

Abstract

JACKL, ANDREW WAYNE. Looking Beyond Socioeconomic Status: Using Quantitative Measures of Student Misconduct to Identify “At-Risk” Schools. (Under the direction of Dr. Robert Serow).

The research project used regression analysis to study the relationship between students’ misconduct and their schools’ corresponding level of academic achievement at the middle and high school levels. This was a non-experimental, *ex post facto* study conducted using data from a large, Southeastern school district collected over three academic years, 2001 to 2004. The operational variables for this analysis were defined as: 1) socioeconomic status (SES) as measured by the schools’ free or reduced lunch percentages, 2) student misconduct (DAR) as measured by the number of suspensions per 100 students in a given school year, and 3) academic achievement (ABC-PC) as measured by the schools’ overall academic performance composites calculated via North Carolina's accountability formulas. A data transformation was conducted on the DAR variable by calculating its logarithm (logDAR) to improve the normality of the variable’s distribution. Regression analyses were run using the SAS 9.1 analytic software package to determine the nature of the relationships between: 1) SES and ABC-PC, 2) logDAR and ABC-PC, and 3) logDAR and ABC-PC while controlling for SES. It was determined that: 1) SES has a significant relationship to ABC-PC at the middle and high school levels, 2) logDAR has a significant relationship to ABC-PC at the middle and high school levels, 3) logDAR does not have a significant relationship to ABC-PC at the middle school level when SES is entered into the regression equation as a control variable, and 4) logDAR does have a significant relationship to ABC-PC at the high school level, even when SES is entered into the regression equation as a control variable. Regression

models using both SES and logDAR as independent variables had greater explanatory power than regression models using either SES or logDAR in isolation.

It was concluded that quantitative measures of student misconduct, such as the logDAR covariate, can be useful in identifying schools at the greatest risk of academic failure – particularly at the high school level.

LOOKING BEYOND SOCIOECONOMIC STATUS:
USING QUANTITATIVE MEASURES OF STUDENT MISCONDUCT
TO IDENTIFY “AT-RISK” SCHOOLS

by

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Dedication

Above all else, I must thank God. He lifted me out of the slimy pit, out of the mud and the mire; He set my feet upon a rock and gave me a firm place to stand (Psalm 40:2). Father, I have felt Your hand in this accomplishment. You have been with me every step of the way, constant, steady, and true. You have blessed me richly in so many ways. God, I lay this degree at Your feet. I pray that I will wisely use the knowledge I have gained for Your glory until my work on earth is done.

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To my parents, Larry and Marie Stocker, Wayne and Ruth Jackl, Jack and Gayle Peacock, I want to thank you for your prayers, support, and encouragement throughout this entire process. My journey is finally over, and I hope I have made you proud. Know that I will continue to love and cherish Kathy as we raise your grandchildren for the glory of God. That, without a doubt, will be my most important and memorable accomplishment.

Biography

Andrew Wayne Jackl

Andrew Wayne Jackl was born on October 6, 1967. He first enrolled in North Carolina State University (NCSU) in 1985, graduating with a Bachelor of Arts in English Education and N.C. teaching certification in 1990. After working four years in the corporate world, he sought employment with the Wake County Public School System (WCPSS) and began teaching English and Journalism at the high school level in July of 1994. Through evening and summer classes, Andrew earned a Master of Education (M.Ed.) degree from NCSU in 2000. At his principal's urging, Andrew accepted a scholarship from the N.C. Principal Fellows Program and was awarded a Master of School Administration (M.S.A.) degree from NCSU in 2002. While working as a school administrator for the WCPSS, he pursued a Doctor of Philosophy degree in Educational Research and Policy Analysis, graduating in May of 2006. Andrew continues to work in the public school system because he believes in the intrinsic rewards of teaching, the importance of our youth, and the power of education. Above all else, Andrew wishes to be remembered as a loving husband to his wife, Kathryn Peacock Jackl, and as a devoted father to their two wonderful children, Drew and Sarah Jackl.

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CHAPTER ONE

Introduction

Overview

The link between student conduct and academic achievement has been well documented in the canon of educational literature. Overall, student misconduct leads to more disorder and the erosion of the learning environment for all students; for example, a study by Barton, Coley, and Wenglinsky (1998) documented how disorderly campus environments resulted in lower student achievement gains. In essence, the research showed how an apparent lack of student discipline can undermine the schools' primary objective of providing quality academic instruction.

This is important because, as Kozol (1991) has noted, issues of safety, current educational practices, and academic achievement are well-known public concerns, and “the issue of school discipline is one of the greatest concerns facing teachers, administrators, and families” (Muscott, Menendez, James, & Jackson, 1993, p. 38). Since then, other reputable studies have supported these conclusions and argued that the situation is only getting worse. Hess summarizes:

The rate of violence and disciplinary difficulty in American schools has increased in recent decades. This necessitates additional expenditures on equipment and administrators, requires increased school district attention focused on procedural and disciplinary matters, and presents a hazard and distraction for teachers. Problems with violent crime are particularly severe in schools seeking to educate disadvantaged students... the need to cope with these disturbances, particularly the need to address crime and other disciplinary problems, affects the ability of schools to focus organizational and monetary

resources on educating students (1998, p. 9).

It should be noted, however, that not all student misbehavior is as flagrant or offensive as the violent transgressions publicized in the popular media. Educators can readily provide an extensive list of relatively minor behaviors that are detrimental to the learning climate: noncompliance, active resistance, verbal or physical disruptions, leaving the instructional area, passive-aggressive behavior, and withdrawal are but a few options (Van Acker, 2003a). Yet no matter how minor an infraction may seem, it must be understood that any inappropriate behavior diverts attention from the teacher's academic instruction. Consequently, one student's chronic misbehavior can dramatically impact the progress of his or her classmates.

The reasons students misbehave in the school environment may be as diverse as the students themselves. Neel and Cessna (1993) documented student misbehavior that was exhibited to attract the attention of classmates and teachers, to gain power or control, to mask academic incompetence, to affiliate with a particular peer group, for self-gratification and/or self expression, or to satisfy a craving for justice or revenge. For other students, acts of aggression have proven to be an effective means of gaining respect and popularity (Rodkin, Farmer, Pearl, & Van Acker, 2000). In other cases, researchers have found that student misbehavior is a healthy response to boredom in the classroom. More specifically, a student may be bored because he or she has already learned the material, the pace is too slow, the instructional delivery is poor, or the concept being taught is perceived to be irrelevant or culturally unrelated to the student's needs or interests (Oudeans, 2003). Surprisingly, many students may even be unaware that their behavior is problematic and unacceptable... students who are exposed to frequent acts of violence and aggression often begin to believe that these behaviors are socially

acceptable (Myles & Simpson, 1998).

Regardless of the reasons for students' misbehavior, there is a consensus among educational researchers that the higher standards of learning, the increased pressure for accountability, the higher academic expectations, the shortage of fully qualified teachers, paperwork demands, the larger caseloads, the increasing student diversity, and the changes in federal legislation have placed extraordinary demands on schools trying to maintain an orderly learning environment (Teaff & Kea, 2003). The remainder of this paper will explore the relationship between students' conduct and the school's overall level of academic achievement in greater detail.

Statement of the Problem

Despite the overriding importance of a safe and orderly learning environment, quantitative measures of student misconduct are rarely – if ever – used to identify “at risk” schools. Consider, for example, the policy of the district used for this study. In the 2000 – 2001 school year the district switched from a race-based student assignment policy to one intended to bolster student achievement through *economic integration* – a topic discussed in greater detail in Chapter Two of this manuscript. In essence, however, the policy states that the district will foster student achievement by “maximizing each child's opportunity for success by balancing out the number of lower achieving students in each school” (WCPSS, “Second Phase,” 2002, ¶ 10). More specifically, the district uses busing initiatives, magnet programs, reassignment plans, and other measures in an attempt to keep the percentage of students qualifying for a federally subsidized free or reduced price lunch below 40 percent at any given school (WCPSS, “Myths and Facts about Student Assignment,” 2003).

It is important to underscore the fact that the “lower achieving” or “at risk” students mentioned in the policy are identified by their socioeconomic status (SES), as determined by their participation in the free or reduced price lunch program. The district's policy goal of economic integration is not without merit; it is grounded in the scientifically validated belief that “in schools with above average poverty rates, the poverty level of the school influences the scores of all children, including those from more advantaged families... low income students in low poverty schools score better than low income students in high poverty schools” (U.S. Department of Education, 1997). Consequently, the poverty level of a school – as measured by the free / reduced lunch percentage – is the most widely used method of identifying “at risk” schools and/or individual students.

Here it must be stressed that the purpose of this paper is not to dismiss the importance of a school's overall poverty level, nor is it intended to belittle the undisputed relationship between students' SES and their academic achievement. As discussed in the successive chapter, there is a substantial body of research documenting the linear relationship between students' socioeconomic status and academic success. Broadly speaking, students from wealthier families tend to perform better academically than students from poorer families, and low-income students achieve better educational results in classrooms where the majority of students are economically advantaged (Yu and Taylor, 1997). The district's policy goal of keeping every school's free / reduced lunch population below 40 percent is based on the body of educational research asserting that once a school's population exceeds 50 percent of low SES students, academic achievement for all students, whether financially poor or not, will begin to suffer (WCPSS, “Wake County Student Reassignment Plan,” 2002).

The proverbial bottom line, however, is that a school's SES is the “red flag” that signals an “at risk” population. It is, arguably, the most cited variable in discussions of “at risk” schools, and many researchers believe SES to be of paramount importance. Yet the question remains: given the amount of research documenting the relationship between students' conduct and academic achievement, should administrators be compelled to look beyond SES and also consider the behavior of the student body when identifying an “at risk” school? If student misbehavior can be quantitatively measured, what is the predictive value of that variable, relative to SES, when predicting the population's overall level of academic achievement? Would it be possible to more accurately identify at-risk schools by considering quantitative measures of student misconduct in conjunction with the SES of a given student population? The remainder of this paper will be devoted to addressing those broad research questions.

Purpose of the Study

The purpose of this research project is: 1) to use linear regression analysis to statistically evaluate the relationship between the socioeconomic status of middle and high school students and their schools' overall level of academic achievement, 2) to use linear regression analysis to statistically evaluate the relationship between the behavior of middle and high school students and their schools' overall level of academic achievement, and 3) to use multiple regression analysis to statistically evaluate the relationship between students' behavior and their schools' overall level of academic achievement while controlling for the influence of socioeconomic status. More specifically, multiple regression equations will be used to determine the relative covariance of each dependent variable – SES and student behavior. To this end, six hypotheses have been formulated for statistical testing; these hypotheses are proffered in a later section of this chapter.

As noted earlier, the relationship between students' behavior and academic achievement has been the subject of previous research efforts. Educational researchers and practitioners agree that students' behavior can have a positive or a negative effect on the academic progress of individual students and/or individual schools. However, a comprehensive review of the educational literature pertaining to this topic suggests that it is often difficult to ascertain the statistical strength of that correlation. We agree that student misbehavior negatively affects academic achievement, but to what extent? In determining the effect of student misbehavior on academic achievement, to what extent can linear and multiple regression analysis show covariance?

Statistically, this research question presents a challenge due to the inherent difficulty involved in defining some of the operational variables. As noted earlier, socioeconomic status is typically measured by the percentage of students receiving a free or reduced lunch price through a federal subsidy. This widely used and widely accepted measure of a school's poverty level will also be used in this analysis. But how does one quantitatively measure student misconduct throughout a given school year? How does one quantitatively measure a school's overall level of academic success? In order to achieve our primary objective, all three operational variables will be carefully defined in a following section.

Data Collection

This will be an *ex post facto* study using data collected from the Wake County Public School System (WCPSS), the WCPSS Office of Student Due Process, and the North Carolina Department of Public Instruction (NCDPI) over a three-year period. Contextually, it should be noted that the WCPSS is the second largest school district in North Carolina. At the time of this writing, the district employs 12,977 full-time staff

members to serve over 108,000 students in 80 elementary schools, 27 middle schools, 16 high schools, and six special / alternative schools (WCPSS, WCPSS Overview, 2005). In terms of student discipline, administrators within the district issue approximately 17,000 short-term suspensions of ten days or less, 350 long-term suspensions of eleven days or more, and six expulsions from the district during a typical school year (V. Curtis, personal communication, March 11, 2003). Chronologically, the scope of this study will encompass data gathered during the 2001-2002, 2002-2003, and the 2003-2004 academic school years.

At this point it must be emphasized that this is a longitudinal study using data collected over a three year period. To that end, only schools that were fully operational in the 2001 – 2002, 2002 – 2003, and the 2003- 2004 academic school years were included in the analysis. That left 24 middle and 15 high schools; three middle schools and one high school within the district were recently constructed, so the data from those schools was not included in this research project. Furthermore, the focus of this analysis was directed at the regular public schools within the system. Consequently, data collected from the district's six special / alternative schools were discarded because the data were inconsistent with the regular public schools. For these analyses, the six special / alternative schools were found to be statistical outliers.

Data was collected over a three year time period in order to 1) allow the use of parametric statistics, 2) to increase the statistical significance of the study, and 3) reduce the likelihood of a *Type I* error. Since there are 24 viable middle schools in the district, and since the data was collected and analyzed over a three-year period, $n = 72$ in those analyses. The same formula applies to the high schools. Since there are 15 viable high schools in the district, and since the data was collected and analyzed over a three-year

period, $n = 45$ in those phases of the analysis.

Definition of Operational Variables

Care must be taken to accurately measure variables within the social sciences. In that vein, the following operational variables were selected for this study after a great deal of consideration. Within any given school year, they are intended to measure: 1) a school's overall level of student misbehavior, 2) the school's overall level of academic achievement, and 3) the school's overall level of socioeconomic status. In the interest of scientific validity, it was important that these variables measure their objectives as consistently and as objectively as possible over a three-year time frame. Consequently, the operational variables for this study were defined as follows:

Student misconduct. For the purpose of this study, an independent variable called the Disciplinary Action Ratio (DAR) will be calculated for each school. This variable will be used to represent the level of student misconduct within any given school during any given year. More specifically, the DAR will be based on the number of times a student was suspended from the school for inappropriate conduct.

To control for the natural variation in school sizes, the DAR will be defined as the number of suspensions per 100 students. Again, this step was taken in order to control for the fluctuating numbers of students across the district's schools. Consider, as a fictional example, that Alpha High School has a population of 1,500 students and its administrators suspended a student from school on 250 different occasions during the 2001-2002 school year. The DAR for that school during the 2001-2002 school year would be 16.67 $[250 / (1,500 / 100)]$. Similarly, fictional Beta High School has a population of 2,000 students and its administrators suspended a student from school on 275 different occasions during the 2001-2002 school year. In this case, the DAR would

be 13.75 $[275 / (2,000 / 100)]$. A lower DAR, therefore, would be indicative of better student behavior. Conversely, a higher DAR suggests a greater incidence of problematic misbehaviors – which would warrant the higher relative suspension rate.

Socioeconomic Status. The second independent variable in the study will be SES. As noted earlier, a school's socioeconomic status is typically measured by the percentage of students receiving a free or reduced lunch price through a federal subsidy. This widely used and widely accepted measure of a school's poverty level will also be used in this analysis.

Academic Achievement. The dependent variable in this study will be the school's overall level of academic achievement as determined by its ABC Performance Composite (ABC-PC), calculated annually by the N.C. Department of Public Instruction (NCDPI). This performance composite score results from a package of state legislation passed in 1995 called the ABCs of Public Education in North Carolina. This initiative was first implemented in the 1996-1997 school year for elementary and middle schools, and subsequently in 1997-1998 by the high schools. In the ABCs model, the standardized test scores from students at individual schools are plugged into formulas used to gauge the schools' overall level of academic growth and achievement. Described as a “comprehensive plan to organize public schools in North Carolina around three goals of strong accountability, an emphasis on the basics and high educational standards, and on providing schools and school districts with as much local control as possible,” (NCDPI, “The ABCs Accountability Model,” 2003, ¶ 1) the statistical analysis of standardized test scores calculated via the ABCs formula has become the most widely-used method of measuring schools' effectiveness in North Carolina.

To better understand the performance composite, the NCDPI explains that it is determined by computing the percentage of students who score at or above grade level on standardized End of Grade (EOG) tests in reading and mathematics, a computer skills test at grade eight, the North Carolina Alternate Assessment Portfolio, the North Carolina Alternate Assessment Academic Inventory (NCAAAI), and all End of Course (EOC) tests administered at the school. The EOC test scores include all state tested subjects: *Algebra I, Biology, Economic, Legal, and Political Systems (ELPS), English I, U.S. History, Algebra II, Geometry, Chemistry, Physics, and Physical Sciences*. The standardized test scores determined to be at or above grade level are summed, and this sum is divided by the total number of valid scores on each of the tests. The final cumulative result of the ABCs formula is believed to be indicative of the school's overall teaching success rate.

Method

The collected data will be disaggregated to examine the relationship between the DARs and the middle schools' and the high schools' overall level of academic achievement. First, linear regression analysis will be used to examine the bivariate relationship between the schools' SES and the middle and high schools' level of academic achievement in isolation, without allowing for the DAR. Secondly, linear regression analysis will be used to examine the bivariate relationship between DAR and academic achievement without controlling for the schools' SES. A subsequent analysis will use multiple regression equations to determine the joint effects of the independent variables on the dependent variable. The results of the analysis will be structured to address the six directional hypotheses outlined below.

Statement of Hypotheses

This study will follow the fundamental principles of the scientific method, which consists of 1) formulating hypotheses, 2) deducing the observable consequences of the hypotheses, and 3) testing the hypotheses empirically by collecting and analyzing the data. To that end, the following six formal hypotheses will be the focus of subsequent analysis, with a p value of less than or equal to 0.05 being considered statistically significant:

(H₁) There will be a significant relationship between the middle schools' socioeconomic status (SES) and the schools' overall level of academic achievement as measured by the ABC performance composites (ABC-PC) during the 2001 – 2004 school years.

(H₂) There will be a significant relationship between the high schools' socioeconomic status (SES) and the schools' overall level of academic achievement as measured by the ABC performance composites (ABC-PC) during the 2001 – 2004 school years.

(H₃) There will be a significant relationship between the middle schools' Disciplinary Action Ratios (DAR) and the schools' overall level of academic achievement as measured by the ABC performance composites (ABC-PC) during the 2001 – 2004 school years.

(H₄) There will be a significant relationship between the high schools' Disciplinary Action Ratios (DAR) and the schools' overall level of academic achievement as measured by the ABC performance composites (ABC-PC) during the 2001 – 2004 school years.

(H₅) The DAR, when used in conjunction with SES, will explain more variation in the middle schools' ABC performance composites (ABC-PC) than either does alone during the 2001 – 2004 school years.

(H₆) The DAR, when used in conjunction with SES, will explain more variation in the high schools' ABC performance composites (ABC-PC) than either does alone during the 2001 – 2004 school years.

Limitations of the Study

This study was conducted using data from one – albeit large – school district in North Carolina. While this author believes that similar studies in other areas would likely yield similar results, the specific relationships between the variables would be expected to vary slightly. Furthermore, limiting this analysis to one Southeastern district brings the inherent limitation of a relatively small sample size – with the “n” value varying from 45 to 117. The author must acknowledge that the small size of the sample population does, to an extent, weaken the ability of this study to be generalized to larger groups of schools, such as those on a statewide or nationwide scales. This restriction, however, should not necessarily cast the findings of this project into question. Even if this study were replicated on a national level, individual districts – such as the one being studied – would undoubtedly request disaggregated data so they may consider the results of their own districts on an independent basis.

On a broader front, there are many factors affecting the primary focus of this study – student behavior – in diverse and sundry ways. As the literature review in the following chapter shows, elements such as socioeconomic status, race, gender, teacher preparation and training, schoolwide discipline plans, etc., can have a pronounced effect on behavioral outcomes. Any researcher interested in improving academic achievement

by modifying students' behavior would be wise to consider this entire body of research. Taken as a whole, the canon of literature carries profound implications for both policy and practice. But while this author can acknowledge and respect the vast multitude of behavioral influences such as socioeconomic status acting within our nation's schools, controlling for all these variables – even the ones that are possible to measure – is beyond the scope of this exercise.

As detailed earlier, the purpose of this analysis is simply to examine the relationship between 1) students' socioeconomic status and their school's level of academic achievement, 2) students' behavior and their schools' subsequent level of academic success, and 3) the relative influence of students' behavior on academic achievement while controlling for SES. This exercise will be conducted using data collected from a single Southeastern school district over a three year period. This paper culminates in a quantitative regression analysis; it is not a study intended to address the myriad of reasons students misbehave in the educational setting, nor does it pretend to afford solutions or remedies for wholesale redirection. It is possible, however, to draw important inferences from the results of this study. These inferences are discussed in detail in Chapter Five.

Summary

Chapter One introduced the reader to this study by providing fundamental background information about the relationship between students' behavior and their academic achievement. The importance of this topic was underscored, as recent trends show that it is becoming increasingly difficult to establish and maintain an orderly campus environment – particularly in schools seeking to educate disadvantaged students. The reader was then informed about the purpose of this research project. This was

followed by contextual information about the district being studied, the data that was collected, and the methodology chosen for this analysis. Afterwards, the operational variables were defined and the hypotheses were stated. Finally, the limitations inherent in the study were acknowledged by the author.

Chapter Two will review prior educational research that has focused on student disciplinary issues. These topics, such as socioeconomic status, race, etc., have been previously linked to student conduct and behavior. Chapter Three will describe the design of the study in greater detail, elaborating on the research methodology and analytic techniques that were used to test the hypotheses first established in Chapter One. Chapter Four will present the results of the regression analyses, with the statistical findings structured around the six hypotheses. Chapter Five will discuss the results of this analysis, the conclusions that can be drawn, and the practical implications and recommendations for district policy. Finally, the author will offer suggestions for future research based on the inferences drawn from this exercise.

CHAPTER TWO

Literature Review

Student Discipline Issues

Introduction

The body of educational research reflects a strong and significant correlation between academic problems and behavioral problems (Van Acker, 2002). Associations between school violence measures and student achievement show that when the incidence of negative behavior increases, there is a corresponding negative effect on academic achievement – even when efforts are made to control for students' background characteristics (Coleman, 1998). Indeed, these two factors are so closely linked that improving in either of these two areas will almost certainly result in an improvement in the other.

As noted in the previous chapter, the purpose of this paper is to reaffirm the relationship between students' behavior and their schools' overall level of academic achievement, using linear regression analysis to examine data collected from a large, Southeastern school district over a three year period. However, no study of this type would be complete without a review of the existing literature relevant to this topic. A comprehensive review of the research pertaining to student discipline issues revealed that much has been written about 1) socioeconomic status, 2) sociological challenges, 3) racial factors, 4) teachers and student discipline issues, 5) school administrators and student suspensions, 6) school-wide discipline plans, 7) zero tolerance policies, and 8) special education legislation. The remainder of this chapter will provide an overview and analysis of those key topics, as well as some summary comments at the end of this section.

Socioeconomic Status

Unfortunately, the United States has one of the highest child-poverty rates among Western nations (Renchler, 1993). Although the child-poverty level naturally varies by area, recent estimates are that between 16 and 20 percent of children live in poverty (Synder and Freeman, 2003). Consequently, there have been countless studies documenting the relationship between a student's socioeconomic status (SES) and his or her academic achievement (i.e., Walker, Petrill, & Plomin, 2005; Howley & Bickel, 2002; Chapell & Overton, 2002; Coley, 2002; Mulvenon, Ganley, & Fritts-Scott, 2001; Marcon, 1999; Sojourner & Kushner, 1997).

The majority of the research concludes that there is a strong positive correlation between a student's SES and academic achievement in school (Shakiba-Nejad & Yellin, 1981). On the other hand, some meta-analyses examining hundreds of research studies have suggested that the relationship between SES and academic achievement may be much weaker than many people have assumed (White, 1979; White, 1982). The point, however, is that there is an agreement within the educational community that SES does have a significant effect on academic achievement; the only debate pertains to exactly how strong that correlation may be. As Hess has summarized, "thirty years of evidence suggests that SES and familial context are the most important factors for academic success" (1998, p. 2).

In that vein, the body of educational research documents a correlation between socioeconomic status and parenting styles. An underlying principle in this genre of research is that academically achieving students have parents who are warm, monitor time use, and set clear standards for academic behavior; the adolescents who are not

achieving academically are more likely to have either harsh or overly permissive parents (Clark, 1983). Additionally, restrictive or harsh parenting practices are more likely to lead to a rejection of adult standards for behavior and academic performance, even after controlling for family income, race, family structure, parental education, and maternal unemployment (Shumow, Vandell, & Posner, 1998). Not surprisingly, there is evidence to indicate that, generally speaking, low-income parents are harsher than middle income parents in their child-rearing (Kelly, Power, & Wimbush, 1992).

With this consensus among professional educators, it is only logical that the advocates of educational equity consistently focus on the environmental disadvantages related to low SES (Gutman, 1987). Some have suggested that school reform initiatives focus on spending because this is one of the few variables affecting student performance that can be accurately measured and easily controlled (Hess, 1998). The relationship between a district's spending and its level of academic performance has been hotly debated since the landmark Coleman Report of 1966, which concluded that school resources had small and uncertain effects on student achievement – and that measurable resources had only a minimal impact on educational quality. While this conclusion has been supported by many contemporary authors (i.e., Betts, 1995; Hanushek, 1997; Clark, 1998), other analysts argue that money does improve student performance and have presented evidence that inputs do have a significant effect on outcomes in some circumstances (Hedges, 1994).

This debate is germane to our purposes because, within schools, students vary considerably in their perceptions and experiences regarding school discipline. This variation in attitude is highly correlated to students' SES; furthermore, there is a significant contextual effect of a school's mean SES on its disciplinary climate, even

larger than the individual effect of a student's SES (Ma & Willms, 2004). A noteworthy study by Brophy & Evertson (1975) noted that high SES schools tended to feature eager and competitive students led by teachers who focused on the curriculum. In contrast, low SES schools featured students who were fearful, anxious, and generally alienated from the student role. And few would be surprised by the conclusions of Cooper (1984), who found that lower levels of SES in the public schools are associated with more frequent reportings of disruptive or violent student behavior. These findings are consistent with a study by Pettit (1996) who found that children from low SES families are more aggressive and less academically skilled than their middle or high SES counterparts.

This raises the interesting and controversial question of *school mix* – or, in other words, the social class composition of a school's students. As Thrupp has written, “although the view that schools can make a difference irrespective of school mix finds much support in the literature, research in this area has been so colored by political, ideological, and methodological issues that it is hard to establish what influence, if any, school mix might have” (1997, p. 4). Nevertheless, “many people define a good school not as one with fancy facilities or highly paid teachers but as one with the 'right' kinds of students, a view in which the quality of a school depends on its exclusiveness” (Jencks et al., 1972, p. 29). But those seeking the “right” kind of school with the “right” kind of students will inevitably find that the academic achievement gap between high and low SES students is closely correlated with the *behavior gap* reflected in attendance and suspension rates (Alspaugh, 1996).

At the heart of the school mix debate lies the fact that students from wealthier families tend to perform better academically than students from poorer families, and low income students achieve better educational results in classrooms where the majority of

the students are economically advantaged (Yu & Taylor, 1997). In schools with above average poverty rates, the poverty level of the school influences the academic achievement of all children, including those from more advantaged families; furthermore, low income students in low poverty schools score better than low income students in high poverty schools (U.S. Department of Education, 1996). These findings have spawned substantial efforts by many districts to integrate our public schools on an economic – rather than a racial – level.

Richard Kahlenberg, one of the leading experts on economic integration, believes that academic achievement and student behavior can be improved by increasing the economic diversity of the public schools. Kahlenberg bases his argument on the “hidden curriculum,” or the lessons that children teach each other. An advocate of the “common school” first advocated by Horace Mann, Kahlenberg writes that “every child in the United States – whether rich or poor, black or white, Latino or Asian – should have access to a good education that is best guaranteed by the presence of a majority middle-class student body” (2001, p. 1). This is important, he explains, because of the detrimental culture that tends to develop in high-poverty schools; those students are more likely to skip class, have behavior problems, have lower aspirations and academic achievement, and in many cases even view academic success as an embarrassment (2001). Kahlenberg believes that economic integration is crucial because “the best guarantee that a school will have what various individual reforms seeks to achieve – high standards, qualified teachers, less crowded classes, and so on – is the presence of the critical mass of middle-class families who will ensure that these things will happen” (2001, p. 4).

The concept of “critical mass” is an important one. In a school where the numbers of non-compliant students are relatively small, it is fairly easy for teachers, administrators, and other school personnel to concentrate their energies and resources on those students. But as the percentage of at-risk students increases, school personnel may find themselves overwhelmed. As Thrupp explains:

... in a predominantly middle class school, the struggles of working class families are marginalized and may have relatively little effect on student culture or instructional organizational policies and practices. As a middle class school gains more working class students, however, it can be predicted that the school will shift, despite resistance from middle class teachers and students, towards the culture of the increasingly dominant working class group. Once a school becomes predominantly working class, its ability to reproduce the middle class culture may no longer be taken for granted, particularly once it can no longer attract “academic” teachers or teach an “academic” curriculum” (1997, p. 25)

To reiterate, a school and its personnel must consistently focus on teaching academics, or an academic curriculum if it is to achieve success. Once the focus shifts to teaching socially acceptable behaviors and /or controlling unruly behaviors, the academic achievement of the student population must necessarily suffer.

Because use of their “cultural capital,” middle class students will not suffer from being educated in a working class school to the same extent that working class students will gain by being educated in a middle class setting (Lauder & Hughes, 1990). It must be noted, however, that studies have implied that economic integration policies intended to benefit low SES students will – to some extent – involve some cost to the middle class.

An analysis by Makedon (1992) demonstrated how schools that were considered “effective” in closing the achievement gap simultaneously lowered the average academic achievement of mid-SES students. The question of school mix is, therefore, “at heart a political and moral issue of power sharing, rather than simply a 'win-win' solution to inequality” (Thrupp, 1997, p. 24).

Sociological Challenges

Most educators would readily agree that maintaining discipline in the classroom is more difficult today than in previous decades. Widespread changes in family structures, demographic shifts in school-aged populations, and increased poverty levels have resulted in larger proportions of students with emotional and educational problems (Griffith, 1999; Snyder & Freeman, 1993). Researchers have argued that these “problems of misbehavior and violence are societal in nature, thus schools can only attempt to ameliorate some of the symptoms... as a result, teachers and administrators spend increasing amounts of time and energy addressing these problems” (Hess, 1998, p. 10). Moriarty, in a more recent manuscript, concurs: “Young people are too often parented in a context of situational ethics... any inappropriate behavior can be persuasively rationalized by the right apologist who will argue for the lack of individual culpability and personal responsibility for even the most heinous of crimes” (2003, pp. 19-20).

In an effort to understand, explain, and overcome this phenomenon, educational researchers have published extensively in recent years – and the focus of their research has often been aimed at the societal changes impacting the overall demographic profile of our schools. Hazelkorn, for example, has noted that modern public schools are now “serving students who have special education needs; have limited English proficiency;

are hungry, abused, unsupervised, suicidal, pregnant, violent, at risk, or bisexual; or are on drugs” (2003, p. 6). There is no doubt that, when considering these factors, the demographic profile of a “typical” American school is vastly different from the standard profile of even a decade ago.

The bottom line is that “the student population is becoming increasingly more culturally, linguistically, and economically diverse” (Muscott, Menendez, James, & Jackson, 1993, p. 39). Many schools across the nation are struggling to address the social as well the educational needs of an increasing number of students with diverse language and cultural backgrounds. The public now expects the schools to welcome students from all walks of life, as well as to provide whatever accommodations and services necessary to ensure their success. Consequently, “the medical and mental health needs of some students and their families place increasing demands on local schools and communities” (Barnes, Flint, & Travnakar, 2003, p. 44).

It has been noted that contemporary school personnel are expected to not only promote academic excellence among students, but also undertake the challenging task of improving students' social and behavioral functioning (Little, 2003). Schools of today are expected to do more than ever to resolve our children's societal problems, i.e., providing clothing, three meals a day, after school supervision, etc. (Johns, 2003). Yet matters are further complicated by the fact that the negative behavior of some students is becoming more severe and the children's needs increasingly complex... some parents are unable to cope with the demands of parenting, and they find themselves unable to manage the behavior of their children without extensive support from the schools (Muscott, Menendez, James, & Jackson, 1993). Coping with these collateral societal issues can overwhelm school personnel, consume their limited resources, and impair their

ability to focus on teaching a quality academic curriculum.

Regardless of the long-term consequences, today's generation of teachers are charged with addressing chronic social issues... issues that distract them from their fundamental goal of providing quality academic instruction. Education experts, such as Fredrick Hess, have warned that "those who view the schools as providing an all-purpose social remedy often overlook the possibility that schools might be overwhelmed if they are asked to remedy social ills that have deep and varied causes" (1998, p. 2).

Nevertheless, the public's belief that schools have the power and the responsibility to correct society's problems remains unshakable – even if the problems in question have been brought about by the collapse of the traditional social values that have sustained the system in the past. As Moriarty writes, today's generation of educators "argue in defense of discipline policies and procedures to reflect the deteriorating culture we have such concerns about" (2003, p. 26).

In fact, "many would argue that the shift in perception of the school from that of an *academic* institution to that of a *social* institution has left educators with the arduous task of trying to be all things to all people" (Moriarty, 2003, p. 25, emphasis added). The danger lies in the fact that "educators may teach less effectively when they are asked to assume a variety of other demanding roles" (Hess, 1998, p. 2). Here again, students' social problems that manifest themselves in the educational setting must be addressed on a daily basis by the teachers and administrators. These issues must, necessarily, consume the educators' finite time and resources. Consequently, the teachers spend less time providing academic instruction, and the students spend less time working on task. Hazelkorn writes that "many believe that schools are spending too much time keeping basic order in the classroom, which undermines the real business of schooling – namely,

for teachers to teach and students to learn” (2003, p. 13).

In conclusion, the sociological aspects affecting student behavior in the public schools are best summarized by Moriarty who writes:

The challenge of managing the behavior of young people is increasingly difficult. We have witnessed a shift in many aspects of education that have exacerbated this challenge. Changes in our culture, the litigious nature of society, and the emphasis on student rights over responsibilities has made the job of school personnel a challenge of a proportion not previously seen in our schools. (2003, p. 19)

The remaining sections will examine the published research pertaining to other aspects of student discipline and behavior management.

Racial Factors

Since the United States Supreme Court ordered the desegregation of schools in its landmark *Brown v. Board of Education* ruling on May 17, 1954, significant efforts have been made to integrate the nation’s schools. Many would claim that providing African-American children with an equal educational opportunity is currently a pillar of U.S. educational policy, while others would claim that school desegregation efforts have been unsuccessful and *de facto* segregation still exists (Hess, 1998). Some researchers have taken this claim a step further by asserting that “an invisible system of unearned privilege and power operates to maintain institutional racism and to assure that its cultural workers (educational professionals and systems) carry out this function” (Johnson, Boyden, & Pittz, 2001). Indeed, the finding that teachers treat children of a different race or ethnicity in ways that may have deleterious consequences for subgroups of children has been a recurrent theme in classroom research (Melnick & Raudenbush, 1986).

Few would argue that racial integration efforts have been universally welcomed by the white middle and upper classes. Ironically, forced integration may have only exacerbated the problem in diverse ways, and researchers have documented how forced busing destroyed neighborhood schools, weakened parental and community involvement, and undercut the informal norms that maintain a school's sense of rootedness and its links to the local community (Philipsen, 1994). Most studies acknowledge that desegregation efforts created a powerful backlash among whites... many white parents responded by moving to suburban areas, withdrawing their children from the public schools, and by opposing tax increases to fund schools with large minority enrollments (Rubin, 1972). Buchanan (1971) argued that forced integration was tantamount to white children being “taken hostage,” as mixing minority and non-minority children into the same schools is one way that district administrators can force parents to support expensive improvements in schools attended by black children.

Why have efforts to integrate the public schools met with such resistance and created such controversy? The answer to this question lies in the way minority and non-minority children are perceived by the dominant social class. A report by Johnson, Boyden, and Pittz (2001) eloquently summarizes the underlying problem of racism within the educational system:

... students of color are blamed for the failures of the educational system, white students are viewed as normal, high academic achievers by some natural ordering process substantiated by tests and other psychological profiles of behavior, attitude, and potential. White privilege in the context of education is exemplified in a variety of ways. White children are liberally represented in teaching materials, they have teachers with similar

cultural experiences, neutral or positive assumptions are made about them, judgements are reserved about their economic class, they are tested on tests that are norm-referenced for their own group, and they are rarely considered the problems of the school. (p. 6)

Given this mindset, it is not hard to deduce why many non-minority parents are reluctant to send their children to schools with large minority populations. Nevertheless, educational statistics consistently show an “achievement gap” and a “behavior gap” between minority and non-minority students.

The discouraging news is that the academic achievement gap between minority and non-minority subgroups is significant and substantial, especially between African-American students and their white counterparts (Johnson, Boyden, & Pittz, 2001). It is commonly acknowledged that white and Asian students come to school with more resources identified with higher academic success than African-American or Hispanic students (Flaxman, 2003). Yet in a comprehensive study commissioned by the North Carolina Education Research Council, Thompson and Quinn noted that “though the broad historical, legal, socioeconomic, and educational causes of the black-white gap are certainly clear, the specific mechanisms that recreate and maintain it from one generation to the next are incompletely understood” (1991, p. 5).

Thompson and Quinn's extensive summary of relevant research, however, resulted in several recommendations that may help to reduce the academic achievement gap, including early childhood education for at-risk students, ensuring that minority children are taught by certified, experienced teachers, reducing class size in the early grades, ensuring that African-American students are equitably represented across the more challenging curriculum tracks, supporting students with individual tutoring,

implementing accountability measures for both students and schools, and adjusting discipline practices to suit students' backgrounds.

Their final recommendation regarding discipline practices is most relevant to this research project; the academic achievement gap between African-American students and white and Asian students has been widely discussed in the media, yet the discipline gap between these subgroups has received far less attention (Gregory & Mosely, 2004). This oversight is surprising, considering that behavioral risk factors are indeed related to significant outcomes of schooling (Finn, 1993). However, a few noteworthy studies on the behavior gap have been conducted in the past. Hale, for example, concluded that the emphasis African-Americans place on emotional expression, their orientation towards people rather than objects, their reliance on interpersonal relationships, their proficiency in nonverbal communication, and their encouragement of expressiveness, spontaneity, and assertiveness contrast with behavior typical of whites and does not typify conduct expected in educational settings (1980).

Other studies relevant to the behavior gap have focused on how a student's culture can impact behavior. Since there are cultural differences in what is expected in various situations, social interactions that involve people from diverse cultures can increase the probability of misinterpretation of behaviors and intentions (Van Acker, 2003a). As Tauber has noted, different expectations can lead to different treatments (1998). For example, a classic study by Kochman (1981) documented how whites typically maintain eye contact when listening and frequently break eye contact when speaking. He found the pattern to be exactly opposite for African-Americans – which led white teachers to misinterpret African-American students' mannerisms as unconcerned, disrespectful, or even aggressive during social interactions. Yet ironically, other studies have found that

there were only relatively minor differences in core value systems within each racial subculture (Gorsuch, 1971). This supports the assumption that neither race nor social class, but culture, is most likely to affect minority students' behavior in schools, as well as the teachers' response to minority children (Hale, 1980).

The most thorough, comprehensive, and impressive research on the topic of African-American culture was conducted by J.U. Ogbu. In a study of academic disengagement published in 2003, Ogbu summarized that African-American students do not perceive schooling to be a preparation for the future job market, do not know enough about the educational requirements of future jobs, tend to select entertainers and athletes as their role models, feel disparaged and misrepresented in their community, hold teachers accountable for their academic performance, feel that academic success means rejecting their collective identity, and generally blame racism for the academic achievement gap. Ogbu extended his research to include African-American parents, noting that they typically believe it is the role of the school to make children learn. Furthermore, Ogbu argues that African-American parents do not often understand the significance of educational placements and are therefore unlikely to argue when the school automatically places their children in lower level classes.

With all this being said, race – like socioeconomic status – is a factor that cannot be ignored in any discussion of student discipline and academic achievement. Further research into relevant topics such as integration, parenting, cultural differences, etc., should obviously be continued until the academic and behavior gaps are closed between all subgroups. In the interim, teachers and other educational professionals should work to expand their knowledge of student discipline practices in order to increase the academic achievement of all students.

Teachers and Student Discipline

Within the sociological context, the educational community has called out for administrators, teachers, and support staff who have the knowledge, skills, and experience to work effectively with students with challenging behaviors (Sugai & Horner, 1994). As Oudeans has observed, “teaching school personnel proactive strategies and methods that prevent challenging behavior and defuse potentially explosive behavior is essential” (2003, p. 21). This is undoubtedly true because the successful completion of academic work is functionally related to classroom behaviors (Reid & Nelson, 2002). In layman's terms, a teacher who is able to elicit appropriate behaviors from his or her students is likely to elicit significant academic progress as well.

Accordingly, teaching is an interactive endeavor; it requires making connections with students... if the students' attitudes and skills vary substantially, so must the content of style of teachers' work with them (Metz, 1990). For example, one key to making the necessary connections is the element of mutual respect. A teacher who demonstrates respect for students is likely to gain much more cooperation and good will from students than a teacher who does not. Students have asserted that if they don't feel respected by their teacher, then they will not apply themselves in the classroom or make strong efforts to behave (Ellis, Hart, & Small-McGinely, 1998). Yet in order to connect culturally with students and their families, educators must gain knowledge and understanding of the cultures, values, beliefs, and differences among their demographic population. Furthermore, they must work to improve communication with their students' families and remain culturally sensitive when developing interventions to improve a student's behavior and academic achievement (Kea, 2002).

Other researchers, such as Sutherland, Wehby, & Yoder (2002), also advocate the use of effective teaching strategies not only to ameliorate academic difficulties, but also to decrease levels of disruptive behavior in their classrooms. After researching the complex relationship between students' behavior, teaching practices, and academic achievement, Johns (2003) concludes:

Teachers set that stage by espousing the belief that if students are academically engaged and meeting with high rates of success, there will be a significant reduction in challenging behaviors. Although an enormous amount has been written about classroom management, there is a dearth of information on meeting students' academic needs as a proven strategy to reduce behavior problems... the more academically successful the child is, the fewer impeding emotional or behavioral problems he or she has. (p. 50)

Yet despite the overriding importance of maintaining order in our classrooms and schools, many studies have concluded that too few teachers have the ability to respond to serious behavioral problems, and, in many instances, address behavioral issues in ways that only make the situation worse (i.e., Heflin & Bullock, 1999; Long, 1994). A comprehensive study by Muscott, Menendez, James, and Jackson (1993) concluded that many teachers lack the skills required to deescalate behaviors; furthermore, teachers often exacerbated the problem, and, on occasion, actually triggered the acts of aggression exhibited by their students. Therefore, any attempt to address a student's behavior should include an examination of other variables such as teacher behavior or the nature of the instructional task... attempts to change student behavior without efforts to alter the social

context in ways that will support the desired behavior change are likely doomed to failure (Tolan & Guerra, 1994).

When viewed as a whole, the literature strongly suggests that most general education teachers do not possess the knowledge, expertise, and experience to use intervention techniques known to be effective with students with behavior problems (Shapiro, Miller, Sawka, Gardill, & Handler, 1999). This problem begins to manifest itself at the earliest stages of a teacher's training, as many teacher preparation programs devote little time to conquering problem student behavior and developing appropriate classroom management skills (Reschke & Hegland, 1999). Beginning teachers are often surprised to learn that many of their students are involved with other agencies such as mental health agencies, child and family services agencies, probation and/or parole departments, law enforcement agencies, vocational rehabilitation facilities, and drug and alcohol treatment centers (Johns, 2003). Consequently, many school personnel begin their careers unprepared to deal with serious student discipline issues (Romi & Freund, 1999).

Yet “while schools report that training and support are being offered, even some *experienced* teachers and other school personnel acknowledge that they remain inadequately trained to work with students who exhibit challenging behaviors” (Oudeans, 2003, p.20, emphasis added). In other words, a teacher's level of experience – in and of itself – does not guarantee that all discipline issues are going to be handled in an appropriate and professional manner. This concept was graphically illustrated in a landmark study by Gunter, Denny, Jack, Shores, and Nelson (1993) in which they exposed a phenomenon termed the *curriculum of noninstruction*. In this manuscript it was noted that many teachers, over time, learn to avoid making demands of students who

are likely to display disruptive behaviors. In an unspoken – and often unconscious agreement – the teacher refrains from “bothering” the student as long as he or she does not disrupt the class.

With all this being said, it must be noted that most veteran teachers do develop the behavior management skills necessary to teach effectively if they do not leave the profession in the early stages of their careers. However, the most serious disciplinary infractions committed by students – offenses that could warrant a suspension from school under the local board policy – are generally handled by building level administrators. These administrators typically have more training in behavior management strategies than classroom teachers, as well as the power and authority to issue the more severe consequences.

Administrators and Student Suspensions

Consequently, too little administrator time is devoted to monitoring and improving instruction; administrators spend too much time handling disciplinary incidents instead of providing teachers with the feedback needed to improve their interactions with students (Van Acker, 2003b). It goes without saying that all school personnel have long relied on punitive consequences to deal with undesired behavior, hoping that the punishment will discourage the future occurrence of the target behaviors (Van Acker, 2003b). Yet it must be underscored that administrators, operating from a position of greater power and authority, typically issue harsher consequences for students' misbehavior than the teachers themselves. Traditionally, school administrators have issued student *suspensions* as a consequence for serious infractions. In other words, students who fail to abide by the district's rules and regulations are not allowed to attend the school for a period of time relative to the student's offense.

One could argue that this traditional consequence sends a message “to the student and the community that the student is in need of punishment rather than in need of help” (Moriarty, 2003, p. 19). In fact, punishment was the sole consequence for over 90 percent of the infractions observed in one study of school disciplinary practices (Colvin, Sugai, & Kame'enui, 1992). A study by Skiba and Peterson (1999) examined this issue and concluded that “there is little evidence to support the fact that suspension and expulsion are effective in changing student behavior, yet their use has increased in schools across the nation” (p. 30). Other researchers have found that student suspensions can actually make things worse; the use of punishment often makes problem students feel increasingly alienated from the school's culture, which only serves to exacerbate their disruptive behavior (Gable, Quinn, Rutherford, Howell, & Hoffman, 1998). Long term, longitudinal studies have warned that “the independent and additive effects of these consequences increase the risk of problem behaviors (psychological disturbance, illegal activities, unemployment and underemployment) in adulthood” (Clark, Dogan, & Akbar, 2003, p. 211). Overall, studies trumpeting the positive effects of student suspensions are absent from the educational literature. Yet despite these shortcomings, student suspensions remain the punishment of choice for most school administrators.

The reasons for this phenomenon are the subject of debate. Here it should be noted that administrators must issue disciplinary consequences that fall within the parameters of school board policy. Administrators of today are typically limited to some type of exclusionary option, i.e., suspension or detention, as a punishment. The days of spanking a student in the principal's office and sending him back to class are over; this researcher was unable to find a public school district that still endorses corporal punishment. Similarly, many other traditional punishments, such as having the offending

student wash dishes in the school's cafeteria, are now considered “cruel and unusual” and are not allowed under school board policy. Paradoxically, the same school boards are likely to address discipline problems by adopting so-called “get tough” policies... policies that have produced an inclination to address student disruption through – possibly excessive – exclusion from the classroom and the school (Van Acker, 2003b). And in the final analysis, those students at the greatest risk for academic failure are frequently pushed away from the educational settings that are perhaps best equipped to meet their needs.

There is, however, another important factor that cannot be overlooked: there is a consensus among educational researchers that administrators are being asked to increase standards for academic achievement and accountability through the prolific use of high-stakes standardized testing (Muscott, Menendez, James, & Jackson, 1993). Destefano, Shriner, and Lloyd (2001) noted that the use of standardized testing has increased dramatically over the past ten years, and students are required to pass more intense district and state testing. With the added pressure and stress that comes with strict accountability, school administrators are working to increase students' level of academic achievement by establishing and maintaining an orderly learning environment. This assumption is not unfounded; studies have shown that schools with less strict discipline policies experienced higher levels of serious offenses (Barton, et al., 1998). Consequently, many school administrators feel the need to enforce harsh discipline policies to maintain order on their campuses. Taking a hard line on student discipline should, by extension, create a more orderly campus and increase students' academic achievement. It is not surprising, then, that nine out of ten principals believe that tough discipline policies, written as school-wide discipline plans, are essential for their school's

success – even if these strict policies result in an increase in student suspensions (Holloway, 2002).

School-wide Discipline Plans

It is well established that school personnel who share a common school-wide vision and philosophy are more successful in meeting the needs of all students (Tonelson & Butler, 2000). This shared vision for a successful school must, by necessity, include a safe and orderly campus. Teachers will not be able to teach effectively, and the students will not be able to concentrate on the academic instruction, in a chaotic school environment.

Conventional wisdom holds that when school personnel fail to confront students' misbehavior, the students infer permission to continue acting inappropriately (Echelbarger, Holler, Kelty, Rivera, Schliesman, & Trojanowski, 1999). Schools and districts that claim success in creating and maintaining effective learning environments through school-wide systems of behavioral support found that systematic, direct instruction on appropriate behavior benefits all students – not just the students who demonstrate problems (Colvin, Sugai, & Patching, 1993).

Yet most school-wide efforts to address challenging student behaviors still rely heavily on punishment and the application of negative consequences in response to undesired behaviors. While these strategies may work for a large number of students, for others the use of punishment only exacerbates the problem... the most challenging students in the school are unlikely to be punished into desired behavior (Sugai, Kame'enui, & Colvin, 1993).

So while the application of an adverse response may curb the unwanted behavior of many students, it has been shown to be ineffective as a means of improving the

behavior of a small minority of students who consistently display challenging behaviors (Van Acker, 2003b). More specifically, three to seven percent of the student population in elementary or middle schools engage in chronic misbehaviors that do not respond to existing school-wide systems, no matter how well designed or well implemented those systems may be (Taylor-Greene, Brown, Nelson, Longton, Gassman, & Cohen, 1997). Other researchers have supported this conclusion by warning that “between five and seven percent of the students in a typical school may require intervention at the tertiary level” (Sugai, Horner, Dunlap, Heineman, Lewis, & Nelson, 2000, p. 34).

These “school-wide systems” of behavior management inevitably include suspensions and/or expulsions warranted as a consequence for serious infractions and transgressions. Most teachers and administrators seek a uniform code of conduct that provides a given, automatic consequence for a given rule violation; however, dealing effectively with challenging behavior sometimes requires more than simply identifying the behavior and applying a standard intervention (Van Acker, 2003a). While it is reasonable and desirable for schools to have a unified set of rules and expectations, a rigid, standardized set of consequences for each student infraction is problematic and generally ineffective (Van Acker, 2003b).

Yet “when this series of negative consequences does not produce the expected behaviors, the school personnel are likely to get tougher by implementing even more punitive practice resulting in exclusionary options as a way to deal with severe and chronic behavior challenges” (Oudeans, 2003, p. 20). The underlying assumption of teachers and district administrators is that after experiencing a series of more severe negative consequences, a student will learn a lesson and behave more appropriately the next time (Walker, Colvin, & Ramsey, 1995).

Unfortunately, many educators fail to consider fully the process of learning when attempting to address challenging student behaviors. As Van Acker (2003a, p.8) writes: “the vast majority of our behavior is not the result of deliberate, planned, and discrete cognitive processes; rather, it is the enactment of learned schema that we employ in given situations.” But if human behavior is neither deliberate nor planned, then having stiffer prescribed punishments for student infractions is unlikely to serve as a deterrent. Here again, the schools serve as a microcosm of larger society. Many assert that harsh, proscriptive punishments such as the death penalty or “three strikes” for convicted felons deter criminal acts, while others argue to the contrary. But within the educational context, it is safe to conclude that the success of any school-wide discipline program will ultimately rest upon the willingness and ability of the school's personnel to implement the procedures specified in the plan. Moreover, “a lack of necessary skills, misunderstood expectations, or a basic unwillingness of teachers or others to implement a program faithfully can threaten a school's best efforts to implement an effective discipline program” (Van Acker, 2003b, p. 36).

Zero Tolerance Policies

Highly publicized acts of school violence, along with the general public desire for safer, more orderly schools, has recently led to a proliferation of “zero tolerance” policies across the nation's schools and districts... the National Center for Educational Statistics (1999) report that more than three-quarters of all schools now enforce some version of “zero tolerance.” By definition, zero tolerance policies “are those school policies that mandate predetermined consequences or punishments for specific offenses” (Holloway, 2002, p.84). This inflexible stance originates from the prevailing belief that we can solve problems of student aggression and violence by making the consequences more punitive

and oppressive (Moriarty, 2003).

On this particular issue, the research is remarkably consistent. In brief, zero tolerance policies are problematic in several ways. Curwin and Mendler assert that “any simple intervention to change children's behavior is simple-minded; those who substitute formulas for decisions are dangerous” (1999, p. 120). Morrison and D'Incau (1997) found that zero tolerance policies often target the wrong behaviors and end up punishing the wrong students; more specifically, they found that only twenty percent of the students disciplined under the zero tolerance policy were the ones the school leaders intended the policy to address. Others argue that there is no scientific data to suggest that zero tolerance policies reduce school violence; however, there is evidence that these types of policies actually have a negative effect on students' emotional health and school-wide graduation rates (Skiba & Peterson, 1999). The reduction these policies cause in the graduation rate – by automatically preventing a child from attending school – indirectly denies many students their fundamental right to a public education (Palakow-Suransky, 1999).

Further studies have concluded that delinquency levels do not differ in schools with and without zero tolerance policies (Barton, Coley, & Wenglinsky, 1998). Therefore, there is little empirical evidence to support these responses to students' misbehavior, particularly when dealing with students whose behavior problems are longstanding (Gottfredson, 1997). Skiba (2002) best summarizes the research by reporting that the accumulated evidence suggests that the adoption of zero-tolerance policies that result in suspensions and expulsions from school do not improve student behavior or make a positive contribution to school safety. Theses on this topic typically conclude by warning school leaders not to be overzealous in adopting and implementing

such policies; instead, school administrators should carefully consider each student's situation on a case-by-case basis (Zirkel, 1999).

Special Education

The concept of considering each student's situation on a case-by-case basis is most rigorously pursued in the arena of special education. This subfield of education began with a national body of legislation called the Education for All Handicapped Children Act (EAHCA) of 1975. In 1990 the laws were revised and renamed the Individuals with Disabilities Education Act (IDEA), and it was reauthorized by the government in 1997 (IDEA '97). Most recently, in 2004, the legislation was modified and reauthorized again (IDEA '04). This extensive body of laws, in all its forms, has continued to exert a powerful influence over every school district's efforts to educate exceptional children. Germane to our purposes, IDEA '04 and its predecessors have placed profound restrictions on the disciplinary consequences school personnel are legally authorized to issue to identified special education students.

In brief, this package of federal legislation has defined *special education* as specially designed instruction to meet the needs of the individual child. Key elements of IDEA '04, as well as the earlier versions of the law, mandate that an annual Individualized Education Plan (IEP) be created for every special education student. The IEP must include specific academic goals tailored to that individual child, a means of measuring whether or not the goals of the IEP have been achieved, and detail the modifications and accommodations school personnel will implement to compensate for the child's disability – which may be “behavioral” in nature. Unfortunately, in many cases, the laws are being misused. Moriarty writes:

In some instances we have observed a shift from needs to wants to “gimmie, gimmie” in our attempts to define the needs of a child... IEP conferences... have sometimes deteriorated to a wish list for frustrated parents. Some school officials have expressed the feeling that the IEP coordinator has been cast in the role of an educational version of Santa Claus. Educators are reluctant to reject parent requests in the face of the threat of costly litigation and the further burden of paying litigants' legal costs. (2003, p.19)

Another major component of IDEA '04, also problematic for educators, requires that every identified special education student be educated in the Least Restrictive Environment (LRE). Often referred to as *inclusion*, this facet of the law requires every child with a disability to attend regular classes with – to the greatest extent possible – his or her non-disabled peers. Consequently, many students with severe behavioral and/or emotional problems are being sent into regular education classrooms.

IDEA '04 and its predecessors were no doubt drafted with the best of intentions. In its most fundamental, idealistic form, the legislation would guarantee that children with physical handicaps would have full and unrestricted access to the nation's public schools. Unfortunately, however, court rulings have resulted in identified children being granted extraordinary protection from the discipline meted out for their misbehavior, regardless of the nature of their “disability.” Among those students protected by legislative and judicial decision are those who have been labeled “emotionally disturbed,” those who have been found to be “behaviorally handicapped,” or those who have vaguely defined “learning disabilities” (Melnick, 1994).

This has created widespread confusion and considerable controversy about what constitutes an appropriate consequence for a student with a disability who “acts up” in

school (Barnes, Flint, & Travnakar, 2003). Hess summarizes one of the major problems that the special education laws have created for educators: “In short, misbehavior has become one symptom of a disability, and the underlying assumption is that the disability should be treated and accommodated – not punished. This approach makes it much more difficult to operate orderly schools” (1998, pp. 10-11). The problem has increased exponentially as the number of special education students has continued to balloon over time (Hess, 1998). Indeed, the increasing number of special education placement recommendations in the public schools may largely result from teachers' perceptions of their skills concerning classroom management, as well as their belief that they can influence student behavior despite factors that are – in reality – beyond their control (Frey, 2002).

The *inclusion* component of IDEA '04 has repercussions for general education students as well as the teachers. Imagine, if you will, a number of students with emotional and/or behavioral “disorders” (E/BD) in a regular education classroom. It is not surprising that students with E/BD have remained the least desired of the disability categories and are usually the last to be placed in fully inclusive settings (Kea & Teaff, 2000). When they are placed in a regular education classroom, they are typically the first students asked to leave the classroom and the last students invited to return (Cheney & Muscott, 1996). As Hazelkorn has concluded, there is little doubt that “integrating students with emotional or behavioral disorders (E/BD) into general education settings remains one of the greatest challenges of our profession... both research and experience demonstrate that these students are the most difficult to include in general education” (2003, p. 6).

Researchers readily agree that students with E/BD challenge the ability of the general education environment to adequately teach and shape prosocial behaviors (Lewis, Chard, & Scott, 1994). It must be noted, however, that the fundamental assumption behind inclusion is a valid one. Research has shown that associating with peers who model conventional behavior is positively related to adaptive functioning (Jessor & Costa, 1998). Furthermore, the ability to select prosocial friends is inversely associated with delinquent behavior (Smith, Flay, Bell, & Weissberg, 2001). Consequently, if an E/BD student remains isolated from his or her non-disabled peers, there is little hope of ever learning the socially appropriate behaviors. On the other side of the coin, we must acknowledge that actions and behaviors typically displayed by students with E/BD have a detrimental effect on the academic learning environment, and they make it much more difficult to operate a safe and orderly school.

Unfortunately most attempts to integrate students with E/BD have not been successful, largely because the standard curriculum may not be appropriate in meeting the needs of students with those types of disabilities (Johns, 2003). In today's era of high-stakes testing, many teachers find themselves ill-prepared to deal with the diversity of disabilities, academic levels, and behavior while seeking to satisfy accountability standards; "state assessment demands have created a conflict between the special education and general education curriculums, specifically IEP goals versus a curriculum driven by tests" (Teaff & Kea, 2003, p. 49). In short, teachers must be more in control of their classes so they will have more time for the academic instruction dictated by their curriculums before they are likely to welcome troubled students into their classrooms (Long, 1994). Nevertheless, the fundamental paradigm inherent in the legislation is that all children, even those with E/BD, can be taught in general education classrooms if they

are provided appropriate supports and services (Hazelkorn, 2003).

The best hope for successful inclusion lies in the ability of school personnel to provide the supports and services each special education student requires for success. For students with E/BD to access the general curriculum as successfully as their peers, various curricular and instructional modifications are required (Mathur, Nelson, & Rutherford, 1998). If that goal comes to fruition, inclusion becomes a “point on the continuum of educational services,” rather than a philosophical position, attitude, or value statement (Guetzloe, 1999, p. 93). As Barnes, Flint, & Travnakar explain, “the purpose of providing support for students with E/BD is so that they may become empowered to manage their own behavior and have equal access to educational opportunities” (2003, p. 46). Therefore, amendments to IDEA '97 – which were retained in IDEA '04 – required the use of positive behavioral supports when addressing the behaviors of students with educational disabilities that interfere with their learning or that of their peers (Conroy, Clark, Gable, & Fox, 1999).

These “positive behavioral supports” can take many forms. Lewis (2001) outlined the basic strategies considered crucial in establishing training for positive behavioral supports at the state, local, and building levels. These include proactive versus reactive management, social skills instruction, academic accommodations, parent training, and individual interventions based on functional assessment. Most importantly, success will require general and special education teachers to function as a team (Bullock & Gable, 1997). Ideally, this collaboration “can and should combine the special educators' knowledge of behavior management, learning strategies, cognitive intervention strategies, and authentic assessment with the general educators' expertise in curriculum, content knowledge, scope and sequence, and group assessment” (Teaff & Kea, 2003, p.

53). The overall goal of this collaboration is to offer school personnel the chance to come together and capitalize on the wealth of knowledge and specialized training of both general and special educators (Wood, 1998).

In summation, the growing number of children with behavioral and/or emotional problems will continue to challenge the ability of school districts to provide special education services required by legislation such as IDEA '04. In all likelihood the demands on the public school systems will increase exponentially; researchers are already warning that “strategies to address the needs of students with serious behavior problems may require so-called wraparound services that provide intervention and support within multiple social contexts (e.g., the school, the home, the community)” (Van Acker, 2003b, p. 36). As Eber, Nelson, and Miles have summarized, as schools establish and implement school-wide and individualized behavior supports, school-based wraparound planning appears to be the next logical step to assisting students with chronic and severe behavioral challenges... “these are the students who need more support in the form of an individualized, comprehensive plan that encompasses home, school, and community” (1997, p. 19). If this trend continues, schools may find themselves having to address the problematic behavior of special education students in a bewildering array of circumstances.

Summary

This chapter has provided an overview of many factors known to affect student discipline and academic achievement, including socioeconomic status, sociological challenges, racial factors, teachers and student discipline issues, school administrators and student suspensions, school-wide discipline plans, zero tolerance policies, and special education legislation. Clearly, the subject of student discipline has many facets, and the

relationships and interactions between these factors and a student's level of academic achievement is often complex. Yet since the relationship between behavior and academic achievement is so well-documented in the canon of educational literature this topic surely warrants continued attention and research. The remainder of this paper will be dedicated to exploring the statistical relationship between SES, behavior, and academic achievement using the quantitative variables defined in the previous chapter.

CHAPTER THREE

Research Methods

Introduction

Few would argue with the fact that children who fail to successfully adapt to the learning environment are likely to face long-term negative consequences such as expulsion from school, peer rejection, and antisocial behavior in their adulthood (Clark, Dogan, & Akbar, 2003). Consequently, educational researchers have labored for decades to identify the factors placing students at risk for academic failure. As noted in the previous chapter, numerous studies have been conducted focusing on students' socioeconomic status, behavior, race, teacher training, and a variety of other topics. It is clear that the questions about the interrelationships between these risk factors and the students' overall level of academic achievement are indeed complex (Whitelaw, Milosevic, & Daniels, 2000).

Nevertheless, research on the academic achievement of high risk students over the past 30 years has continued to identify a myriad of influences contributing to educational disadvantage. It is estimated that approximately 30 percent of the present school population is at risk of academic failure, and demographic projections predict a dramatic increase in the poor and minority school-age populations that largely comprise this group (Bempechat & Ginsburg, 1989). With so much at stake for so many children, it is essential to properly understand the relative importance of as many risk factors as possible.

After reviewing the body of educational research, one can safely conclude that the link between SES and academic achievement has been well-established and thoroughly documented. Moreover, this particular research project will try to statistically determine

the nature of the relationship between students' misconduct and their schools' overall level of academic achievement. To better understand the predictive value of quantitative measures of student misconduct, it would be useful and illuminating to conduct the analysis using a highly regarded SES index as a covariate. In other words, how useful would a quantitative measure of student misconduct be, relative to SES, in identifying at-risk schools? Could both measures, used in conjunction, be more effective than either variable used in isolation?

In the larger scheme of things, this task is important because accurate identification of at-risk students and/or schools could help districts allocate limited resources where they are most needed. If the at-risk schools can be accurately identified, the districts may choose to target those schools for interventions such as an increased allocation of fiscal resources, innovative remedial programs, and increased training for teachers, administrators, and other staff members. The larger implications and inferences which can be drawn from the results of this research will be covered in greater detail in Chapter Five.

The remainder of this chapter will describe the research methods used in orchestrating this analysis. Some of the information presented in the early sections of this chapter, such as a description of the context of the study, the definitions of the operational variables, the statements of the hypotheses, and a review of the overall research design were previously covered in Chapter One. Being directly relevant to the methodology of this research project, they have been repeated in this chapter so that the reader may benefit from their review. These sections are followed by a comprehensive description of the data, as promised in Chapter One. More specifically, the data distributions and corresponding summary statistics will be presented, and the issues of

data transformations, correlations, and multicollinearity will be subsequently addressed. This will be followed by an explanation of the analytic techniques used to calculate the final results, which are presented in Chapter Four. Finally, the highlights of this chapter will be reviewed in a concluding summary.

Context of the Study

This will be an *ex post facto* study using data collected from the Wake County Public School System (WCPSS), the WCPSS Office of Student Due Process, and the North Carolina Department of Public Instruction (NCDPI) over a three-year period. Contextually, it should be noted that the WCPSS is the second largest school district in North Carolina. At the time of this writing, the district employs 12,977 full-time staff members to serve over 108,000 students in 80 elementary schools, 27 middle schools, 16 high schools, and six special / alternative schools (WCPSS, *WCPSS Overview*, 2005). In terms of student discipline, administrators within the district issue approximately 17,000 short-term suspensions of ten days or less, 350 long-term suspensions of eleven days or more, and six expulsions from the district during a typical school year (V. Curtis, personal communication, March 11, 2003). Chronologically, the scope of this study will encompass data gathered during the 2001-2002, 2002-2003, and the 2003-2004 academic school years.

Operational Definition of Variables

Care must be taken to accurately measure variables within the social sciences. In that vein, the following operational variables were selected for this study after a great deal of consideration. Within any given school year, they are intended to measure: 1) a school's overall level of student misbehavior, 2) the school's overall level of academic achievement, and 3) the school's overall level of socioeconomic status. In the interest of

scientific validity, it was important that these variables measure their objectives as consistently and as objectively as possible over a three year time frame. Consequently, the operational variables for this study were defined as follows:

Student misconduct. For the purpose of this study, an independent variable called the Disciplinary Action Ratio (DAR) will be calculated for each school. This variable will be used to represent the level of student misconduct within any given school during any given year. More specifically, the DAR will be based on the number of times a student was suspended from the school for inappropriate conduct.

To control for the natural variation in school sizes, the DAR will be defined as the number of suspensions per 100 students. Again, this step is taken in order to control for the fluctuating numbers of students across the district's schools. Consider, as a fictional example, that Alpha High School has a population of 1,500 students and its administrators suspended a student from school on 250 different occasions during the 2001-2002 school year. The DAR for that school during the 2001-2002 school year would be 16.67 $[250 / (1,500 / 100)]$. Similarly, fictional Beta High School has a population of 2,000 students and its administrators suspended a student from school on 275 different occasions during the 2001-2002 school year. In this case, the DAR would be 13.75 $[275 / (2,000 / 100)]$. A lower DAR, therefore, would be indicative of better student behavior. Conversely, a higher DAR suggests a greater incidence of problematic misbehaviors – which would warrant the higher relative suspension rate.

Socioeconomic Status. The second independent variable in the study will be SES. As noted earlier, a school's socioeconomic status is typically measured by the percentage of students receiving a free or reduced lunch price through a federal subsidy. This widely used and widely accepted measure of a school's poverty level will also be

used in this analysis.

Academic Achievement. The dependent variable in this study will be the school's overall level of academic achievement as determined by its ABC Performance Composite (ABC-PC), calculated annually by the N.C. Department of Public Instruction (NCDPI). This performance composite score results from a package of state legislation passed in 1995 called the ABCs of Public Education in North Carolina. This initiative was first implemented in the 1996-1997 school year for elementary and middle schools, and subsequently in 1997-1998 by the high schools. In the ABCs model, the standardized test scores from students at individual schools are plugged into formulas used to gauge the schools' overall level of academic growth and achievement. Described as a “comprehensive plan to organize public schools in North Carolina around three goals of strong accountability, an emphasis on the basics and high educational standards, and on providing schools and school districts with as much local control as possible,” (NCDPI, “The ABCs Accountability Model,” 2003, ¶ 1) the statistical analysis of standardized test scores calculated via the ABCs formula has become the most widely-used method of measuring schools' effectiveness in North Carolina.

To better understand the performance composite, the NCDPI explains that it is determined by computing the percentage of students who score at or above grade level on standardized End of Grade (EOG) tests in reading and mathematics, a computer skills test at grade eight, the North Carolina Alternate Assessment Portfolio, the North Carolina Alternate Assessment Academic Inventory (NCAA AI), and all End of Course (EOC) tests administered at the school. The EOC test scores include all state tested subjects: *Algebra I, Biology, Economic, Legal, and Political Systems (ELPS), English I, U.S. History, Algebra II, Geometry, Chemistry, Physics, and Physical Sciences.* The

standardized test scores determined to be at or above grade level are summed, and this sum is divided by the total number of valid scores on each of the tests. The final cumulative result of the ABCs formula is believed to be indicative of the school's overall teaching success rate.

Statement of Hypotheses

This study will follow the fundamental principles of the scientific method, which consists of 1) formulating hypotheses, 2) deducing the observable consequences of the hypotheses, and 3) testing the hypotheses empirically by collecting and analyzing the data. To that end, the following six directional hypotheses will be the focus of subsequent analysis, with a p value of less than or equal to 0.05 being considered statistically significant:

(H₁) There will be a significant relationship between the middle schools' socioeconomic status (SES) and the schools' overall level of academic achievement as measured by the ABC performance composites (ABC-PC) during the 2001 – 2004 school years.

(H₂) There will be a significant relationship between the high schools' socioeconomic status (SES) and the schools' overall level of academic achievement as measured by the ABC performance composites (ABC-PC) during the 2001 – 2004 school years.

(H₃) There will be a significant relationship between the middle schools' Disciplinary Action Ratios (DAR) and the schools' overall level of academic achievement as measured by the ABC performance composites (ABC-PC) during the 2001 – 2004 school years.

(H₄) There will be a significant relationship between the high schools' Disciplinary Action Ratios (DAR) and the schools' overall level of academic achievement as measured by the ABC performance composites (ABC-PC) during the 2001 – 2004 school years.

(H₅) The DAR, when used in conjunction with SES, will explain more variation in the middle schools' ABC performance composites (ABC-PC) during the 2001 – 2004 school years than either does alone.

(H₆) The DAR, when used in conjunction with SES, will explain more variation in the high schools' ABC performance composites (ABC-PC) during the 2001 – 2004 school years than either does alone.

Research Design

The collected data will be analyzed in its entirety to determine the overall relationship between academic achievement and DAR, then disaggregated to examine the relationship between the DAR and the middle schools' and the high schools' overall levels of academic achievement. First, linear regression analysis will be used to examine the bivariate relationship between the schools' SES and the middle and high schools' level of academic achievement in isolation, without allowing for the schools' DAR. Secondly, linear regression analysis will be used to examine the bivariate relationship between the DAR and academic achievement without controlling for the schools' SES. A subsequent analysis will utilize multiple regression analysis to determine the joint effects of both independent variables on the dependent variable.

The purpose of this study, therefore, is to: 1) to use linear regression analysis to statistically evaluate the relationship between the socioeconomic status of middle and high school students and their schools' overall level of academic achievement, 2) to use

linear regression analysis to statistically evaluate the relationship between the behavior of middle and high school students and their schools' overall level of academic achievement, and 3) to use multiple regression analysis to statistically evaluate the relationship between students' behavior and their schools' overall level of academic achievement while controlling for the influence of socioeconomic status. More specifically, multiple regression equations will be used to determine the relative covariance of each dependent variable – SES and student behavior – to determine if a model that includes both explanatory variables can have a stronger predictive value than either variable in isolation.

Data Description

As noted above, this study uses longitudinal data collected over a three year period. To that end, only schools that were fully operational in the 2001 – 2002, 2002 – 2003, and the 2003 – 2004 academic school years were included in the analysis. That left 24 middle and 15 high schools; three middle schools and one high school within the district were recently constructed, so the data from those schools was not included in this research project. Furthermore, the focus of this analysis was directed at the regular public schools within the system. Consequently, data collected from the district's six special / alternative schools was discarded because the data was inconsistent with the regular public schools.

Data was collected over a three year time period in order to 1) allow the use of parametric statistics, 2) to increase the statistical significance of the study, and 3) reduce the likelihood of a *Type I* error. Since there are 24 viable middle schools in the district, and since the data was collected and analyzed over a three-year period, $n = 72$ in those analyses. The same formula applies to the high schools. Since there are 15 viable high

schools in the district, and since the data was collected and analyzed over a three-year period, $n = 45$ in those phases of the analysis.

Data Distributions

In the initial assessment, the data from all the secondary schools in the district were viewed as a whole. Afterwards, the data was disaggregated to illustrate the differences between the middle and high schools, which will also be looked at separately.

Table 1, as follows, shows the basic summary statistics for the raw data:

Table 1

Summary Statistics and Data Distributions of Operational Variables

Variable	N	SD	Mean	Min	Max	Skewness	Kurtosis
<u>All Schools</u>							
ABC-PC	117	6.46	85.60	68.20	96.9	-0.51	-0.10
SES	117	10.31	20.11	4.30	43.6	0.64	-0.54
DAR	117	19.31	31.33	4.15	116.0	1.70	4.14
<u>Middle Schools</u>							
ABC-PC	72	5.02	88.27	78.00	96.9	-0.21	-1.13
SES	72	10.54	24.23	7.20	43.6	0.16	-1.04
DAR	72	21.24	33.25	4.15	116.0	1.57	3.61
<u>High Schools</u>							
ABC-PC	45	6.23	81.32	68.20	91.7	-0.39	-0.53
SES	45	5.37	13.52	4.30	25.9	0.45	0.04
DAR	45	15.48	28.25	11.00	87.0	1.76	3.70

ABC Score. It must be noted that the first variable, the schools' ABC Performance Composite scores, showed a relatively normal distribution, with a skewness of -0.51 for all secondary schools, a skewness of -0.21 for the middle schools, and a skewness of -0.39 for the high schools. An examination of the kurtosis shows the measures to be -0.10 for all secondary schools, -1.13 for the middle schools, and -0.53 for

the high schools. Again, this is within acceptable limits for a normal distribution.

Figure 1, below, graphically illustrates the disaggregated data distribution for both the middle and high schools:

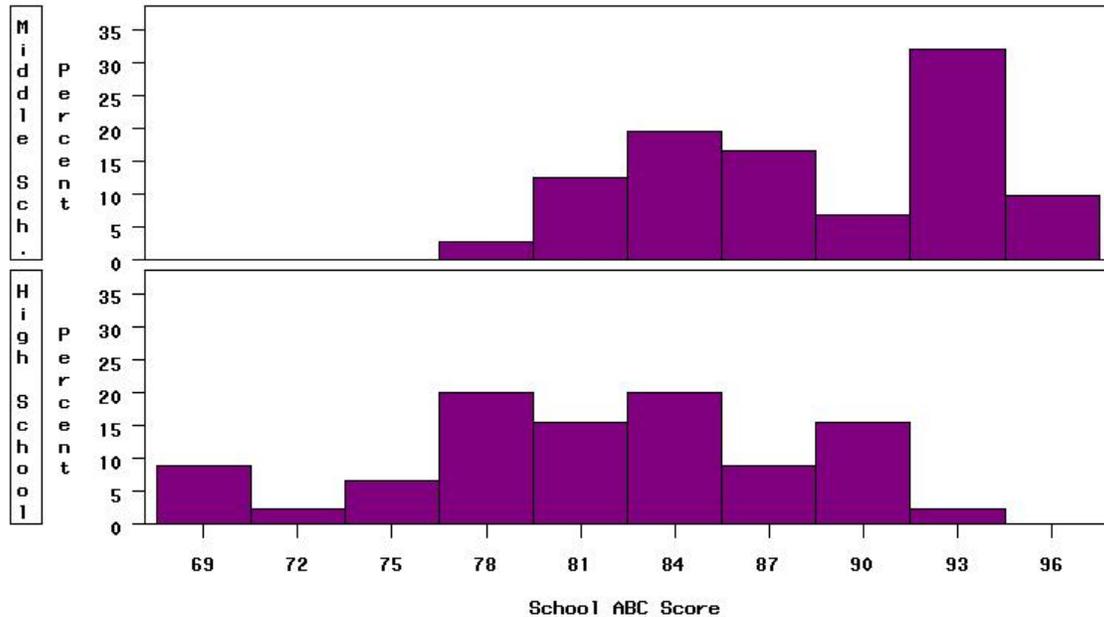


Figure 1

Histogram of Schools' ABC Performance Composite by Middle and High Schools

SES (Free / Reduced Lunch Percentage). The second variable of interest, the schools' socioeconomic status as measured by the percentage of the student population receiving a free or reduced price lunch, also showed a fairly normal distribution. The skewness for all of the secondary schools was 0.64, the skewness for the middle schools was 0.16, and the skewness for the high schools was 0.45. Similarly, the measures of kurtosis were -0.54 for all secondary schools, -1.04 for the middle schools, and 0.04 for the high schools. In short, the measures of skewness and kurtosis were within acceptable

levels and consistent with a relatively normal distribution. Figure 2, below, graphically illustrates the disaggregated data distribution for both the middle and the high schools.

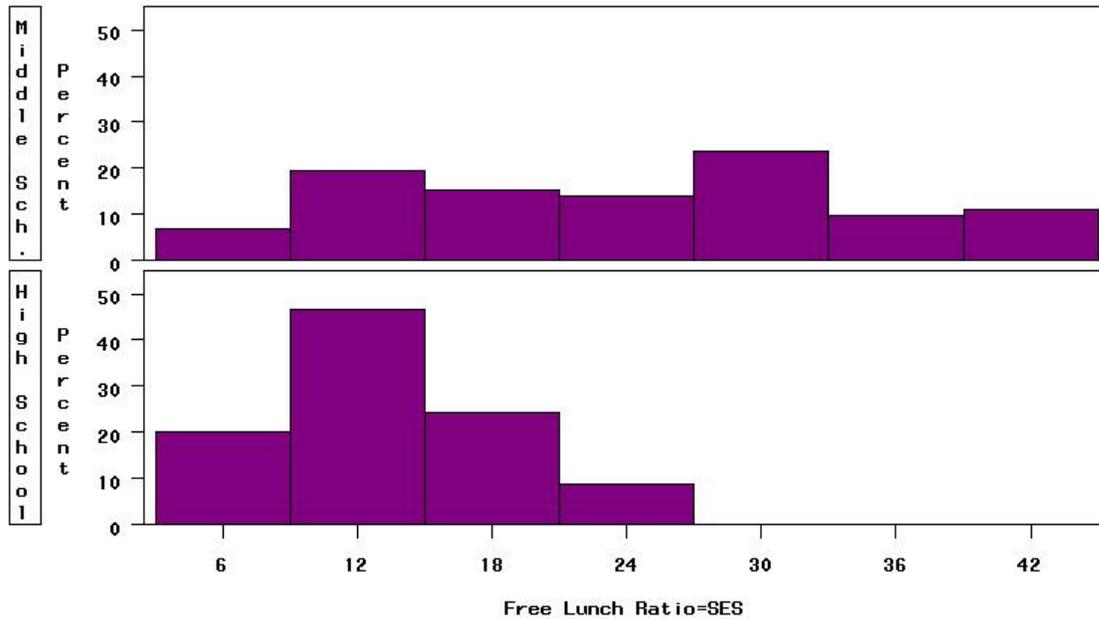


Figure 2

Histogram of Schools' SES by Middle and High Schools

Disciplinary Action Ratio (DAR). Unfortunately, a review of the summary statistics before regression analysis showed an abnormal distribution for the schools' DAR. The skewness was 1.70 for all secondary schools, 1.57 for the middle schools, and 1.76 for the high schools. Furthermore, measures of kurtosis were 4.14 for all secondary schools, 3.61 for the middle schools, and 3.70 for the high schools. Figure 3, as follows, graphically illustrates the uneven distribution:

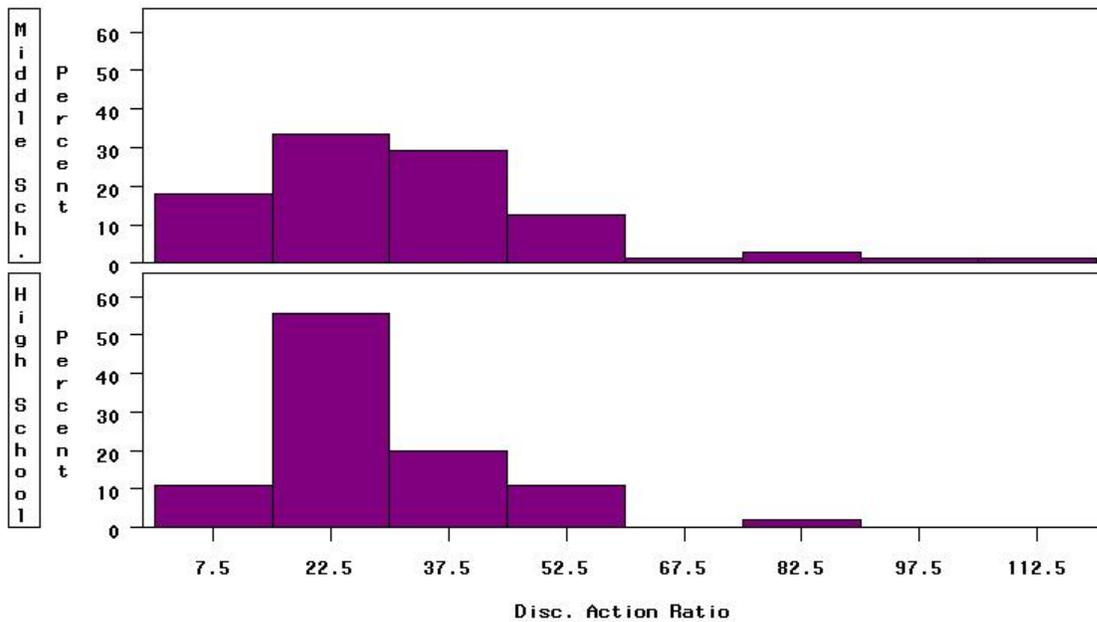


Figure 3

Histogram of Schools' DAR by Middle and High Schools

Data Transformations

In order to conduct a more effective and trustworthy analysis, a data transformation was conducted on the DAR variable. This is because “many statistical procedures assume or benefit from normality of variables... data transformations can be employed to improve the normality of a variable's distribution” (Osborne, 2002, p.1). It must be noted that this procedure is, in some cases, controversial. A data transformation, for example, should never be used to disguise procedural errors – such as missing data or mistakes in data entry (Osborne, 2002). But data transformations are widely used as long as the non-normality of the data is due to a legitimate reason, as is the case in this analysis. In fact, many prominent statisticians, such as Tabachnick and Fidell (2001), argue that researchers should consider the transformation of variables in all

circumstances to improve analyses, even when normality is not an issue.

The three most common methods of data transformation to reduce positive skew involve 1) taking the square root of the variable, 2) taking the logarithm (log) of the variable, or 3) taking the inverse of the variable (Ritchey, 2000). For our purposes, the second method was determined to be the most appropriate. By computing the log of the DAR (logDAR) and recalculating the summary statistics, a more normal distribution was immediately evident. Table 2, below, summarizes the results of the data transformation for DAR to logDAR:

Table 2

Summary Results of Data Transformation from DAR to logDAR

Variable	N	SD	Mean	Min	Max	Skewness	Kurtosis
<u>All Schools</u>							
DAR	117	19.31	31.33	4.15	116.00	1.70	4.14
logDAR	117	0.62	3.27	1.42	4.75	-0.44	0.71
<u>Middle Schools</u>							
DAR	72	21.24	33.25	4.15	116.0	1.57	3.61
logDAR	72	0.70	3.30	1.42	4.8	-0.69	0.59
<u>High Schools</u>							
DAR	45	15.48	28.25	11.00	87.0	1.76	3.70
logDAR	45	0.47	3.22	2.40	4.5	0.57	-0.07

Note that the transformation lowered the skewness of all secondary schools to -0.44, the skewness of the middle schools to -0.69, and the skewness of the high schools to 0.57. Kurtosis was reduced to 0.71 for the secondary schools, 0.59 for the middle schools, and -0.07 for the high schools. Figure 4, below, graphically illustrates the improved distribution after the data transformation:

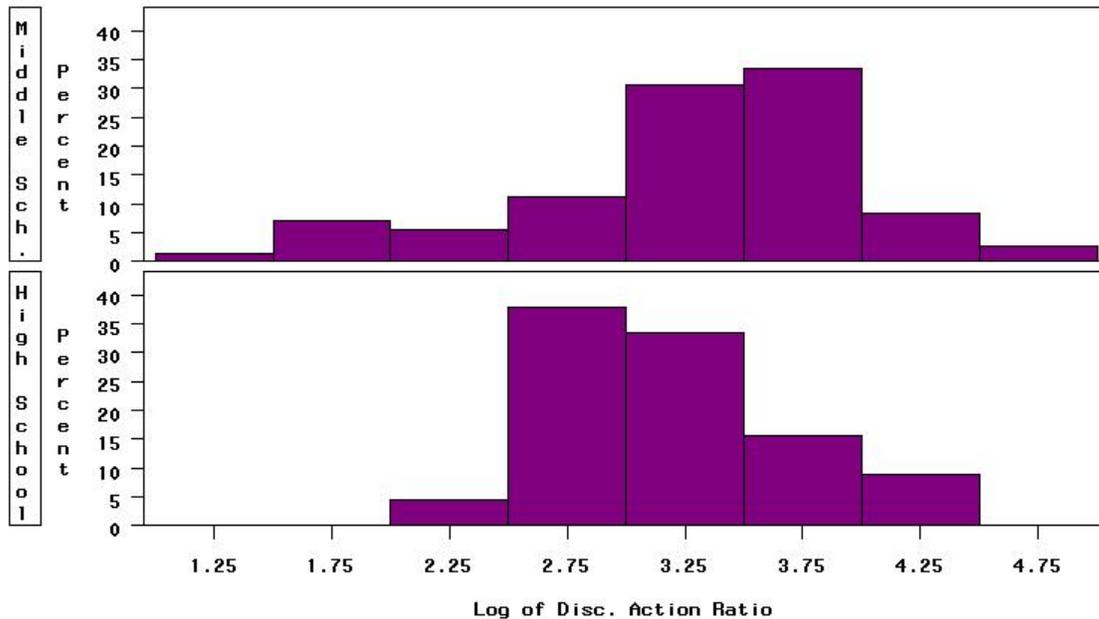


Figure 4

Histogram of Schools' logDAR by Middle and High Schools

Correlations and Multicollinearity

Competent researchers know that highly correlated predictors can cause problems in regression models; these problems center around the issues of reliability and interpretation of the model's coefficient estimates (Leahy, 2000). In brief, certain problems may arise when two covariates are highly correlated, meaning that they convey essentially the same information (Motulsky, 2002). However, the exact point at which

multicollinearity becomes a concern for regression analysts remains the subject of debate. Most mathematical texts set the benchmark at correlations of .70, whereas other statisticians (i.e., Wulder, 2005) have argued that multicollinearity only becomes an issue at correlations greater than .80 or even .90.

Before proceeding further, the Pearson Correlation Coefficients for the data used in this study should be presented for inspection. All listed correlation coefficients meet the alpha standard for significance in this study; $p < .0001$ for all cases. Table 3, as follows, summarizes these results.

Table 3

Pearson Correlation Coefficients Among Data

Variable	ABC-PC	SES	logDAR
<u>All Schools</u>			
ABC-PC	1	-0.328	-0.557
SES	-0.328	1	0.678
logDAR	-0.557	0.678	1
<u>Middle Schools</u>			
ABC-PC	1	-0.923	-0.723
SES	-0.923	1	0.758
logDAR	-0.723	0.758	1
<u>High Schools</u>			
ABC-PC	1	-0.764	-0.697
SES	-0.764	1	0.749
logDAR	-0.697	0.749	1

A cursory examination shows that the variables used in this study are, in fact, highly correlated and the issue of multicollinearity must therefore be addressed. Fortunately for our purposes, multicollinearity is not always harmful, although this fact is often not understood by many researchers, even those with substantial statistical backgrounds (Leahy, 2000). To better understand the nature of multicollinearity, Leahy

(2000) proceeds to explain that the underlying problem is one of statistical power. More specifically, the common, shared variation between the variables makes it hard to estimate the separate effects of each. Therefore, an analyst typically needs a larger sample size to achieve the same level of statistical significance. As Achen (1982) explains:

Beginning students of methodology occasionally worry that their dependent variables are correlated... the so-called multicollinearity problem. But multicollinearity violates no regression assumptions. Unbiased, consistent estimates will occur, and the standard errors will be correctly estimated. The only effect of multicollinearity is to make it harder to get coefficient estimates with small standard errors. But having a small number of observations also has that effect. Thus, “What should I do about multicollinearity?” is a question like “What should I do if I don't have many observations?”

So in summation, if the coefficient estimates mentioned by Achen are statistically significant, then the parameter estimates are every bit as reliable as any other predictor – even if the coefficient estimates are highly correlated; prediction, therefore, is unlikely to be affected since the sum of the regression coefficient variables is likely to remain stable (Leahy, 2002).

This aspect of prediction is an important one, for it brings us to the first of two ways that the issue of multicollinearity will be addressed in this analysis.

Mathematicians generally agree that if the researcher's goal is “simply to predict Y from a set of X variables, then multicollinearity is not a problem... the predictions will still be accurate, and the overall R^2 (or adjusted R^2) quantifies how well the model predicts the Y

values” (Motulsky, 2002, p. 1). In other words, whether or not multicollinearity is an issue has to do with the purpose for which the model is developed. As Leahy writes, “if the goal is *prediction* and not *explanation*, then the primary concern is not so much as knowing how or why each variable impacts on the dependent variable, but rather on the efficacy of the model as a predictive instrument” (2000, p. 2).

As detailed earlier in this manuscript, the purpose of this exercise is to determine if quantitative measures of student misconduct can be used to identify schools at risk of academic failure. Admittedly, in the final phases of the regression analysis the two highly correlated predictor variables – SES and DAR – will appear in the same regression equation. However, the ultimate goal remains the same: to use the two explanatory variables to predict which schools in the district are most likely to attain the lowest levels of academic achievement – not to explain the variance already present in the ABC performance composites across the district.

Secondly, a review of the first four hypotheses will remind us that multicollinearity is being addressed in the traditional manner by looking at each of the explanatory variables in isolation. Simply removing one of the highly correlated variables from the equation will reduce or eliminate multicollinearity (Motulsky, 2002). Some statisticians might argue that not all variation between two predictors is redundant, and that by deleting a highly correlated variable we run the risk of throwing away additional useful information, such as the independent variation accounted for by the discarded predictor, or the variation above and beyond what is explained by the two variables working in conjunction (Leahy, 2000). These arguments, however, are moot for our purposes. The series of hypotheses requires that the predictor variables be looked at individually and then as whole. Looking at the relative predictive values of SES and

DAR by themselves may prove informative and enlightening. Afterwards, the final two hypotheses require us to examine DAR while controlling for SES to determine if the model using both variables can predict schools at risk of academic failure more efficiently than either variable working alone. Within that context we do not have to worry about weakening the effectiveness of the model as a predictive tool since all variables of interest will be included in the regression equation.

Analytic Techniques

All calculations used in this research project were generated using the SAS 9.1 software package. The analysis began with univariate statistical analyses to determine summary statistics for each variable. These univariate statistics, such as means, standard deviations, minimum and maximum values, as well as measures of skewness and kurtosis, were all summarized and reported. The data was disaggregated to examine the effects of these variables on the middle schools, the high schools, and the secondary schools as a whole. The summary statistics were carefully reviewed to ensure that the assumptions of ordinary least squares regression were met. Most importantly, the measures of skewness and kurtosis were examined to ensure that the data represented a normal distribution. After reflection, the DAR variable was transformed to logDAR to improve the reliability of the analysis. The summary statistics of the other variables fell within accepted values for parametric analysis.

The second phase of the analysis involved determining correlations between all three variables of interest. Again, the data was disaggregated to illustrate the relationships between variables in the middle schools, high schools, and the secondary schools as a whole. These figures were also summarized and reported. As noted earlier, in some cases relatively strong correlations among the variables became apparent, and the

issue of multicollinearity had to be carefully weighed before concluding that multicollinearity was not a threat to the validity of the subsequent regression analyses.

The third phase consisted of multivariate statistical analyses. More specifically, linear regression analysis was first used to examine the bivariate relationship between SES and ABC-PC. Another regression equation was computed to determine the nature of the bivariate relationship between the DAR and the ABC-PC. Finally, a multiple regression analysis was conducted to determine the relative influence of the DAR on the ABC-PC while controlling for the influence of SES. The multivariate statistics from these analyses, such as degrees of freedom, parameter estimates, t values, p values, standardized estimates, and squared semi-partial correlations are also reported in Chapter Four.

Summary

The chapter presented the methodology used in this study. It began by reviewing the fundamental goals of this research project that were outlined in Chapter One, including a review of the context of the study, the definition of the operational variables, the hypotheses to be tested, the overall research design, and the data collection methods. Afterwards, the data gathered to complete this project was discussed in depth. Univariate summary statistics were calculated and presented, and the need to execute a data transformation on the DAR variable was explained. The correlation coefficients among the variables were reported and discussed, and the issue of multicollinearity was analyzed to determine if it presented a threat to the validity of the study. The final section summarized the analytic techniques used to test the six hypotheses – the results of which are detailed in the following chapter.

CHAPTER FOUR

Results

Introduction

Previous chapters have introduced this research project, outlined the overall framework of the study, reviewed the academic literature pertinent to the topic, and detailed the methodology that was used in this analysis. This chapter will present the results of all regression analyses. The most interesting statistics will be highlighted and emphasized, according to their relevance in testing the six hypotheses detailed earlier. The larger, contextual meaning of these analytic results, as well as the practical implications for policy and practice, will be discussed in the following chapter.

Explained previously, this study was designed to examine the bivariate relationship between: 1) students' socioeconomic status and their schools' corresponding level of academic achievement, 2) students' misconduct and their schools' corresponding level of academic achievement, and 3) students' misconduct and their schools' corresponding level of academic achievement while controlling for socioeconomic status. As noted earlier, the schools' socioeconomic status (SES) is measured by the percentage of students receiving a free or reduced price lunch. The schools' level of student misconduct (logDAR) is measured by calculating the number of suspensions per 100 students. The schools' level of academic achievement (ABC-PC) is measured by each school's overall ABC performance composite determined through the state's accountability formulas. In the interest of clarity, the results of the regression analyses are structured around the six hypotheses discussed in previous sections of this manuscript.

Hypotheses One and Two:

(H₁) There will be a significant relationship between the middle schools' socioeconomic status (SES) and the schools' overall level of academic achievement as measured by the ABC performance composites (ABC-PC) during the 2001 – 2004 school years.

(H₂) There will be a significant relationship between the high schools' socioeconomic status (SES) and the schools' overall level of academic achievement as measured by the ABC performance composites (ABC-PC) during the 2001 – 2004 school years.

The regression model of the effect of SES on ABC-PC, allowing for differing slopes and intercepts between school types (middle and high schools), was strongly significant, as shown in Table 4. Note that the overall model explains approximately 80 percent of the variation in the dependent variable, as demonstrated by the R^2 of 0.798. Table 5, as follows, reports the regression output for all secondary schools, the middle schools, and the high schools being studied.

It must be noted that the regression models for disaggregated schools were fit by including an indicator variable for school type. Commonly known as “dummy coding,” the high schools or middle schools were categorized as either a “one” or a “zero.” This indicator variable, and its corresponding interaction with the independent variable(s) in the regression model, was used to isolate either the middle or high schools for disaggregated data analysis. This procedure resulted in three degrees of freedom for the disaggregated model, as shown in Tables 4 and 5. Parameter estimates, as displayed in Table 5, are given in terms of middle and high school for the sake of clarity. Similarly, for the larger regression model including both SES and logDAR, interaction terms for

school type were included for each variable, resulting in five degrees of freedom for the model. An interaction between SES and logDAR was not found to be significant; therefore, it was not included in the model.

Table 4

Comparison of Aggregated and Disaggregated Regression Models

Dependent Variable: ABC Performance Composite (ABC-PC)

Independent Variable: Socioeconomic Status (SES)

Model	DF	<i>F</i> Value	<i>p</i> Value	R ²
All Schools (aggregated)	1	13.85	0.0003	0.108
Disaggregated Schools	3	149.08	<0.0001	0.798

Table 5

Dependent Variable: ABC Performance Composite (ABC-PC)

Independent Variable: Socioeconomic Status (SES)

	DF	Parameter Estimate	<i>t</i> value	<i>p</i> value	Beta	Squared Semi-Partial Correlation Type I
<u>All Schools</u>						
	1	-0.21	-3.72	<0.0003	-0.33	0.107
<u>Middle Schools</u>						
	1	-0.44	-13.29	<0.0001	-0.70	0.852
<u>High Schools</u>						
	1	-0.89	-10.76	<0.0001	-1.42	0.582

It is worth noting that the predictive value of the SES covariate greatly improves when the data is disaggregated into the middle and high schools. As shown in Table 5, the squared semi-partial correlation moves from 0.107 for all secondary schools to 0.852 for middle schools and 0.582 for high schools, when the two groups are disaggregated. The following two scatterplots, Figures 5 and 6, graphically illustrate this improvement. Figure 5 plots the SES variable against the ABC-PC data when all secondary schools being studied are included in the regression equation.

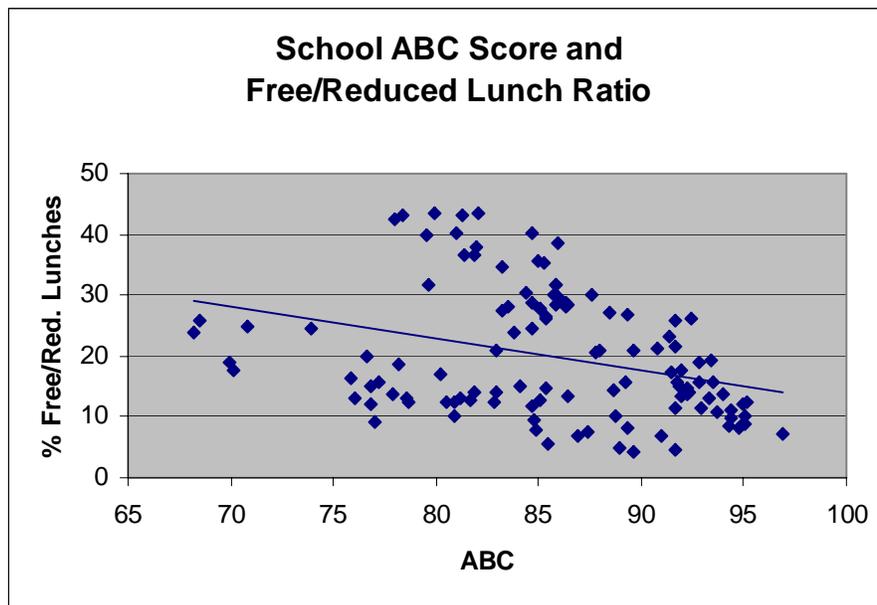


Figure 5.

Scatterplot of Secondary Schools' SES and ABC-PC

Clearly, the data shows a linear relationship between SES and the secondary schools' ABC-PC. Regression, therefore, is an appropriate method of data analysis. However, the fan-like distribution around the regression line suggests that heteroscedasticity may be present within the regression model. This is most apparent within the secondary schools whose ABC performance composites fall between 75 and 85. However, the disaggregated data, illustrated in Figure 6, reveals the different distributions of middle school and high school scores, and the much tighter fits of regression lines when the model includes indicators for school type. This helps to explain the impressive improvement in the squared semi-partial correlation values shown in Table 5. Nevertheless, this analysis underscores the powerful relationship between SES and academic achievement – no matter how the data is presented.

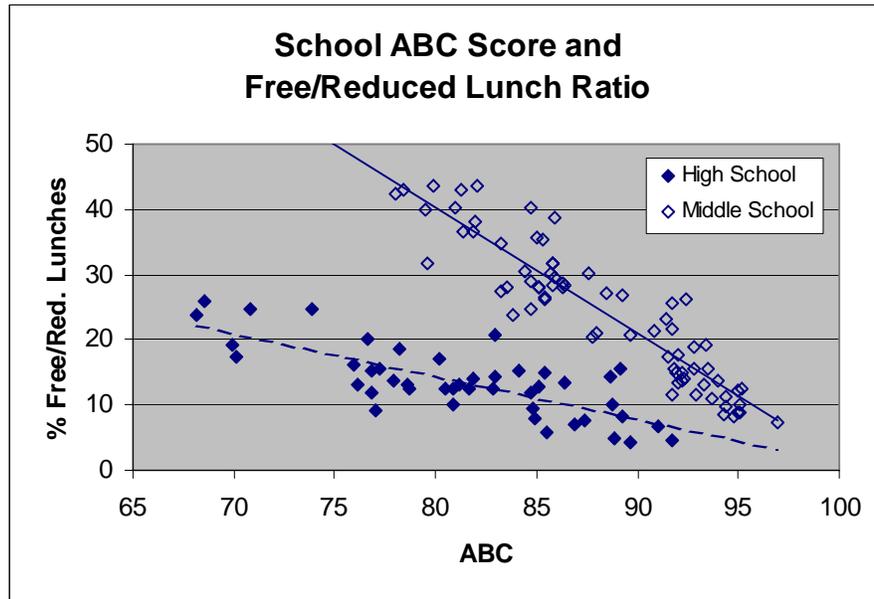


Figure 6

Scatterplot of Schools' SES and ABC-PC by Middle and High Schools

Conclusion:

(H₁) is supported by the data. There is a significant relationship ($p < 0.0001$) between the middle schools' socioeconomic status and the schools' overall performance on the ABC performance composites during the 2001 – 2004 school years.

(H₂) is supported by the data. There is a significant relationship ($p < 0.0001$) between the high schools' socioeconomic status and the schools' overall performance on the ABC performance composites during the 2001 – 2004 school years.

Hypotheses Three and Four:

(H₃) There will be a significant relationship between the middle schools' Disciplinary Action Ratios (DAR) and the schools' overall level of academic achievement as measured by the ABC performance composites (ABC-PC) during the 2001 – 2004 school years.

(H₄) There will be a significant relationship between the high schools' Disciplinary Action Ratios (DAR) and the schools' overall level of academic achievement as measured by the ABC performance composites (ABC-PC) during the 2001 – 2004 school years.

The regression model of the effect of logDAR on ABC-PC, allowing for differing slopes and intercepts between school types, was strongly significant, as documented in Tables 6 and 7. Note that, in this case as well, the regression model meets the highest standards for statistical significance and explains approximately 65 percent of the variation in the dependent variable. A comparison of the aggregated and disaggregated models is shown in Table 6, while Table 7, as follows, reports the entire regression output for the disaggregated model – which is a better fit.

Table 6

Comparison of Aggregated and Disaggregated Regression Models

Dependent Variable: ABC Performance Composite (ABC-PC)

Independent Variable: Student Misconduct (logDAR)

Model	DF	F Value	p Value	R ²
All Schools (aggregated)	1	51.81	<0.0001	0.311
Disaggregated Schools	3	69.07	<0.0001	0.694

Table 7

Dependent Variable: ABC Performance Composite (ABC-PC)

Independent Variable: Student Misconduct (logDAR)

	DF	Parameter Estimate	t value	p value	Beta	Squared Semi-Partial Correlation Type I
<u>All Schools</u>	1	-5.82	-7.20	<0.0001	-0.56	0.311
<u>Middle Schools</u>	1	-5.29	-7.98	<0.0001	-0.51	0.537
<u>High Schools</u>	1	-9.20	-7.42	<0.0001	-0.88	0.486

Again, we see that the predictive value of the covariate greatly improves when the data is disaggregated into the middle and high schools, with the squared semi-partial correlation value moving from 0.311 for the secondary schools to 0.537 for the middle schools and 0.486 for the high schools. The following scatterplots, Figures 7 and 8, graphically illustrate this improvement. Figure 7 plots the logDAR covariate against the ABC-PC data when all secondary schools being studied are included in the regression equation.

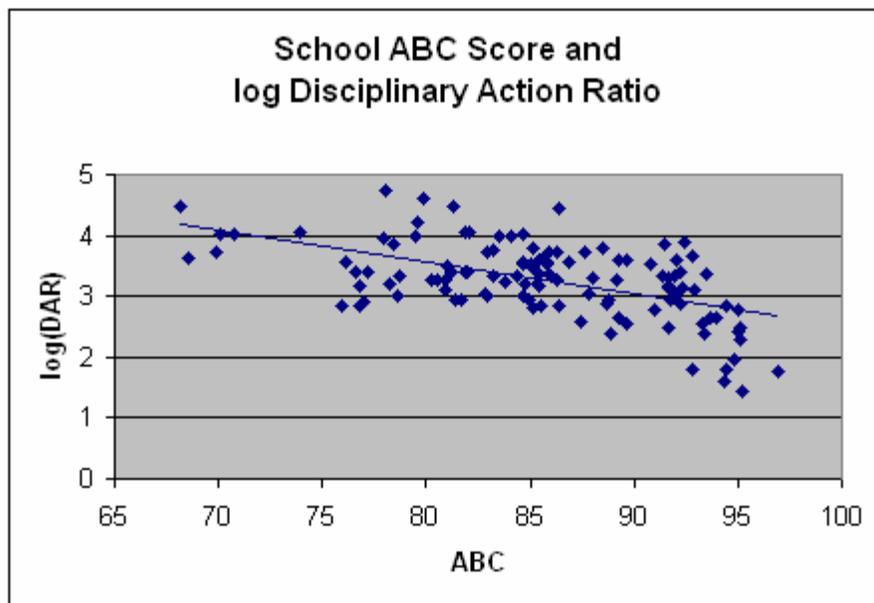


Figure 7

Scatterplot of Schools' logDAR and ABC-PC

Here again, the linear nature of the relationship between logDAR and ABC-PC is immediately evident. However, as with the case of SES, the analysis can be improved by examining the data after it has been disaggregated by middle and high schools. The

following scatterplot shows much tighter fits around the regression lines, and it graphically illustrates the dramatic improvement in the squared semi-partial correlation values. Figure 8, as follows, plots logDAR against the ABC-PC while making distinctions between the middle and high school data.

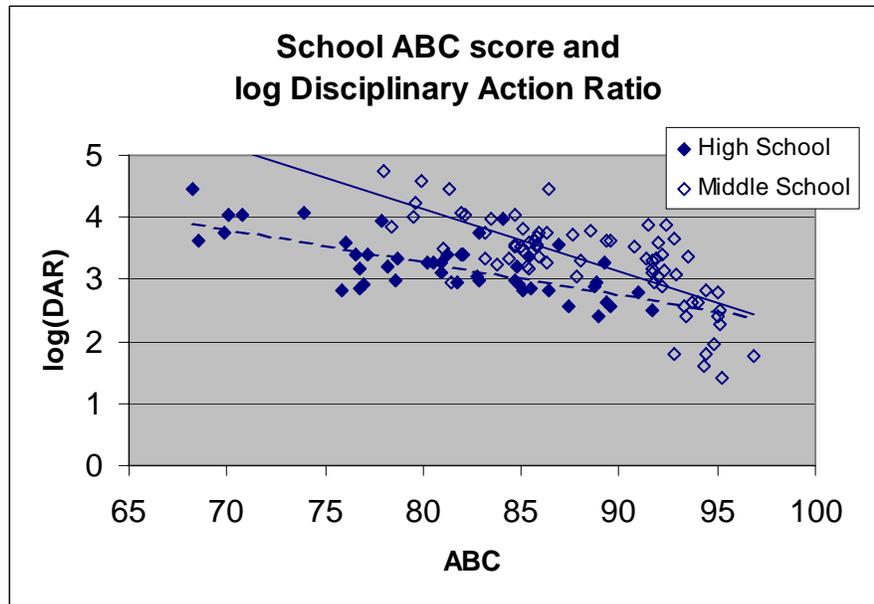


Figure 8

Scatterplot of Schools' logDAR and ABC-PC by Middle and High Schools

While the two regression lines are not as drastically dissimilar as those for the SES and ABC-PC relationships, they are visibly and significantly different. As illustrated, middle schools are expected to have a greater decrease in logDAR with increasing ABC-PC score than the high schools, as shown by the larger slope of the regression line.

Conclusion:

(H₃) is supported by the data. There is a significant relationship ($p < 0.0001$) between the middle schools' logDAR and the schools' overall performance on the ABC performance composites during the 2001 – 2004 school years.

(H₄) is supported by the data. There is a significant relationship ($p < 0.0001$) between the high schools' logDAR and the schools' overall performance on the ABC performance composites during the 2001 – 2004 school years.

Hypotheses Five and Six:

(H₅) The DAR, when used in conjunction with SES, will explain more variation in the middle schools' ABC performance composites (ABC-PC) than either does alone during the 2001 – 2004 school years.

(H₆) The DAR, when used in conjunction with SES, will explain more variation in the high schools' ABC performance composites (ABC-PC) than either does alone during the 2001 – 2004 school years.

At this point the regression model becomes slightly more complicated, as both explanatory variables – SES and logDAR – are entered into the regression equation to determine their relative covariance. It must also be emphasized that, when entering the independent variables into the SAS 9.1 software package for regression analysis, the logDAR covariate was entered first and SES covariate was entered second. The reasons for this action, as well its corresponding effect on the regression model, will be detailed shortly.

As before, the regression model, including both independent variables and indicator variables (dummy coding) to allow for different effects for the middle and high

schools, was strongly significant, as reflected in Tables 8 and 9. Again, the disaggregated model explains approximately 81 percent of the variation in the dependent variable. Table 9, as follows, summarizes the results of the entire regression output from the disaggregated model.

Table 8

Comparison of Aggregated and Disaggregated Regression Models

Dependent Variable: ABC Performance Composite (ABC-PC)

Independent Variables: Student Misconduct (logDAR) and Socioeconomic Status (SES)

Model	DF	F Value	p Value	R ²
All Schools (aggregated)	2	26.21	<0.0001	0.315
Disaggregated Schools	5	95.80	<0.0001	0.812

Table 9

Dependent Variable: ABC Performance Composite (ABC-PC)

Independent Variables: Student Misconduct (logDAR) and Socioeconomic Status (SES)

	DF	Parameter Estimate	<i>t</i> value	<i>p</i> value	Beta	Squared Semi-Partial Correlation Type I
<u>All Schools (aggregated)</u>						
<u>logDAR</u>						
	1	-6.46	-5.88	<0.0001	-0.62	0.310
<u>SES</u>						
	1	-0.06	0.85	<0.3951	-0.09	0.004
<u>Middle Schools</u>						
<u>logDAR</u>						
	1	-0.57	-0.76	0.45	-0.05	0.537
<u>SES</u>						
	1	-0.41	-8.33	<0.0001	-0.66	0.318
<u>High Schools</u>						
<u>logDAR</u>						
	1	-3.76	-2.73	0.0075	-0.36	0.486
<u>SES</u>						
	1	-0.64	-5.28	<0.0001	-1.02	0.134

As shown in the earlier models, disaggregating the data to separate the middle and high schools creates a much stronger model than when all of the secondary schools are lumped together. It should be stressed that the above outcomes, in particular the squared semi-partial correlations, are obtained from entering the logDAR into the regression model before SES. Reversing this order leads to identical parameter estimates and p values, but differing squared semi-partial correlations. Table 10, below, shows how changing the order of operations of the analytic software dramatically alters the squared semi-partial correlations. This is undoubtedly due to the strong correlation between SES and logDAR, previously detailed in Chapter 3 of this manuscript.

Table 10.

Comparison of Squared Semi-Partial Correlation Values

	Squared Semi-Partial Correlation Type I	Squared Semi-Partial Correlation Type I
<u>logDAR Entered Before SES</u>		
Middle Schools	0.537	0.318
High Schools	0.486	0.134
<u>SES Entered Before logDAR</u>		
Middle Schools	0.003	0.852
High Schools	0.036	0.584

When logDAR is entered into the regression equation before SES, some notable differences exist between the middle school and high school models. Consider, for example, the squared semi-partial correlation values for the middle schools. The squared semi-partial correlation for the logDAR covariate suggests that it could explain approximately 54 percent of the variation in the ABC-PC. Unfortunately, that value is not statistically significant ($p = 0.45$) and must be discounted. In the middle schools, therefore, SES reigns supreme with a squared semi-partial correlation of 0.318 while retaining the highest level of statistical significance ($p < 0.0001$). However, it is apparent that the addition of the logDAR covariate is not in any way detrimental to the SES middle school model, and adding logDAR to the regression equation may possibly provide some slight explanatory power that is not easy to detect in this study due to the relatively small sample sizes.

In the high school analyses, however, it is apparent that logDAR adds further explanatory power to the model. The logDAR covariate produced a squared semi-partial correlation value of 0.486, with a highly significant p value of 0.0075. SES, by comparison, has as less impressive squared semi-partial correlation value of 0.134, yet remains unquestionably significant with a p value of <0.0001 .

In summary, this model, containing both SES and logDAR while allowing for differences between middle schools and high schools, has slightly greater explanatory power than either the SES or logDAR model did alone, as shown by the R^2 values; 0.812 versus 0.798 and 0.694, respectively. The logDAR covariate was not statistically significant at the middle school level when SES was entered into the regression equation. Conversely, the logDAR covariate remained highly significant at the high school level, even after SES was added to the equation as a control variable.

Multicollinearity

Earlier in this section the author explained that, when entering the independent variables into the regression equation, logDAR was entered first and SES was entered second. This was done because the primary focus of this research project was on student misconduct and its effect on academic achievement, so emphasizing the logDAR covariate seemed to make sense. However, in the interest of responsible science, it must be reported that entering SES into the regression equation first and logDAR second alters the squared semi-partial correlation coefficients in the regression output considerably because the variables are so highly correlated. The following two scatterplots, Figures 9 and 10, graphically illustrate the high degree of correlation between the two independent variables. Figure 9, as follows, graphs the correlation when all middle and high schools are viewed jointly.

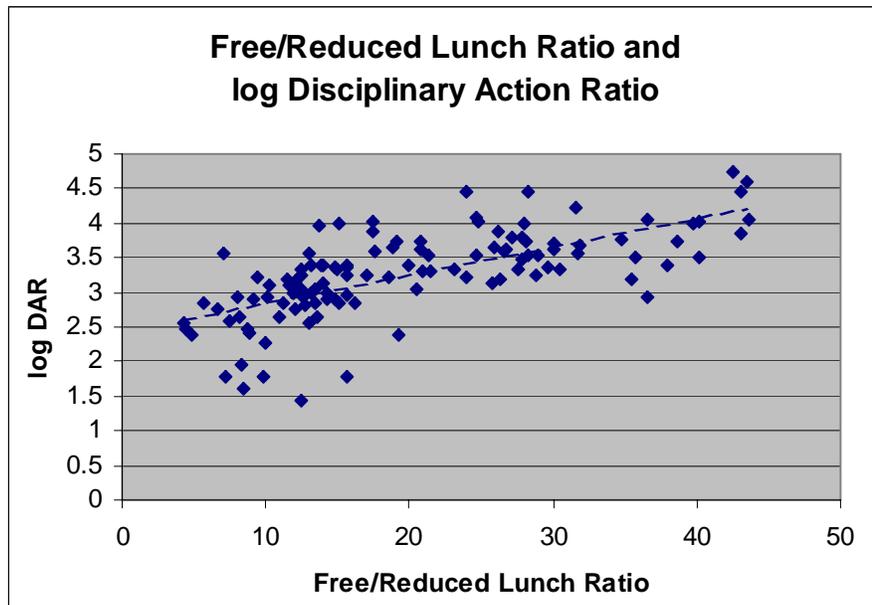


Figure 9

Scatterplot of Secondary Schools' logDAR and SES

This high degree of correlation ($r = 0.676$, $p < 0.0001$) between the SES and logDAR covariates, as shown for the aggregated schools, makes it difficult to separate the effects of the two variables within the same model. When disaggregated, even higher correlations are present within the middle schools and the high schools ($r = 0.758$ and $r = 0.759$ respectively, $p < 0.0001$ for both). Please refer to Table 3, Chapter 3, for all relevant correlations between variables. Figure 10, as follows, graphically illustrates these relationships when the data is disaggregated.

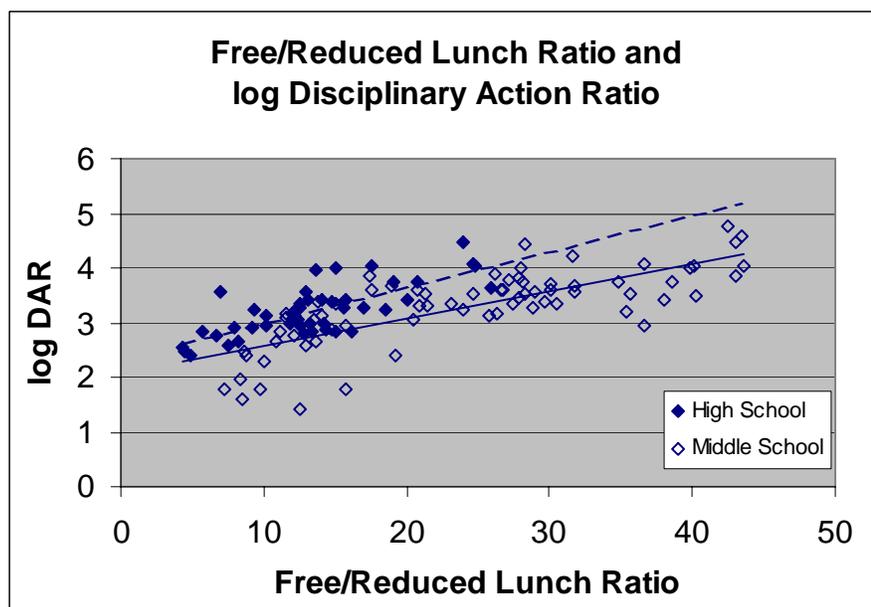


Figure 10

Scatterplot of logDAR and SES by Middle and High Schools

While there does appear to be a high degree of overlap between the variation of the ABC performance composite score explained by logDAR and the variation explained by SES, many reputable statisticians would argue against either variable being removed from the model (please refer to the section on *multicollinearity* in Chapter 3). Instead, while SES has shown to be a very strong predictor of the ABC-PC score, the logDAR covariate provides additional descriptive power – ultimately yielding a stronger model by using the two variables in conjunction.

Conclusion:

(H₅) is not strongly supported by the data. The overall regression model including both SES and logDAR as independent variables had a higher R² value than the

models using only one of the independent variables. However, while the addition of the logDAR covariate provides a slight improvement in the descriptive ability of the model when compared to the model using SES alone, logDAR is not statistically significant ($p = 0.4508$) at the middle school level when SES was also entered into the regression equation. Changing the order of operations of the analytic software (i.e., entering SES before logDAR, or entering logDAR before SES) does not alter this conclusion. Therefore, it would be unwise to conclude that the logDAR covariate is useful in identifying at-risk middle schools at this point in time. At the very least, it must be acknowledged that explanatory power of the logDAR covariate is called into question when SES is used as a control variable, at least at the middle school level. Nevertheless, it is possible that the addition of logDAR to the regression equation may provide a distinct improvement over the SES model alone, but the sample size is not large enough to definitively conclude whether such a difference truly exists, or whether this slight effect is due to random variation. More research is needed to address this issue definitively.

(H₆) is supported by the data. As noted earlier, the overall model including both SES and logDAR resulted in an initial R^2 value of 0.812. While this appears to be only a slight improvement over the regression model using SES alone, both independent variables in the model are strongly significant when the high schools are examined in isolation. Therefore, it is reasonable to conclude that both variables make an important contribution to the model, and logDAR can be useful in identifying at-risk schools at the high school level. In fact, when the logDAR covariate is entered into the regression equation before SES, the squared semi-partial correlations suggest that logDAR has much greater explanatory power than SES (0.486 versus 0.134, respectively).

Chapter Summary:

This chapter began by briefly reviewing the goals of this analysis and the definitions of the operational variables. The multivariate statistics, detailing the results of all regression analyses, were reported. It was determined that: 1) there was a statistically significant relationship between the middle schools' socioeconomic status and the schools' corresponding level of academic achievement, 2) there was a statistically significant relationship between the high schools' socioeconomic status and the schools' corresponding level of academic achievement, 3) there was a statistically significant relationship between the middle schools' measures of student misconduct and the schools' level of academic achievement, 4) there was a statistically significant relationship between the high schools' measures of student misconduct and the schools' level of academic achievement, 5) the regression model using both socioeconomic status and measures of student misconduct as explanatory variables revealed that a measure of student misconduct was not statistically significant at the middle school level when socioeconomic status was added to the regression model, 6) the regression model using both socioeconomic status and measures of student misconduct as explanatory variables revealed that a measure of student misconduct remained statistically significant at the high school level, even when socioeconomic status was used as a control variable.

The following chapter will discuss the results of the analyses within the larger context. Weaknesses and limitations inherent in this study will be acknowledged and addressed. Inferences will be drawn, and recommendations will be made for both policy and practice. The chapter will conclude with suggestions for future research inspired by this research project.

CHAPTER FIVE

Discussion

Introduction

Chapter One introduced the topic of this study and provided a broad overview of the entire research project. In the simplest terms, this analysis was intended to explore the relationship between student misconduct and academic achievement. To that end, a comprehensive review of the literature pertaining to this topic was presented and evaluated in Chapter Two. Chapter Three detailed the methodology that would be used to ascertain the strength of the relationship between student misconduct and academic achievement, with the larger goal of determining if a quantitative measure of student misconduct could prove useful in identifying “at risk” student populations. However, since the importance of socioeconomic status has been a longstanding pillar of educational research, a quantitative measure of socioeconomic status was introduced as a control variable in the final stages of the analysis. The previous chapter, Chapter Four, presented the statistics from all regression analyses; the regression output was structured around the six hypotheses first presented in Chapter One. This final chapter will discuss the implications of these results, as well as contextualize them within a larger frame of reference.

Summary of the Study

This was a non-experimental, *ex post facto* study conducted using middle and high school data collected from the Wake County Public School System’s Office of Student Due Process and the North Carolina Department of Public Instruction. It encompassed three academic school years, beginning in August of 2001 and ending in June of 2004. From the outset, the variables were operationally defined as:

1) socioeconomic status (SES) as measured by the schools' free or reduced lunch percentages; the higher the free or reduced lunch percentage, the lower the school's overall socioeconomic status, 2) student misconduct (DAR) as measured by the number of suspensions per 100 students in a given school year, and 3) academic achievement (ABC-PC) as measured by the schools' overall academic performance composites calculated through the state's accountability formulas. A data transformation was conducted on the DAR variable by calculating its logarithm (logDAR) to improve the normality of the variable's distribution. Regression analyses were run using the SAS 9.1 analytic software package to determine the nature of the relationships between: 1) SES and ABC-PC, 2) logDAR and ABC-PC, and 3) logDAR and ABC-PC while controlling for SES.

Summary of Results

The previous chapter stressed, on several occasions, that the results of the regression analyses were improved when the data was disaggregated by middle and high schools, versus looking at all of the secondary schools as a solitary group. More specifically, the R^2 value for the combined model, including SES, logDAR, and separate effects for school type, was a respectable 0.812. As noted in Chapter Four, this model was fit by including an indicator variable for school type. Commonly known as "dummy coding," this indicator variable, and its corresponding interaction with the independent variables in the regression model, was used to isolate either the middle or the high schools for disaggregated data analysis. In the aggregated model, the R^2 plummeted to 0.315 when the models were run without the indicator variable, which eliminated the opportunity to calculate separate effects by school type.

As a visual aid, scatterplots graphically illustrated much tighter fits around the regression lines with the disaggregated data. It is reasonable to conclude, at least for the purposes of this analysis, that the data collected from the middle and the high schools are fundamentally different in nature; therefore, the data is best analyzed in a disaggregated forum. Consequently, in the interests of brevity and simplicity, only the more accurate regression models – the ones run with separate effects for middle and high school – will be discussed in this final chapter.

The model using SES as the only independent variable strongly supported decades of research emphasizing the relationship between socioeconomic status and academic achievement (DF = 3, F = 149.08, $p < 0.0001$, $R^2 = 0.798$). The disaggregated data proved SES to be highly significant for both middle and high schools ($p < 0.0001$ for both). The squared semi-partial correlations for the middle and high schools suggested that the SES model accounted for approximately 85 and 58 percent of the variation in the schools' ABC performance composites, respectively.

The model using logDAR as the only independent variable produced results consistent with the body of research documenting the close relationship between student behavior and academic achievement (DF = 3, F = 69.07, $p < 0.0001$, $R^2 = 0.647$). Again, the disaggregated data showed logDAR to be a highly significant independent variable for both the middle and high schools ($p < 0.0001$ for both). The squared semi-partial correlations for the middle and high schools suggested that the logDAR model accounted for approximately 54 and 49 percent of the variation in the ABC performance composites, respectively.

The final model included both SES and logDAR as explanatory variables. As in the earlier analyses, this regression model – with both independent variables and

indicator variables to allow for different effects by school type – was strongly significant (DF = 5, F = 95.8, $p < 0.0001$, $R^2 = 0.812$). It was noted that this larger model, using both SES and logDAR as independent variables, had a greater R^2 value than the model using SES alone ($R^2 = 0.798$), or the model using logDAR alone ($R^2 = 0.647$).

Yet the model fit statistics, while enlightening, do not completely address H₅ and H₆. In order to better understand the nature of the relationship between SES, logDAR, and ABC-PC, it is necessary to consider the variance explained by the squared semi-partial correlations and the corresponding p values. The p values showed that, in the case of the middle schools, logDAR was not a statistically significant variable ($p = 0.45$) when SES was entered into the regression equation. SES, in contrast, remained strongly significant ($p < 0.0001$). For the middle schools, the squared semi-partial correlation values for logDAR and SES were 0.537 and 0.318, respectively. As for the high schools, the logDAR covariate remained significant ($p = 0.0075$) along with SES ($p < 0.0001$). The squared semi-partial correlations suggested that logDAR and SES explained approximately 49 and 13 percent of the variation in the ABC performance composite, respectively – at least when logDAR was the first independent variable entered into the regression equation. In summation, the data suggests that logDAR may be useful in identifying high schools at risk of academic failure, but its value in identifying troubled middle schools seems highly questionable.

Discussion

As colloquial wisdom dictates, “we all stand on the shoulders of the giants who came before us.” Members of the educational research community will readily recognize that this study is neither revolutionary nor groundbreaking in nature. It is, however, exactly what it was intended to be: an affirmation of what we already know, a

resounding confirmation of what we know to be important. As Moriarty writes, “we do not need new knowledge, nor expensive packaged innovations, or fads... we need to reevaluate what we already know and make better application of this existing knowledge... assert what we know and what we can do” (2003, p. 26). To this end, the following issues should be underscored at the conclusion of this study:

Socioeconomic Status

As emphasized earlier, the primary focus of this research project was to document how, and to what extent, student misconduct affected academic achievement.

Socioeconomic status was introduced in the final stages of the regression analyses as a control variable, yet its overriding importance seemed to, in some instances, overshadow the logDAR covariate – especially when the regression models were run in isolation. More specifically, SES accounted for approximately 85 percent of the variation in the middle schools’ ABC-PC, and approximately 58 percent of the variation in the high schools’ ABC-PC. By comparison, the logDAR model accounted for approximately 53 percent of the variation in the middle schools’ ABC-PC, and approximately 49 percent of the variation in the high schools’ ABC-PC. It is easy to understand why measures of socioeconomic status, such as the free or reduced lunch percentage, are so widely used to identify at-risk schools, districts, and student populations.

As the literature review in Chapter Two has shown, the premise is a sound one. Numerous studies have demonstrated that socioeconomic status is related to academic proficiency in reading and mathematical tasks, and nearly all racial and ethnic differences disappear when children are grouped into similar levels by SES (Coley, 2002). Yet this study illuminated an interesting facet of SES that has received little attention in the literature: the most commonly used measure of SES, the schools’ free or reduced lunch

percentage, drops markedly as the students progress from elementary to middle to high school. Consider, for example, the district selected for this analysis. The WCPSS Department of Evaluation and Research reports that, over a ten-year period ranging from 1993 to 2004, the elementary schools in the district had an average free or reduced lunch percentage of 28.36, the middle schools averaged 20.91, and the high schools averaged 11.91. As the students progress through the grades, there is a steady decline in the free and reduced lunch percentages – over a population with the same relative demographic profile.

The reasons for this phenomenon are not fully understood. It is reasonable to speculate that, as the students age, so do their parents – and a higher degree of affluence may naturally appear over time. It may also be reasonable to assume that, as the students age, they become more conscious of the social stigma that comes from accepting a government subsidy – and are consequently more reluctant to participate in the program. Yet for whatever reason, the SES covariate in this study lost much of its explanatory power between middle and high school, with the squared semi-partial correlation falling from 85 to 58 percent, respectively. Future, larger studies may show that alternative predictive variables – such as logDAR – may prove more useful than measures of SES in identifying at-risk schools, at least at the high school level. Until then, however, it is apparent that direct comparisons of schools without regard to the percentage of free or reduced lunch participation would not be equitable (Mulvenon, Ganley, & Fritts-Scott, 2001).

Student Misconduct

This study has shown that quantitative measures of student misconduct can be useful in identifying at-risk schools, at least at the secondary levels. Used by itself, the logDAR covariate was able to explain approximately 53 percent of the variation in the ABC-PC in the middle schools and 49 percent of the variation in the high schools. Most importantly, the regression models using both logDAR and SES had slightly greater explanatory power than the models using the covariates in isolation. If educational researchers, district administrators, or other interested parties wish to accurately identify the schools or districts at the greatest risk of academic failure when allocating their limited resources, it would be prudent to consider quantitative measures of student misconduct – such as logDAR – in conjunction with the traditional measures such as SES.

Quantitative measures of student misconduct could be used in other ways, and some of these uses may have far reaching effects. Many districts in the nation, for example, are assigning certain students to specific schools in an attempt to achieve “economic integration” (discussed in Chapter Two of this manuscript). In brief, the stated goal of economic integration is to balance the number of low SES students as equitably as possible, since the poverty level of the school influences the academic achievement of all children, including those from more advantaged families (Kennedy, Jung, & Orland, 1996). In other words, the canon of educational research warns against having schools with large concentrations of students at a high risk of academic failure; student achievement shows sharp declines when the school poverty concentration rises

above 40 percent (Lippman, Burns, & McArthur, 1996). But given the importance of student conduct and its strong relationship to academic achievement, it may be wise to consider quantitative measures of student behavior, as well as SES, when attempting to balance school populations.

The Wake County Public School System, for example, currently tracks the SES of each population node, or attendance zone, that is assigned to each school in the district. Again, the goal is to equally distribute the students at the highest risk of academic failure across the schools in the district as equitably as possible. Adjustments are made on a periodic basis, with significant student reassignment plans appearing every few years. Tracking the DAR of each population node or attendance zone, along with other demographic data such as SES, may help the district to better achieve its stated policy goals – and the students at the highest risk of academic failure may be more efficiently dispersed. Future research into the predictive value of other indicator variables may also prove useful in achieving this policy goal.

Policy Recommendations

As Gable (2002) has written, schools must root out flawed and ineffective practices currently in place and replace them with more effective, efficient, and relevant practices based on the prioritized needs of target students. To that end, the following three recommendations can be proffered based on a review of the relevant educational research and the results of this analysis:

1. Use the logDAR covariate, or similar quantitative measures of student misconduct, in conjunction with SES when seeking to identify at-risk schools and/or student populations. While these analyses demonstrated only a modest improvement in the predictive ability of the regression model, the

improvement is promising enough to warrant implementation and evaluation – at least on a trial basis.

2. Greatly strengthen and improve the quality and the amount of training educators receive in effective behavior management. This recommendation, naturally, applies to the pre-service teacher training typically provided by colleges and universities. However, the research shows that continuing, ongoing staff development in behavior management strategies provides significant benefits to veteran teachers as well. Student misconduct and academic achievement have a significant relationship; an improvement in one variable will almost certainly yield a corresponding improvement in the other. To that end, focusing on increasing the capacity of school personnel to deal more effectively with inappropriate behaviors should become one of the top priorities in our nation’s schools (Oudeans, 2003).

3. Implement effective schoolwide behavior management programs that we know to be effective. Many behavior management plans and strategies, such as “zero tolerance” policies, are not supported by research (see Chapter Two). However, effective behavior supports are not a patchwork of reactive behavior management plans developed incident-by-incident or student-by-student (Todd, Horner, Sugai, & Sprague, 1999). In reality, the research shows that the key to effective behavior management lies in proactive instruction in dealing with challenging behaviors (Oudeans, 2003). Furthermore, students are more likely to cease misbehavior when interventions are designed to promote a replacement behavior that more effectively satisfies the same need (Gable & Hendrickson, 2000). In short, schoolwide behavior support

networks may produce notable improvements in academic achievement, but only if they are selected and implemented wisely. As Moriarty has written, “greater punishment is too simplistic an idea... the problems of violence and aggression are many and varied; so too, must be the solutions” (2003, p. 25).

Study Limitations

Many of the limitations inherent in this study were outlined at the outset of this project in Chapter One. The data used in these analyses, for example, was collected over a three-year period from one large Southeastern school district. Using data from a single district makes the sample size seem relatively small, especially when viewed from a statewide or nationwide perspective. Furthermore, some would argue that the narrow focus of the study weakens its ability to be generalized to other regions. However, similar studies in other geographic areas of the nation are likely to yield similar results. The data that was collected and analyzed to address the initial research questions, along with the canon of supporting educational research, document the strong relationship between student conduct and academic achievement. Future, larger studies may show the relationship between student conduct and academic achievement to be even stronger than the relationship that was found in this single district.

Secondly, this study selected two impact variables in its attempt to explain the covariance inherent in the schools’ academic performance composites. Obviously there are other variables, not selected for this analysis, that may have tremendous predictive value – variables that may interact with SES and logDAR in various and sundry ways. As shown in Chapter Two, the body of research has documented multiple factors that appear to have some bearing on students’ behavior and their subsequent educational outcomes. Some of these variables are relatively easy to measure and analyze, such as

students' race, gender, special education status, reading level, English proficiency, etc. Simultaneously, other variables affecting behavior and/or educational outcomes are much harder to accurately identify and measure, such as parenting styles, the parents' level of education, family status... and the list goes on. But building an enormous regression equation with a myriad of variables is well beyond the scope of this exercise, since this research project was intended, from its inception, to be tightly focused on students' misconduct and its relationship to the schools' academic achievement. Yet it must be acknowledged that this study ignored, perhaps to its detriment, other control variables that may have shed even more light on the relative predictive value of the logDAR covariate.

On a final note, it is apparent that socioeconomic status, student behavior, and academic achievement are deeply intertwined and intimately connected. The actual correlations among these variables, listed in Chapter Three, were so strong that multicollinearity became a serious concern in the regression analyses. While the multicollinearity factor did not undermine the methodology of this study nor the conclusions that were reached, its appearance does spotlight the fact that the educational variables we researchers have so diligently studied are part of an extraordinarily complex matrix. The sheer multitude of these variables, as well as the possible range of their values, makes predicting educational outcomes an enduring challenge for researchers.

Suggestions for Future Research

It is possible, and even likely, that future studies with sample sizes large enough to definitively overcome the multicollinearity issue may demonstrate that the logDAR covariate has even greater explanatory power than was found in these regression models, and it may even surpass the predictive value of SES at the high school level where the

number of students participating in the free or reduced price lunch program are relatively small. With the relationship between student conduct and academic achievement so well established, and with so much at stake, it would be wise continue our research in this area. Similarly, in our quest to improve the academic achievement of our students, we must acknowledge that there is little we can do to improve the SES of the students we serve. We can, however, do much to encourage and maintain appropriate behavior – which would undoubtedly reap huge rewards in the classroom. To that end, it is important to focus on the factors we can control; to continue our research into promising behavior management strategies and techniques; to carefully evaluate behavior modification programs and school-wide discipline plan; to make data-based, scientific decisions about what is working and what is not. Improving student behavior will, in all likelihood, produce a corresponding increase in academic achievement.

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