.0001
5	MOTHED	5	0.01	0.61	12.40	5.48	0.0200
6	FATHOCC	6	0.01	0.62	9.25	5.11	0.0246
7	SCHOOL	7	*	0.62	8.37	2.88	0.0911
8	SEX	8	*	0.62	7.94	2.43	0.1200

* values < .01

All variables left in the model are significant at the 0.15 level.

ABS = absences   MOTHED = mother's education
FATHOCC = father's occupation   RET = retentions
FATHED = father's education   TRANS = transfers

TABLE 26.--Summary of Stepwise Procedure for 1988-1989 Data With Test Scores

Step	Variable Entered	Number In	Partial R**2	Model R**2	C(p)	F	Prob>F
1	RET	1	0.43	0.43	93.09	147.47	0.0001
2	ABS	2	0.14	0.57	26.43	61.16	0.0001
3	TRANS	3	0.03	0.60	12.73	15.00	0.0001
4	MOTHED	4	0.02	0.62	7.01	7.64	0.0063
5	FATHOCC	5	0.01	0.62	6.10	2.91	0.0899
6	FATHED	6	0.01	0.63	5.17	2.95	0.0873

All variables left in the model are significant at the 0.15 level.

ABS = absences   MOTHED = mother's education
FATHOCC = father's occupation   RET = retentions
FATHED = father's education   TRANS = transfers

TABLE 27.--Summary of Stepwise Procedure for 1989-1990 Data Without Test Scores

Step	Variable Entered	Number In	Partial R**2	Model R**2	C(p)	F	Prob>F
1	ABS	1	0.39	0.39	148.89	187.85	0.0001
2	RET	2	0.10	0.49	80.95	55.29	0.0001
3	TRANS	3	0.05	0.54	44.87	33.42	0.0001
4	MOTHED	4	0.03	0.57	25.66	19.81	0.0001
5	RACE	5	0.01	0.58	19.86	7.45	0.0067
6	MOTHOCC	6	0.01	0.59	16.69	5.00	0.0261
7	FATHED	7	0.01	0.59	14.75	3.85	0.0507
8	FATHOCC	8	0.01	0.60	12.07	4.64	0.0322
9	GPA	9	*	0.60	10.65	3.41	0.0656

* values < .01

All variables left in the model are significant at the 0.15 level.

ABS = absences
GPA = grade point average
FATHOCC = father's occupation
MOTHOCC = mother's occupation

FATHED = father's education
MOTHED = mother's education
RET = retentions
TRANS = transfers

TABLE 28.--Summary of Stepwise Procedure for 1989-1990 Data With Test
Scores

Step	Variable Entered	Number In	Partial R**2	Model R**2	C(p)	F	Prob>F
1	ABS	1	0.33	0.33	64.75	84.85	0.0001
2	RET	2	0.08	0.40	39.50	22.52	0.0001
3	TRANS	3	0.04	0.45	26.30	13.46	0.0003
4	MOTHED	4	0.03	0.47	18.86	8.74	0.0036
5	RACE	5	0.02	0.49	15.08	5.49	0.0203
6	MOTHOCC	6	0.02	0.51	10.58	6.36	0.0126
7	SEX	7	0.01	0.52	8.14	4.44	0.0366
8	READING	8	0.01	0.53	7.71	2.45	0.1191

All variables left in the model are significant at the 0.15 level.

ABS = absences   RET = retentions
MOTHOCC = mother's occupation   TRANS = transfers
MOTHED = mother's education

APPENDIX D
STEPDISC STEPWISE SELECTION OF VARIABLES

TABLE 29.--Stepwise Selection of Variables 1988-1989 Data With Test Scores

Step	Variable Entered	Number In	Partial R**2	F	Prob>F	Wilks' Lambda	Prob< Lambda
1	RET	1	0.43	147.47	0.0001	0.57	0.00
2	ABS	2	0.24	61.16	0.0001	0.43	0.00
3	TRANS	3	0.07	15.00	0.0001	0.40	0.00
4	MOTHED	4	0.04	7.64	0.0063	0.38	0.00
5	FATHOCC	5	0.02	2.91	0.0899	0.38	0.00
6	FATHED	6	0.02	2.95	0.0873	0.37	0.00

No variables can be entered.

ABS = absences
FATHOCC = father's occupation
FATHED = father's education

MOTHED = mother's education
RET = retentions
TRANS = transfers

TABLE 29.--Stepwise Selection of Variables 1988-1989 Data With Test Scores

Step	Variable Entered	Number In	Partial R**2	F	Prob>F	Wilks' Lambda	Prob< Lambda
1	RET	1	0.43	147.47	0.0001	0.57	0.00
2	ABS	2	0.24	61.16	0.0001	0.43	0.00
3	TRANS	3	0.07	15.00	0.0001	0.40	0.00
4	MOTHED	4	0.04	7.64	0.0063	0.38	0.00
5	FATHOCC	5	0.02	2.91	0.0899	0.38	0.00
6	FATHED	6	0.02	2.95	0.0873	0.37	0.00

No variables can be entered.

ABS = absences   MOTHED = mother's education
FATHOCC = father's occupation   RET = retentions
FATHED = father's education   TRANS = transfers

TABLE 30.—Stepwise Selection of Variables 1988-1989 Data Without Test Scores

Step	Variable Entered	Number In	Partial R**2	F	Prob>F	Wilks' Lambda	Prob< Lambda
1	RET	1	0.38	170.00	0.0001	0.62	0.00
2	ABS	2	0.23	84.03	0.0001	0.48	0.00
3	TRANS	3	0.10	30.52	0.0001	0.43	0.00
4	FATHED	4	0.08	22.52	0.0001	0.40	0.00
5	MOTHED	5	0.02	5.48	0.0200	0.40	0.00
6	FATHOCC	6	0.02	5.11	0.0246	0.38	0.00
7	SCHOOL	7	0.01	2.88	0.0911	0.38	0.00
8	SEX	8	0.01	2.43	0.1200	0.38	0.00

No variables can be entered.

ABS = absences   MOTHED = mother's education
FATHOCC = father's occupation   RET = retentions
FATHED = father's education   TRANS = transfers

TABLE 31.--Stepwise Selection of Variables 1989-1990 Data With Test
Scores

Step	Variable Entered	Number In	Partial R**2	F	Prob>F	Wilks' Lambda	Prob< Lambda
1	ABS	1	0.33	84.85	0.0001	0.67	0.0001
2	RET	2	0.11	22.52	0.0001	0.60	0.0001
3	TRANS	3	0.07	13.46	0.0003	0.55	0.0001
4	MOTHED	4	0.05	8.74	0.0036	0.53	0.0001
5	RACE	5	0.03	5.49	0.0203	0.51	0.0001
6	MOTHOCC	6	0.04	6.36	0.0126	0.49	0.0001
7	SEX	7	0.03	4.44	0.0366	0.48	0.0001
8	READING	8	0.01	2.45	0.1191	0.47	0.0001

No variables can be entered.

ABS = absences   RET = retentions
MOTHOCC = father's occupation   TRANS = transfers
MOTHED = mother's education

TABLE 32.—Stepwise Selection of Variables 1989-1990 Data Without Test Scores

Step	Variable Entered	Number In	Partial R**2	F	Prob>F	Wilks' Lambda	Prob< Lambda
1	ABS	1	0.39	187.85	0.0001	0.61	0.00
2	RET	2	0.16	55.29	0.0001	0.51	0.00
3	TRANS	3	0.10	33.42	0.0001	0.46	0.00
4	MOTHED	4	0.06	19.81	0.0001	0.43	0.00
5	RACE	5	0.03	7.45	0.0067	0.42	0.00
6	MOTHOCC	6	0.02	5.00	0.0261	0.41	0.00
7	FATHED	7	0.01	3.85	0.0507	0.41	0.00
8	FATHOCC	8	0.02	4.64	0.0322	0.40	0.00
9	GPA	9	0.01	3.42	0.0656	0.40	0.00

No variables can be entered.

ABS = absences
GPA = grade point average
FATHOCC = father's occupation
MOTHOCC = mother's occupation

FATHED = father's education
MOTHED = mother's education
RET = retentions
TRANS = transfers

APPENDIX E
DISCRIMINANT ANALYSIS COMPUTER PROGRAMS

TABLE 33.--Discriminant Analysis Computer Program 1

```
***THIS PROGRAM INCLUDES TEST SCORE DATA;

CMS FI STUDENT DISK STUDENT DAT A1;
DATA BASE;
INFILE STUDENT;
INPUT SCHOOL SEX RACE ABS GPA READING ENGLISH MATH COMP FATHOCC MOTHOCC
MARITAL FATHED MOTHED RET TRANS STATUS;

***DATA CHECK CONTAINS RECORD(S) OF STUDENT(S) TO BE CLASSIFIED;
***NUMERICAL RECORD BELOW PROVIDED AS AN EXAMPLE;
DATA CHECK ;
INPUT SCHOOL SEX RACE ABS GPA READING ENGLISH MATH COMP FATHOCC MOTHOCC
     MARITAL FATHED MOTHED RET TRANS;
CARDS;
2  1  0  21  1.30  293  333  297  322  3  2  1  1  1  0  2
;

PROC DISCRIM DATA=BASE POOL=TEST SIMPLE LIST LISTERR
                            TESTDATA=CHECK TESTLIST;
CLASS STATUS;
TITLE1 'CLASSIFICATION RESULTS BY STATUS (DROPOUT / NONDROPOUT) ';
RUN;
```

TABLE 34.--Discriminant Analysis Computer Program 2

```
***THIS PROGRAM DOES NOT INCLUDE TEST SCORE DATA;

CMS FI STUDENT DISK STUDENT DAT A1;
DATA BASE;
INFILE STUDENT;
INPUT SCHOOL SEX RACE ABS GPA FATHOCC MOTHOCC MARITAL FATHED MOTHED RET
     TRANS STATUS;

***DATA CHECK CONTAINS RECORD(S) OF STUDENT(S) TO BE CLASSIFIED;
***THE NUMERICAL RECORD BELOW IS PROVIDED AS AN EXAMPLE;
DATA CHECK ;
INPUT SCHOOL SEX RACE ABS GPA FATHOCC MOTHOCC MARITAL FATHED MOTHED RET
     TRANS;
CARDS;
3  1  1  13  1.41  6  0  0  0  0  0  2
;

PROC DISCRIM DATA=BASE POOL=TEST SIMPLE LIST LISTERR
                           TESTDATA=CHECK TESTLIST;
CLASS STATUS;
TITLE1 'CLASSIFICATION RESULTS BY STATUS (DROPOUT / NONDROPOUT) ';
RUN;
```

APPENDIX F
STEPWISE SELECTION OF VARIABLES BY SCHOOL

TABLE 35.--Combined Stepwise Selection of Variables for 1988-1990 Data With Test Scores for Western Branch High School

Step	Variable Entered	Number In	Partial R**2	Model R**2	C(p)	F	Prob>F
1	RET	1	0.24	0.24	14.92	18.70	0.0001
2	READING	2	0.06	0.30	11.42	4.82	0.0321
3	FATHED	3	0.04	0.33	9.67	3.42	0.0696
4	SEX	4	0.05	0.38	6.89	4.63	0.0357
5	FATHOCC	5	0.04	0.43	4.60	4.40	0.0404

All variables left in the model are significant at the 0.1500 level.

FATHOCC = father's occupation
FATHED = father's education
RET = retentions

**TABLE 36.--Combined Stepwise Selection of Variables for 1988-1990 Data
With Test Scores for Great Bridge High School**

Step	Variable Entered	Number In	Partial R**2	Model R**2	C(p)	F	Prob>F
1	TRANS	1	0.41	0.41	50.28	70.80	0.0001
2	RACE	2	0.14	0.55	15.21	33.14	0.0001
3	RET	3	0.04	0.59	6.81	10.12	0.0019
4	MOTHED	4	0.02	0.61	3.13	5.78	0.0180

All variables left in the model are significant at the 0.1500 level.

MOTHED = mother's education
RET = retentions
TRANS = transfers

TABLE 37.--Combined Stepwise Selection of Variables for 1988-1990 Data With Test Scores for Deep Creek High School

Step	Variable Entered	Number In	Partial R**2	Model R**2	C(p)	F	Prob>F
1	RET	1	0.39	0.39	14.33	47.04	0.0001
2	ABS	2	0.09	0.48	2.94	13.40	0.0005
3	MOTHED	3	0.03	0.51	0.42	4.76	0.0324
4	FATHED	4	0.02	0.53	-0.76	3.46	0.0670
5	MOTHOCC	5	0.02	0.55	-1.47	3.03	0.0862

All variables left in the model are significant at the 0.1500 level.

ABS = absences   MOTHED = mother's education
MOTHOCC = mother's occupation   RET = retentions
FATHED = father's education

TABLE 38.--Combined Stepwise Selection of Variables for 1988-1990 Data With Test Scores for Indian River High School

Step	Variable Entered	Number In	Partial R**2	Model R**2	C(p)	F	Prob>F
1	ABS	1	0.53	0.53	44.02	84.53	0.0001
2	RET	2	0.09	0.62	24.52	16.61	0.0001
3	TRANS	3	0.06	0.68	11.92	13.15	0.0005
4	MARITAL	4	0.02	0.70	8.22	5.46	0.0223
5	READING	5	0.02	0.72	6.50	3.69	0.0588
6	MOTHED	6	0.01	0.73	5.03	3.58	0.0628
7	FATHOCC	7	0.01	0.74	4.39	2.78	0.1000

All variables left in the model are significant at the 0.1500 level.

ABS = absences   RET = retentions
FATHOCC = father's occupation   TRANS = transfers
MOTHED = mother's education

TABLE 39.--Combined Stepwise Selection of Variables for 1988-1990 Data With Test Scores for Oscar Smith High School

Step	Variable Entered	Number In	Partial R**2	Model R**2	C(p)	F	Prob>F
1	ABS	1	0.52	0.52	11.28	52.96	0.0001
2	RET	2	0.11	0.64	-0.17	14.42	0.0004
3	FATHED	3	0.03	0.67	-2.24	4.71	0.0352

All variables left in the model are significant at the 0.1500 level.

ABS = absences
FATHED = mother's education
RET = retentions

TABLE 40.--Combined Stepwise Selection of Variables for 1988-1990 Data
Without Test Scores for Western Branch High School

Step	Variable Entered	Number In	Partial R**2	Model R**2	C(p)	F	Prob>F
1	FATHED	1	0.31	0.31	31.42	41.89	0.0001
2	GPA	2	0.09	0.40	17.25	14.04	0.0003
3	FATHOCC	3	0.06	0.46	8.59	10.16	0.0020
4	RACE	4	0.02	0.48	7.09	3.42	0.0676
5	ABS	5	0.02	0.50	4.84	4.30	0.0409

All variables left in the model are significant at the 0.1500 level.

ABS = absences   FATHOCC = father's occupation
GPA = grade point average   FATHED = father's education

TABLE 41.--Combined Stepwise Selection of Variables for 1988-1990 Data Without Test Scores for Great Bridge High School

Step	Variable Entered	Number In	Partial R**2	Model R**2	C(p)	F	Prob>F
1	TRANS	1	0.40	0.40	86.01	120.04	0.0001
2	ABS	2	0.12	0.53	35.01	44.84	0.0001
3	RET	3	0.06	0.58	11.66	24.28	0.0001
4	FATHED	4	0.02	0.60	5.47	8.18	0.0048
5	RACE	5	0.01	0.61	4.21	3.29	0.0715
6	SEX	6	0.01	0.61	4.04	2.21	0.1388

All variables left in the model are significant at the 0.1500 level.

ABS = absences   RET = retentions
FATHED = father's education   TRANS = transfers

TABLE 42.--Combined Stepwise Selection of Variables for 1988-1990 Data Without Test Scores for Deep Creek High School

Step	Variable Entered	Number In	Partial R**2	Model R**2	C(p)	F	Prob>F
1	RET	1	0.41	0.41	37.60	78.77	0.0001
2	MOTHED	2	0.08	0.48	20.37	16.69	0.0001
3	ABS	3	0.05	0.53	10.23	11.50	0.0010
4	TRANS	4	0.02	0.55	7.51	4.61	0.0339
5	MOTHOCC	5	0.01	0.56	5.94	3.57	0.0615
6	RACE	6	0.01	0.57	5.68	2.29	0.1332
7	FATHOCC	7	0.01	0.58	5.28	2.46	0.1195

All variables left in the model are significant at the 0.1500 level.

ABS = absences   MOTHED = mother's education
FATHOCC = father's occupation   RET = retentions
MOTHOCC = mother's occupation   TRANS = transfers

TABLE 43.—Combined Stepwise Selection of Variables for 1988-1990 Data
Without Test Scores for Indian River High School

Step	Variable Entered	Number In	Partial R**2	Model R**2	C(p)	F	Prob>F
1	ABS	1	0.51	0.51	61.28	121.59	0.0001
2	RET	2	0.08	0.58	36.30	20.97	0.0001
3	TRANS	3	0.06	0.64	17.55	18.56	0.0001
4	MOTHED	4	0.04	0.68	6.93	12.40	0.0006
5	FATHED	5	0.01	0.69	6.15	2.78	0.0981
6	MARITAL	6	0.01	0.69	5.73	2.45	0.1204
7	FATHOCC	7	0.01	0.70	5.38	2.41	0.1235

All variables left in the model are significant at the 0.1500 level.

ABS = absences   MOTHED = mother's education
FATHOCC = father's occupation   RET = retentions
FATHED = father's education   TRANS = transfers

TABLE 44.—Combined Stepwise Selection of Variables for 1988-1990 Data
Without Test Scores for Oscar Smith High School

Step	Variable Entered	Number In	Partial R**2	Model R**2	C(p)	F	Prob>F
1	ABS	1	0.49	0.49	36.21	63.16	0.0001
2	RET	2	0.12	0.61	14.56	20.04	0.0001
3	FATHED	3	0.04	0.66	8.15	7.88	0.0066
4	FATHOCC	4	0.02	0.68	5.63	4.47	0.0384
5	GPA	5	0.02	0.70	4.42	3.30	0.0744
6	TRANS	6	0.02	0.72	2.60	4.12	0.0468

All variables left in the model are significant at the 0.1500 level.

ABS = absences   FATHED = father's education
GPA = grade point average   RET = retentions
FATHOCC = father's occupation TRANS = transfers

APPENDIX G
STEPWISE SELECTION OF VARIABLES
FOR MORE URBAN SCHOOLS VERSUS LESS URBAN SCHOOLS

TABLE 45.--Stepwise Selection of Variables for 1988-1990 Data Without
Test Scores for Schools Serving Less Urban Population

Step	Variable Entered	Number In	Partial R**2	Model R**2	F	Prob>F
1	RET	1	0.32	0.32	182.19	0.0001
2	ABS	2	0.11	0.43	75.20	0.0001
3	TRANS	3	0.06	0.49	46.46	0.0001
4	MOTHED	4	0.03	0.52	23.49	0.0001
5	FATHED	5	0.01	0.53	8.27	0.0043
6	RACE	6	0.01	0.54	6.37	0.0120
7	SEX	7	*	0.54	4.06	0.0446
8	FATHOCC	8	*	0.55	3.62	0.0578

* values < .01

All variables left in the model are significant at the 0.1500 level.

ABS = absences
FATHOCC = father's occupation
FATHED = father's education

MOTHED = mother's education
RET = retentions
TRANS = transfers

TABLE 46.--Stepwise Selection of Variables for 1988-1990 Data Without Test Scores for Schools Serving More Urban Population

Step	Variable Entered	Number In	Partial R**2	Model R**2	F	Prob>F
1	ABS	1	0.51	0.51	191.40	0.0001
2	RET	2	0.09	0.60	43.58	0.0001
3	TRANS	3	0.04	0.64	19.12	0.0001
4	FATHED	4	0.02	0.67	13.38	0.0003
5	MOTHED	5	0.01	0.68	6.49	0.0117
6	FATHOCC	6	0.01	0.69	6.57	0.0112
7	MARITAL	7	*	0.69	2.66	0.1045
8	GPA	8	*	0.70	2.45	0.1191

* values < .01

All variables left in the model are significant at the 0.1500 level.

ABS = absences
GPA = grade point average
FATHOCC = father's occupation
FATHED = father's education

MOTHED = mother's education
RET = retentions
TRANS = transfers

TABLE 47.--Stepwise Selection of Variables for 1988-1990 Data With Test
Scores for Schools Serving Less Urban Population

Step	Variable Entered	Number In	Partial $R^{**}2$	Model $R^{**}2$	F	Prob>F
1	RET	1	0.29	0.29	97.70	0.0001
2	TRANS	2	0.09	0.38	34.31	0.0001
3	ABS	3	0.04	0.42	15.59	0.0001
4	MOTHED	4	0.03	0.44	11.60	0.0008
5	RACE	5	0.02	0.46	10.69	0.0012
6	READING	6	0.01	0.47	3.64	0.0576
7	FATHOCC	7	*	0.48	1.21	0.1387

* values < .01

All variables left in the model are significant at the 0.1500 level.

ABS = absences   RET = retentions
FATHOCC = father's occupation   TRANS = transfers
MOTHED = mother's education

TABLE 48.--Stepwise Selection of Variables for 1988-1990 Data With Test
Scores for Schools Serving More Urban Population

Step	Variable Entered	Number In	Partial R**2	Model R**2	F	Prob>F
1	ABS	1	0.56	0.56	155.46	0.0001
2	RET	2	0.09	0.65	33.10	0.0001
3	TRANS	3	0.02	0.67	7.17	0.0084
4	SEX	4	0.01	0.68	3.06	0.0826
5	MOTHED	5	0.01	0.68	2.57	0.1115
6	FATHOCC	6	0.01	0.69	3.17	0.0774
7	MARITAL	7	0.01	0.70	2.64	0.1069
8	FATHED	8	0.01	0.71	2.60	0.1094
9	MOTHED	7	*	0.70	1.39	0.2401

* values < .01

All variables left in the model are significant at the 0.1500 level.

ABS = absences	MOTHED = mother's education
FATHOCC = father's occupation	RET = retentions
FATHED = father's education	TRANS = transfers

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137

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