DISTRICT LEVEL ACHIEVEMENT GAP BETWEEN THE DISTRIBUTION OF CAUCASIAN AND AFRICAN AMERICAN DISTRICT MEANS ON THE 2003/2004 OHIO 4TH GRADE READING PROFICIENCY EXAM

A Thesis

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By

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ABSTRACT

To help school districts close the achievement gap that exists between the district level means for African American and Caucasian on the 2003/2004 4th grade reading proficiency scores, researchers must first understand how elements of the school district are related to district level achievement. This thesis approaches this inquiry from the perspective of educational equity at the district level in adherence with No Child Left Behind (NCLB) legislation of 2002. School districts can play a positive role in the successful implementation of NCLB. They act as a liaison between the state and the building level to manage adherence of NCLB reform.

NCLB is an admirable venture, but is it too ideal? The legislation does not consider what portion of district achievement can be attributed to the quality of the students that live within the boundaries of the district. How does the location of the district contribute to the mind-frame of the students and families living in the district, or what are the organizational priorities of the district? Or do any of these make a difference in district level achievement?

This research investigates whether certain aspects of school districts are related to district level academic performance in reading as measured by Ohio's 2003/2004 fourth grade reading proficiency test. This study provides a multiple regression analysis for the evaluation of variables that have a may have a relationship with the district achievement disparity between the distribution of 4th grade Caucasian and African

American district level mean score. These variables are categorized into three groups: district student characteristics, district context, and district organizational structure.

Dedicated to my husband, Matthew Ellis.

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FIELDS OF STUDY

Major Field: Education

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CHAPTER 1

INTRODUCTION

1.1 Overview

This research investigates whether certain aspects of school districts are related to district level academic performance in reading of fourth graders in Ohio as measured by the 2003/2004 Ohio fourth grade reading proficiency test. Reading was chosen for analysis because reading proficiency is often considered a predictor of subsequent academic success (Huba, Kontos, & Robinson, 1989). Therefore, the research questions ask:

- What are the relative relationships between district level student characteristics, district contextual issues, and district organizational decisions on the district mean score for African American and Caucasians on Ohio's 2003/2004 reading proficiency test?
- Which of these classifications of variables contributes the most variability to the district mean achievement of African American and Caucasians on the 2003/2004 4th grade reading proficiency scores in Ohio?

To help school districts close the achievement gap that exists between the district level means for African American and Caucasian on the 2003/2004 4^{th} grade reading proficiency scores, researchers must first understand how the above forces are

related to district level achievement. The paper approaches this inquiry from the perspective of educational equity at the district level in adherence with No Child Left Behind (NCLB) legislation of 2002. School districts can play a positive role in the successful implementation of NCLB. They act as a liaison between the state and the building level to manage adherence of NCLB reform. School districts have the power to provide the capacity necessary for an equitable education to help close the achievement gap with focused reform at the district level (Scheurich & Skrla, 2003; Rorrer, Skrla, & Scheurich, in press).

After analyzing variables related to student characteristics, district context, and district organizational structure this study offers insight into the relationships these school district forces have on the district reading achievement of fourth grade African American and Caucasian scores. This chapter will provide background information on the achievement gap with an overview of the groups of variables employed in this study, and offer expectations for the present analysis. Next, this chapter will provide a statement of the problem posed in this study, a conceptual framework of the research, and state the purpose and objectives of the research. This chapter will also name limitations and assumptions of this research, and state how this study will contribute to the literature on the district level achievement disparity between the distribution of Caucasian and African American 4^{th} grade reading proficiency in Ohio. The last section in this chapter will provide a layout of the subsequent chapters.

1.2 Background: Achievement Gap between African American and Caucasian

Currently, Jencks and Phillips (1998) stated the achievement gap between African American and Caucasian students has narrowed over the last 25 years, and both African American and Caucasian students are performing higher on proficiency tests than they did in the early 1970s. NAEP has been testing nine, 13, and 17 year-old students since the early 1970s in mathematics, science and reading, and in 1984, NAEP added a writing test to the test battery. The average score for reading achievement as recorded by the National Assessment of Educational Progress (NAEP) longitudinal data shows that in 1971, nine year old Caucasian students scored an average reading proficiency of 214.0, SD=0.9 and the average African American nine year old scored 170.1, SD=1.7. The 1999 data denotes that in reading, nine year old Caucasian students scored an average of 221.0, SD=1.6 and African American nine year olds scored an average of 185.5, SD=2.3 (National Assessment of Educational Progress , 2005). Longitudinal data for reading achievement for the years 1971 to 1999 indicates that in 1999 the African American 95th percentile of achievement is only at the 75th percentile of Caucasian achievement for students at age nine; African American 95th percentile of achievement is only between the 75th and 90th percentile of Caucasian achievement for students at age 13. Lastly, the African American 95th percentile of student achievement is only at the 75th percentile of Caucasian achievement for students at age 17.

Early research on the achievement gap as conducted by James S. Coleman (1966) looked at variables related to family backgrounds of Caucasian and African American students and their widely different social and economic differences

(Rothstein, 2004). Through his research he determined that all students learn in school; however, schools themselves have demonstrated limited ability to change differences in the rate at which children from different social classes' progress through school. According to Coleman (1966) this is because low achievement among lower class students was a by-product of low-income. Moreover, the culture of low-achievement in school affected African American students to a greater degree than Caucasian students (Caldas & Bankston, 1997) because on average more African American students come from low-income families (Social Venture Capital Foundation, 2004). Therefore, according to Coleman's early research on the achievement gap phenomena, schools cannot be held solely accountable for closing the achievement gap citing low-income and poverty as the greatest predictor of low scholastic achievement.

The work of Coleman (1966) were widely accepted by schools and the academic community. Presently, Coleman's research is being challenged by an emerging body of research that cites district reform as having a relationship to district level achievement and working to close the achievement gap (Scheurich & Skrla, 2003; Rorrer, Skrla, & Scheurich, in press). Studies of effective school districts identify a number of variables that when strategically implemented to work interdependently, predict student positive outcomes (Rorrer, Skrla, & Scheurich, in press, Abbott, Joireman & Stroh, 2002; Zhang & Zhang, 2004). This research cites dynamic leadership, clear district goals, curriculum alignment, data driven decision making and focused professional development as the pathway to closing the district achievement gap. (Rorrer, Skrla, & Scheurich, in press, Abbott, Joireman & Stroh, 2002; Zhang & Zhang, 2004).

1.3 Student Characteristics

Students bring to school certain characteristics that can impact their overall academic performance. A body of research has investigated the relationship of academic performance with socioeconomic status (Caldas and Bankston, 1997; Klingele and Warrick, 1990), family relationships (Taylor and Lopez, 2005), health (Milton, Whitehead, Holland, & Hamilton, 2004), and peer influences (Kindermann, 1993; Berndt and Keefe, 1995) to conclude these areas of student characteristics have a significant relationship with academic performance. Researchers have investigated the relationship of attendance rate in school with health and family structure, (Parcel, Gilman, Nadar, & Bunce, 1979; Jeynes, 2003) and the relationship of socioeconomic status of the school district with student achievement (Caldas and Bankston, 1997). The following paragraphs will discuss the findings for these studies.

Students who attend a high percentage of school days, on average, perform better in school than those students who miss a high percentage of school days (Fowler, Davenport, & Garg, 1992). On average low-income students are absent more frequently than middle and high-income students (Rothstein, 2004) due to health issues that can be attributed to living in urban areas. Low-income students are mostly minority and mostly live in urban areas. These urban areas often report higher incidences of asthma (than non-urban areas), which is cited as the most frequent reason for students to miss school (Parcel, Gilman, Nader, & Bunce, 1979). In addition, urban areas tend to have a higher concentration of low-income students (Rivkin, 1994) and low-income students tend to be minority (Caldas and Bankston, 1997).

In addition to increased health issues among low-income and minority students as a contributor to absenteeism, family influence has an influence on absenteeism as well. The way a family unit perceives schooling has been associated with whether or not the student attends school with any amount of frequency (Taylor and Lopez, 2005). Low-income families also have different norms concerning grades and in-school behavior. Low-income families claim to enforce strict rules about school and grades, but tend not to follow through with consequences if the student receives poor grades or causes trouble in school (Rothstein, 2004). Middle and high-income families have a tendency to reinforce positive behaviors about school and follow through with consequences if students perform poorly at school (Rothstein, 2004).

The school context has also been shown to have a relationship with student academic behavior and subsequent student achievement. Differences in school infrastructure have been shown to have a relationship with average school attendance (Branham, 2004). When school facilities are in ill repair, students feel that school is not worth attending. They feel that they are not cared for nor do they feel that the administration cares about their education (Branham, 2004). More schools in urban areas than in suburban areas are in need of repair. Schools in urban areas are older than in suburban areas; the age of the buildings often determines the condition of the heating and air system. If these systems are not in proper working order thy can emit toxins that have been correlated to higher incidences of respiratory illnesses, including asthma, that also have a relationship with non-attendance at school (Mendell and Heath, 2004; U.S. Environmental Protection Agency, 2005).

The percentage of disadvantaged students within the school has been shown to influence overall school performance; high concentrations of minority students within a school are negatively correlated with high student achievement outcomes (Bankston and Caldas, 1996). This may be the reason urban and rural school districts, which tend to have more disadvantaged students, on average, perform lower on proficiency tests than students in wealthier suburban school districts. Research on peer groups in schools indicates that students tend to affiliate with peers who share a similar motivation toward school performance (Kindermann, 1993). As a school, if there is a high concentration of students who do not place value on school performance, they have the potential to drag down the performance of the entire school (Bankston and Caldas, 1996; Caldas, 1993; Klingele and Warrick, 1990).

1.4 District Context

School district context refers to the interrelated conditions in which the district exists. Among these contextual conditions of districts are size and location. These two conditions of districts have been shown to be related to student outcomes specific to the district in which students live. On average, students in suburban school districts perform better on proficiency tests than their peers in urban and rural school districts (Thirunarayanan, 2004; Sipple, Benjamin, & Faessler, 2003). More affluent students attend school in the suburbs and lower income students attend school in urban and rural districts. Research has shown there is also a with the size of the district also impacts the achievement gap because urban school districts that tend to have higher concentrations of African American students also tend to be larger than suburban districts which tend

to have high concentrations of Caucasians; rural districts are small because of their rural setting and in Ohio are mostly Caucasian.

For some districts, providing a high quality education is more difficult than it would seem. NCLB requires that states must hire only qualified teachers to work in their school districts. However, some school districts have a difficult time staffing with qualified teachers. This problem is due to their location within the state. Rural and urban districts must compete with suburban districts for qualified teachers because many times, suburban districts pay higher salaries and even offer signing bonuses for hard to staff content areas like special education or science (Opfer, Olejownik, & Ellis, 2004).

In addition to difficulties staffing buildings with qualified teachers, rural and urban districts face the problem of providing a vision of the future for their students. Many students in rural school districts feel an obligation to stay close to home and not pursue higher education (Johnson, Elder, & Stern, 2005). This strong local tie to the rural community may have a relationship to school performance because the students do not want to leave the community for college; therefore, they do not exert strong effort in kindergarten through 12^{th} grade. Urban districts, especially districts that have more than 75 percent of its students classified as disadvantaged, suffer higher rates of absenteeism and more negative attitudes toward learning than students in suburban and rural districts (The Conditions of Education, 2005).

District size also has a relationship with student achievement, but this relationship acts differently depending on location and socioeconomic status of the

district (Bickel and Howley, 2000). More specifically, large school districts show a larger negative relationship between school poverty and student achievement, indicating that when poverty is high, students perform better in small districts. Conversely, research also indicates that wealthier districts are less affected by district size (Bickel and Howley, 2000).

Moreover, the interaction of school district size and school poverty has shown to have a significant relationship (Howley and Bickel, 2002). This directly affects the achievement gap because urban school districts tend to be larger than suburban and rural districts (Rivkin, 1994) and urban school districts tend to have high concentrations of African American students (Rivkin, 1994). Districts with high concentrations of African American students tend to be poor (Caldas and Bankston, 1997), and on average school districts with a disproportional number of students from poor families, have low achievement scores on proficiency tests (Bankston and Caldas, 1996).

1.5 District Organizational Structure

School districts' organizational structure, i.e., hiring certified teachers and class size limits, may also have a relationship with student achievement. School districts are able to control certain aspects of school structure. NCLB requires that all teachers be highly qualified in the core academic content area(s) they teach and placing major emphasis upon teacher quality as a factor in improving achievement for all students. It is up to the school district to only hire highly qualified teachers. This is sometimes a problem, because as earlier stated, some school district have difficulties hiring qualified

teachers. In addition, school districts control how large or small the total class size within their district.

Highly qualified teachers become highly qualified through various routes. Many teachers enter the profession through teacher preparation programs at colleges and universities. Other teachers enter the profession through alternative certification programs. Whichever way the teacher enters the profession, state certification must be met before the teacher can be labeled as highly qualified. This strand of reform imposed by NCLB stems from research that reveals a positive relationship between teacher certification and student performance (Darling-Hammond, 2000a). It is generally accepted that teacher certification means that a teacher has completed a teacher preparation program or has completed an alternate licensure program. Many states also require a test of basic skills in the subject area of certification along with a test of professional knowledge. To be a highly qualified teacher in Ohio, teachers must be fully licensed in the area they teach, and fulfill specified professional development hours (Highly Qualified Teacher, Ohio Department of Education, 2004).

Class size has a long research history that has revealed questionable evidence between the relationship of class size and student achievement due to the lack of internal validity within studies (Slavin, 1989). A study in Tennessee did produce evidence that small class sizes in early grades yield significantly higher achievement over those students in medium and large classes (Word, Johnston, Bain, Fulton, Zaharias, Achilles, Lintz, Folger, & Breda, 1990). At the end of the first year of the project, results for kindergarten showed an advantage for small classes in achievement

over regular average size classes, but no significant advantage over classes with a teacher's aide. The results for first grade indicated that students in small classes significantly outperformed in regular average classes and classes with a teacher's aid. In second grade students in small classes continued to outperform students in regular classes and regular sized classes with a full-time aide. Last, third grade students in STAR outperformed third grade students in regular average size classrooms and classrooms with teacher's aides (Word, Johnston, Bain, Fulton, Zaharias, Achilles, Lintz, Folger, & Breda, 1990). However, the achievement gains are not sustainable and are mostly erased as students' progress in grade. Even though this study did supply evidence for a positive relationship between small classes and increased student achievement, critics feel the gains in achievement are not large enough or last long enough to spend resources to supply smaller classes.

1.6 Research Expectations

Given the research on district student characteristics, district context influences, and district organizational structure, would it be expected to observe that district student characteristics will have the greatest relationship with district achievement on the 2003/2004 4^{th} grade Ohio reading proficiency test. Within district context, it would then be expect that in large urban districts there would be high concentrations of minorities and poverty and that the interaction of poverty and location would result in a low district mean achievement score. In small rural districts we would expect to have higher percentages of disadvantaged students than suburban districts, but less of a minority population within the district. However, given the socioeconomic advantage

found in suburban districts, high district mean achievement would occur. It would also be expected to observe that teacher certification will have a significant relationship with a high magnitude of contribution with the distribution of African American means in urban school districts. Also, it would be expected to observe that average class size have a small magnitude, if found to be significant, of influence on the distribution of Caucasian and distribution of African American district means.

1.7 Statement of Problem

An achievement gap between African American and Caucasian students exists in the Unites States (Jencks & Phillips, 1998). To help ameliorate this problem, the Senate passed a bi-partisan bill, signed by President Bush that changed the federal government's role in kindergarten-through-grade-12 education by asking America's schools to describe their success in terms of what each student achieves on state testing. This legislation, the No Child Left Behind (NCLB) Act, was enacted to provide all students an equal chance at receiving a quality education. According to the U.S. Department of Education, the act is based on four education reform principles: stronger accountability for results; increased flexibility and local control; expanded options for parents; and an emphasis on teaching methods that have been proven to work (U.S. Commission on Civil Rights, Office of the General Counsel, 2004).

NCLB presents a nation-wide goal for our educational system, and grants states autonomy to design accountability systems to meet federal NCLB standards. School districts can play a positive role in the successful implementation of NCLB. School districts are between the state and building level; they act as a liaison between the two

organizations to manage building-level adherence of NCLB reform. School districts have the power to provide the capacity necessary for an equitable education to help close the achievement gap with focused reform at the district level (Scheurich & Skrla, 2003; Rorrer, Skrla, & Scheurich, in press).

1.8 Conceptual Framework

Federal reform requires states to describe their success in providing an equitable education to students in terms of how students perform on state proficiency testing. NCLB was established to help ensure all students receive a quality education with special focus on students in low-income and failing school systems in an attempt to lessen and ultimately close the achievement gap between African American and Caucasian students. This paper offers empirical research on the relative relationship between student characteristics, district context, and district organizational decisions that have been shown to influence the performance of African American and Caucasian students.

Reading proficiency implies a thorough competence derived from training and practice. Past research has revealed student characteristics such as socioeconomic status and ethnicity have a relationship with levels of experience and exposure to learning (Rothstein, 2004). These characteristics are associated with where students attend school and how the school they attend manages learning. Within this framework, it can be expected that student characteristics, district context, and district organizational structure will have strong relationships with reading achievement. Student characteristics may contribute the most variability to district reading

proficiency because district context and district organizational structure are tightly controlled environments dictated by NCLB reform. Student characteristics vary from household to household because federal and state law is unable to tightly control student households.

1.9 Purpose and Objective of Study

Within the conceptual framework of NCLB this thesis addresses two related research questions, both of which fit together under the broader question of how school districts impact elements that contribute to the achievement disparity between African American and Caucasian students. The study provides an empirical analysis of achievement inequality using Ohio district mean scores for 4th grade reading proficiency collected from the 2003/2004 reading proficiency exam. It is important to note that using district means as the dependent variable does mute within district and between district variability. Muted variability will lower the standard errors. This is important because low standard errors have a higher probability to yield significant test statistics. Therefore, if the standard errors are artificially low due to muted variability in the unit of analysis, the analysis could be biased due to artificially inflated test statistics, resulting in a Type I error.

The study first addresses the question of the relative relationship between student characteristics, district context, and district organizational decisions on the achievement of African American and Caucasian students. Each of these categories will be measured by two independent variables. Using multiple regression, the study will be able to examine the relative relationship of each variable on the district mean

score of the 2003/2004 4th grade reading achievement for African American and Caucasian students.

Secondly, the study will analyze the contribution of variability for each of the classifications of variables. By being able to discern the contribution of variability, researchers can have a more in-depth understanding of what variables contribute to the achievement gap and make data driven decisions to help ameliorate the achievement disparity.

1.10 Limitations

A limitation of this study is that many rural school districts in Ohio have less than ten African American students per district. State privacy law prohibits the release of scaled scores of student groups with less than ten students per group. Therefore, district mean scores for those districts that have less than 10 Caucasian or African American students reported to be living within the district, will be assumed to have zero students of that ethnicity in the district. Those particular districts will be categorized as not having a mean score to represent reading achievement. The study will employ the mean district level scores for 608 Ohio school districts. (There are 612 districts in Ohio, four will not be used because they are very small, isolated districts on islands in Lake Erie). Ohio has many more Caucasian students than African American students; therefore, a limitation of this study is a small population of African American students as compared to Caucasian students.

Another limitation of the study is the use of district means as the dependent variables. This limitation takes two forms: lessened variability in the individual

proficiency scores, and each district was counted as one unit, not weighted according to size of the district.

As mentioned in the previous section, the use of district level means lessens both the within district and between district variations. The within district variation is lessened because using the means mutes the variability of student level scores. This could confound the results because it could be expected that district level performance could have a relationship to the types of students that live in the district. The between district variation is compromised because in this study each district was considered to have the same weight in the analysis (a weight of one). This could confound the results of the study because school districts in Ohio vary in size, and it could be expected that size would have a relationship to district performance.

The muting of variation in the overall data set by using district means could lessen the yielded standard errors. This is important to note because small standard errors are more likely to reveal significant test statistics. Therefore, an artificially low standard error could have the potential to yield a Type I error. A Type I error in this analysis would indicate that this study yielded significance when actually there is no significance due to muted within and between district variability.

1.11 Assumptions

This study works under the assumption that school districts have the goal to provide an equitable education and increase proficiency test achievement for all students. This is a reasonable assumption because if schools fail to meet their annual target for achievement, NCLB triggers a mandatory set of costly remediation efforts.

One of these remediation efforts includes supplemental tuition services and offers to move children to different schools where space is available in search of an effective education (U.S. Commission of Civil Rights, Office of the General Counsel, 2004). This remediation effort may potentially remove students from one school district and place them in another district. This movement of students could cause school districts to lose funding. Technically, the provisions of NCLB apply to schools (U.S. Commission of Civil Rights, Office of the General Counsel, 2004), but districts are the liaison between state and local governments for school buildings. Therefore, if schools do not meet NCLB standards school districts also feel the consequences.

In addition to federal expectation of upholding NCLB legislation, school districts in Ohio are held accountable by the Ohio Department of Education statewide accountability system. One component of Ohio's accountability system is that Ohio districts can have one of five classifications: excellent, effective, continuous improvement, academic watch, or academic emergency. A consequence of not meeting district goals for improvement translates to dropping a classification in the district designation rating system and a funding cut (Ohio Department of Education, Center for School Finance, Office of Federal Programs, 2004)

1.12 Contributions to the Field

This paper extends the literature by applying empirical analysis of achievement data to understand the current achievement disparity between Ohio's African American and Caucasian population. By quantifying the relationship of the variables that contribute to disparate academic performance between African American and Caucasian

students, educators and policymakers will have a better understanding of the nature of achievement differences.

This study provides a multiple regression analysis for the evaluation of variables that may have a relationship with the reading disparity between the distribution of 4th grade district means for African American and Caucasian on the 2003/2004 Ohio reading proficiency exam.

By examining the variables that contribute to the achievement disparity, this study advances the analysis of educational equity at the district level. By understanding how school districts may play a part in the achievement gap, policymakers can use the information provided by this study to further understand how school districts can help to provide equitable education.

By providing distributions of district means to quantify the achievement between African American and Caucasian 4^{th} grade reading proficiency, this study will enable future inquiry into the relationships of district context, organizational structure, district student characteristics with district level achievement and what measures can be taken to close the achievement gap.

1.13 Layout of the Study

The first chapter has provided the reader with an overview of the research problem and background of the problem. The second chapter examines the literature that supports the research questions, i.e., district level student characteristics to be represented by the percent disadvantaged in the district and percent attendance for the district; district context with regard to district size and location on overall achievement;

district organizational structure with regard to relationships between class size, certified teachers and student outcomes. The chapter details how these categories of variables take different forms across ethnicity and income level.

The third chapter presents the empirical methodology employed in the analysis, assumptions of the model to be used, variable selection, and data collection. This chapter also includes results of the statistical analysis.

Chapter four provides a discussion of findings, results and conclusions drawn from results. Chapter five provides a summary of the study and offers recommendations for future research on district level achievement disparities.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

The purpose of this chapter is to provide a literature review of the prior research concerning the variables used in this study. In the following three sections the three categories of variables will be discussed: student characteristics, district contextual issues, and district organizational structure.

First, the section on student characteristics will review the literature with regard to the relationship school absenteeism and student demographics within the school district have with district level achievement. Absenteeism will discuss the following topics: health issues of students within a school and district, parents' education of the students in the district, family expectations of the students in the district, and school building infrastructure of the district. The section on student demographics will discuss the relationship residential segregation has with district achievement, the relationship student peer groups may have with district achievement, and the relationship that African American role models may have on African American students in a school district.

Next, the section on district context issues will review the literature with regard to the relationship school district size and location may have with district achievement. The section on school district size offers a review of studies the found significant relationships to district size and district achievement. The section on district location

offers a review of the literature with reference to rural, urban, and suburban school districts. This section will also discuss the problems school districts have with attracting teachers, and the special needs of school districts that may have a relationship with district achievement.

Last, the section on district organizational issues will review the literature with regard to the relationship that class size and certified teachers has with district achievement. The section on class size will offer a review of previous studies conducted on the relationship between class size and student achievement. The section on teacher certification will discuss teacher quality with regard to teacher preparation, certification, knowledge of pedagogy, and knowledge of subject matter.

2.2 Student Characteristics

The following section will review the literature that suggests a relationship between school absenteeism and student demographics within the school district, have with district level achievement. The section on absenteeism will discuss the following topics: health issues of students within a school and district, parents' education of the students in the district, family expectations of the students in the district, and school building infrastructure of the district. The section on student demographics will discuss the relationship residential segregation has with district achievement, the relationship student peer groups may have with district achievement, and the relationship that African American role models may have on African American students in a school district.

2.2.1 Absenteeism and Achievement

Researchers believe school attendance can predict academic success and behavioral problems in school (Taylor & Lopez, 2005; Caldas, 1993; Milton, Whitehead, Holland, & Hamilton, 2004; Fowler, Davenport, & Garg, 1992; Parcel, Gilman, Nader, & Bunce, 1979). In addition, Research suggests that certain characteristics students bring to school such as health (Milton, Whitehead, Holland, & Hamilton, 2004; Fowler, Davenport, & Garg, 1992; Parcel, Gilman, Nader, & Bunce, 1979), and family structure (Taylor & Lopez, 2004; Jeynes, 2003) have a relationship with their school attendance. There is also research to suggest school infrastructure (Branham, 2004; Mendell & Heath, 2004) may also have a relationship with student attendance. All in all, if children do not come to school, the best teachers, the best principals, and the best administrators have absolutely no value in improving education (Branham, 2004).

One cause for absenteeism that has been documented in prior research is the health issues of children. Children with asthma are at more risk of school absence than their healthy peers (Milton, Whitehead, Holland, & Hamilton, 2004; Fowler, Davenport, & Garg, 1992; Parcel, Gilman, Nader, & Bunce, 1979). "Most of the current epidemiologic research on childhood asthma has focused on demographic and environmental risk factors" (Fowler, Davenport, & Garg, 1992, p. 939) with children living in deprived areas being found to have higher rates of diagnosed asthma than their more affluent peers (Milton, Whitehead, Holland, & Hamilton, 2004). Rothstein (2004) said the asthma rate is substantially higher for urban than for rural children whose

families are disadvantaged than for non-disadvantaged families and for children from single parent than from two-parent families. This is particularly a problem for African American students because more low-income students tend to be African American (Social Venture Capital Foundation, 2004). On average, middle class children get medical treatment for asthma more often then their low-income peers that could contribute to an overall higher absenteeism rate for disadvantaged students (Rothstein, 2004).

Evidence suggests that microbiological, chemical exposure from indoor sources (Mendell & Heath, 2004), and building maintenance (Branham, 2004) have a relationship with school attendance.

Indoor microbiological sources such as mold and chemical pollutants as well as a variety of emissions from poorly maintained air conditioning systems have been related to a broad range of adverse health symptoms such as lung inflammation, nasal swelling, and bronchial obstruction which have relationships to decreased student performance and overall school attendance (Mendell & Heath, 2004). Evidence suggests that high levels of nitrogen dioxide are related to decreased school attendance (Mendell & Heath, 2004). Nitrogen dioxide comes from fuel burned at high temperatures, and come principally from motor vehicle exhaust (U.S. Environmental Protection Agency, 1995). "Nitrogen dioxide can irritate the lungs and lower resistance to respiratory infections such as influenza; concentrations that are typically higher than those normally found in the ambient air may cause increased incident of respiratory illness in children" (U.S. Environmental Protection Agency, 1995, second paragraph).

Overall, African American students are more likely to live in urban areas with high concentrations of automobiles than their Caucasian counterparts (Rivkin, 1994).

In addition to microbiological and chemical pollutants, research indicates schools with facilities in ill repair have a relationship with decreased student attendance (Branham, 2004). Branham (2004) argues, "If a school is damaged and left unrestored, the disrepair will create an atmosphere of instability. Students in such an environment perceive they are not special, that school is not important, that no one really cares, and as a result will be more likely to stay home from school" (p. 113). To that end, minority students are more likely than Caucasian students to attend schools with facilities in ill repair (Kober, 2000).

Parents' education is a critical variable in children's academic achievement, and minority children are more likely than Caucasian children to have parents with low levels of education (Kober, 2001). Parents' education is an indicator of responsibility and expectations children have for learning (Rothstein, 2004). For example, disadvantaged parents say they expect children to get good grades, but they are less likely to reinforce these expectations behaviorally; where more advantaged students are more likely to be punished by their parents for poor grades, or even rewarded for good ones. In addition, African American parents are less likely to reinforce high expectations than are Caucasian parents at a similar income level (Rothstein, 2004). Advantaged children are also more likely to be expected to consider college a routine part of growing up because not only their parents, but many adults known to them are

likely to have attended college, where the opposite may be true for disadvantaged students (Rothstein, 2004).

These ingrained expectations can have a relationship to family structure. Studies reveal that structured family routine and high parental expectations have a positive association with high attendance rates, and attendance rates are positively associated with high scholastic achievement (Taylor & Lopez, 2005; Jeynes, 2003). To that end, Taylor and Lopez (2005) further assert that high attendance rates are negatively associated with problem behavior and low student achievement.

In conclusion, it is difficult to assist children's progress in school if they miss a high percentage of school days (Parcel, Gilman, Nader, & Bunce, 1979). Overall, Fowler, Davenport, and Garg (1992) report that asthmatic children, who are reported to have higher rates of school absence than non-asthmatic children, have slightly higher rates of grade failure and have almost twice the rate of learning disabilities. To that end, Taylor and Lopez (2005) found that student attendance was negatively related to problem behavior in school and positively related to high academic achievement.

Student Demographics/Percent Disadvantaged in the School District

"Whether African American and Caucasian students attend school together is an issue over which school districts exert little control" (Rivkin, 1994, p. 291), because school districts cannot control where families live. In most of the country, students attend schools close to their homes; urban areas tend to have a higher population of African American students and suburban areas tend to have a higher concentration of Caucasian students (Rivkin, 1994). Caucasian migration away from urban areas to

suburban areas has contributed to residential segregation in the United States which in turn exacerbates school segregation (Rivkin, 1994). This causes an academically harmful disproportionate number of minorities in some school districts. A disproportion of minorities creates learning environments that have negative relationships with achievement for both African American and Caucasian students (Caldas, 1993; Caldas & Bankston, 1997; Klingele & Warrick, 1990).

Data from Columbus,Ohio's public school district illustrates Caucasian migration away from urban school districts. In 1968, Columbus Public school district enrollment was 111,000 students; of that total, 74 percent were Caucasian and 26 percent were African American. In 1980 total enrollment was 73,000 and the racial percentage shifted to 59 percent Caucasian students and 39 percent African American students, and finally, in 1988 enrollment for Columbus Public schools declined to 65,000 with 51 percent Caucasian students and 46 percent African American (Rivkin, 1994).

On the surface, the percentages could indicate that Columbus public schools are becoming more racially diverse, but the decline of total enrollment and an increase in the percentage of African American students could indicate that Caucasian families are migrating from urban school districts to attend suburban schools. Currently, 2004 enrollment data for Columbus Public schools indicates total enrollment at 63,100 with 62 percent of students African American and 32 percent of students Caucasian. A possible reason for Caucasian families to move from urban areas are to enroll their children in white homogenous school settings because a high minority concentration in

schools not only relates to learning outcomes of minority students, but also has a significant negative relationship on the Caucasian students in the school (Bankston & Caldas, 1996). Therefore, it can be inferred that a Caucasian student who attends a predominantly African American school could be expected to have lower learning outcomes than if that student attended a predominately Caucasian school (Caldas & Bankston, 1997).

However, low-income school environments have a negative relationship on test scores of African American students, as on the test scores of students in general, because low income environments tend to have students from less educationally and occupationally advantaged family backgrounds (Bankston & Caldas, 1996). To that end, African American students and Caucasian students suffer a roughly equal negative relationship on proficiency test performance from having a family income low enough to qualify for the free/reduced lunch program (Bankston & Caldas, 1996).

Conversely, research on school demographics finds that occupational and family background of fellow students within the same school influences performance of African American students more than Caucasian students (Caldas, 1996). Attending school with peers who come from families with higher education and occupational family backgrounds has a significant positive relationship on academic performance, but it is less important than students' own family background (Bankston & Caldas, 1996).

Residential segregation does not explain the degree of minority concentration has a powerful negative relationship to achievement test results, or why both Caucasian

and African Americans are negatively affected by the degree of minority concentration in the school building (Bankston & Caldas, 1996). Research on peer groups may provide some explanation. This research indicates that children tend to affiliate with classmates who share a similar motivation orientation toward school performance (Kindermann, 1993). To that end, on average, low-income schools have a high concentration of African American students (Caldas & Bankston, 1997), and low-income students come from low-income families (Rothstein, 2004). Low-income parents report they expect children to get good grades, but they are less likely to reinforce these expectations behaviorally, and low-income parents are less likely to reinforce high expectations (Rothstein, 2004). Therefore, in schools with high numbers of minorities, if there is no motivation from home to have high academic achievement, a student is less likely to exert effort in school and subsequently form homogenous peer groups whose binding characteristic is low academic achievement (Berndt & Keefe, 1995; Kindermann, 1993). Social influence among friends is a mutual process: students influence their friends while simultaneously being influenced by them. The end result is students' characteristics become more similar to those of their friends (Berndt & Keefe, 1995). A student body of academically low motivated students can potentially infect the culture of the school, and in high enough concentrations maybe even the culture of the school district (Caldas, 1993; Caldas & Bankston, 1997; Klingele & Warrick, 1990). This is not to say that African American students are less motivated than Caucasian students are, but more African American students live school districts where a disproportionate number of students qualify to receive free or reduced

lunch and have high concentrations of students with low motivation to succeed in school. (Rothstein, 2004).

Conversely, a study by conducted in Texas by Polinard, Wrinkle, & Meier (1995) researched the relationship of educational and political resources on minority students within the school district. At the district level, they examined the rate of minority students placed in gifted programs, the percentage of minority teachers, school revenue, district socioeconomic status, and level of education of minorities in the district. They found that the more prevalent the incidence of low income in the Black community the lower the Black achievement rate, and the Black-White pass ratio on the Texas state proficiency test is positively related to the number of Blacks in the community with at least a High School diploma. In addition, a greater presence of Black teachers in the school district had a positive affect on the Black-White pass ratio on the Texas state proficiency test. The implications of this study are that school district population demographics are important to the success of Black students. In this particular study a "role-model" effect may be happening with regard to the presence of Black faculty in schools and the Black-White pass ratio which may influence the African American students to succeed.

Bankston & Caldas (1996) argue that the most salient characteristic of schools attended by minority students, their racial concentration, is one of the greatest barriers to educational accomplishment. On the other hand, as Polinard, Wrinkle, and Meier's (1995) research indicates, demography is not destiny and African American students can be successful in impoverished districts if positive role models are highly visible,

because students' social characteristics are a powerful influence in their relative average achievement (Rothstein, 2004).

2.3 District Context

The following sections will review the literature with regard to the relationship that school district size and location may have with district achievement. The section on school district size offers a review of studies the found significant relationships to district size and district achievement. The section on district location offers a review of the literature with reference to rural, urban, and suburban school districts. This section will also discuss the problems school districts have with attracting teachers, and the special needs of school districts that may have a relationship with district achievement.

2.3.1 District Size

Bickel and Howley (2000) raise the issue that school district size in relation to student achievement remains an interesting topic for researchers. For example, school districts have been examined as an administrative center with regard to funding and resource allocation (Huang & Yu, 2002), demographics of students and residents (Caldas, 1993; Caldas & Bankston, 1997; Klingele & Warrick, 1990; Berndt & Keefe, 1995), and location (Howley, 1997). There is also a slow growing body of research dedicated to the relationship between district size and student achievement (Howley & Bickel, 2000; Abbott, Joireman, and Stroh, 2002; Zhang & Zhang, 2004). Moreover, the interaction of school district size and school poverty have resulted in significant affects (Bickel & Howley, 2000; Howley & Bickel, 2002).

District size has a relationship with student achievement; significant results for the relationship were found by Zhang & Zhang (2004) for third and fifth graders as measured by Delaware mathematics proficiency scores for 1998 – 2000. This study used Hierarchal Linear Regression and employed school district size and district socioeconomic status, measured by the percentage of students on free and reduced lunch, as independent variables without creating an interaction. They found that district size had a significant, but negative, relationship with school-level mathematic achievement for third and fifth graders. Specifically, the third grade data showed no significant relationship for the percent of students in the district on free and reduced lunch. Conversely, the fifth grade data from the same study revealed that as district size and the and percentage of students on free and reduced lunch increased, the magnitude of the negative relationship between the two variables and student achievement became greater.

Research has reported that district size and district socioeconomic status are related and the interaction of the two variables contributes to the variability of student achievement (Bickel & Howley, 2000; Abbott, Joireman, and Stroh, 2002; Howley & Bickel, 2002). Without observing an interaction of these independent variables, in some analyses, district size does not contribute to the variation of student achievement as measured by proficiency test scores (Bickel, 1999a).

Bickel and Howley's (2000) study that analyzed school-level percentile rank scores of eighth grade students on the Iowa Test of Basic Skills and eleventh grade school-level percentage of passing the first administration of the Georgia High School

Graduation Test, was groundbreaking. This study was important to education research because it yielded significant results using Hierarchical Linear Modeling (HLM) and an interaction term between school district size and poverty rate associated with students in the school. Their findings negated previous research by Bickel (1999a) who conducted analysis on the same data but used a single level analysis without the interaction term. Overall, Bickel and Howley (2000) revealed that small district size was positively related to student achievement in Georgia:

> "Interaction effects suggest that the well-known adverse consequences of poverty are tied to school size and, to some extent to district size. In brief, as size increases, the mean achievement of a school or district with less-advantaged students declines" (Bickel & Howley, 2000, p. 5).

Furthermore, with regard to equity of achievement, the analysis also found that "larger schools in larger districts seem to propagate inequity of learning outcomes by comparison to smaller schools and smaller districts" (Bickel & Howley, 2000, p. 22).

Interaction effects of size and district socioeconomic status are repeatable. To determine the effect of school district size on student achievement in Washington State, Abbott, Joireman, and Stroh (2002), conducted a study for the Washington School Resource Center that was based on Bickel and Howley (2000). Using Washington State school-level proficiency test data for 4^{th} and 7^{th} grade in mathematics and reading, Abbott, Joireman, and Stroh's analysis also included the interaction effect of district size and poverty in the school. The data revealed that in 4^{th} grade for both mathematics and reading, district size and poverty in the school was found to have a significant

relationship with student achievement. Also, the interaction of the two factors in the analysis was significant. In 7th grade, results for both mathematics and reading were such that the poverty of students' families in the school was significant, but district size was not significant. However, the interaction of the two factors was significant. Overall, the study concluded that large district size strengthens the negative relationship between the poverty rate associated with students in the school and student achievement- to indicate that when poverty rate associated with students in the school is high, students perform better in small districts. The Washington State study replicates Bickel and Howley (2000) except that Bickel and Howley's study showed a tendency for large schools to positively contribute to achievement in school districts that are located in more affluent areas. There is some indication for this finding in the Abbott, Joireman, and Stroh analysis, but it was not found to be statistically significant (Abbott, Joireman, and Stroh, 2002). African American students tend to attend schools in districts with a disproportionate number of students from poor families. This could contribute to the achievement gap because low-income students can be assumed to not receive the benefits of attending schools that have a culture of high achievement. Bankston & Caldas (1996) state that the most salient characteristic of schools attended by minority students, their racial concentration, is one of the greatest barriers to educational accomplishment.

Howley and Bickel (2002) demonstrated using Ohio data that interaction effects of poverty and district size were repeatable. In addition, this study indicated that as students progressed in grade, this interaction becomes more detrimental to their overall

achievement. Further study into district size and student achievement and the interaction of district size and poverty rate associated with students in the school was conducted by Howley and Bickel (2002) to determine if findings from districts in Georgia (Bickel and Howley, 2000), Montana, (Howley, 1999) and Texas (Bickel, 1999b) were repeatable in Ohio. Each of these previous studies indicated that smaller school districts dampened the affects of poverty in low-income school districts and that districts with a disproportionate number of students come from wealthy families were not affected by district size (Bickel & Howley, 2000). For the Ohio study, school-level data from grades 4, 6, 9, and 12 on Ohio's state proficiency test indicated that Ohio replicated the same results as Georgia, Montana, and Texas to indicate that both smaller schools and smaller districts have a statistically positive relationship to student achievement in poorer communities.

> "In urban areas of Ohio, larger schools adversely affect student achievement in communities at all income levels. In rural areas, larger schools adversely affect student achievement in low- and moderate-income communities, but not in wealthier communities" (Howley & Bickel (2002, p. 5).

Moreover, it was found that the relationship between district size, socioeconomic status, and student achievement, were powerful at grades where students are at or approaching an age, when they are at high-risk of dropping out of school (Howley & Bickel, 2002), to conclude that research indicates the relationship between district size and poverty in the district become more detrimental as students progress in grade.

A reason why student achievement increases when district size is small may be that as small districts increase their enrollment, they become less, rather than more financially efficient (Bulter and Monk, 1985). One possible reason is that small districts have better opportunity for communication in turning district policy into practice (Honig, 2003). Butler and Monk (1985) back up that claim and assert that smaller school districts operate with greater efficiency than otherwise similar larger school districts. Their belief stems from research conducted on operational costs examining the effects of district enrollment and salary. They found that an increase in enrollment is associated with a smaller cost increase in the small compared to the large districts in New York State. As small districts become larger, they realize some scale economies and can therefore operate with lower average costs. However, in the growing process, the districts fall short of fully realizing the scale economies that their cost function promises (Bulter and Monk, 1985).

2.3.2 District Location

People of particular income levels or sociological beliefs and backgrounds have the tendency to live in similar areas (Glaeser, Hanushek, & Quigley, 2004), and social background factors are associated with school success (Lee & Burkam, 2002). School districts manifest a variety of differences linked to the population that lives within their boundaries. For example, strong social ties might be linked to preferences to remain in the local area and live near family; rural areas are generally known as places of strong local ties (Johnson, Elder, & Stern, 2005). In New York State, among rural, suburban, and urban districts, there is great variation in levels of community wealth, proportions

of disadvantaged students, and district size (Sipple, Benjamin & Faessler, 2003). Socioeconomic status is not the only difference between rural, urban, and suburban school districts. Across these three types of school districts, there are varying levels of academic achievement (Sipple, Benjamin & Faessler, 2003)

Population concentrations within districts have a relationship with overall district achievement (Bankston & Caldas, 1996). People are likely to domicile in areas that provide the level of public goods, including education for their children, that they desire. For this reason, households located in an area with a higher level of public school expenditure per students may desire a higher level of public school expenditure per student (Tiebout, 1956). Expenditure per student has been found to have a relationship with student achievement (Monk, 1984).

Conversely, urban school districts have high concentrations of African American students (Rivkin, 1994). Generally, schools where more than 75 percent of the students receive free or reduced lunch, have higher numbers of African American students, higher rates of absenteeism, less parental involvement, and more negative attitudes toward scholastic achievement (The Conditions of Education, 2002). Community factors also have a relationship to how children learn. For example, communities with concentrations of minority families may have fewer learning resources and institutions such as libraries, museums, stable businesses, and youth organizations. Some communities also have environmental factors that impede learning – for example, if the neighborhood is unsafe or offers few opportunities for residents to build trust and communication (Kober, 2001).

Students across district types have different needs for their learning environment (McCartin & Freehill, 1986). In McCartin and Freehill (1986) higher socioeconomic status, being Caucasian and living in a suburban or a rural environment predicted a school environment preference related to prosperity, achievement, security, and achieving recognition. These students' choices are externally orientated , not personal, and are focused on recognized achievement and influence. Conversely, low socioeconomic status, urban environment and being a minority predicted a preference for a school environment related to experiencing pleasure and being clean. These students' choices reflected personal satisfactions and discounted values of self-direction, and achieving reputation. Moreover, students from rural and urban areas perform better in small school districts, students from suburban areas do not necessarily perform better in small districts (Bickel & Howley, 2000).

"On average, when only considering geography, New York State's rural school districts outperform urban districts but fall short of the performance of suburban districts" (Sipple, Benjamin & Faessler, 2003, p. 3). Thirunarayanan, (2004) analyzed NAEP data to determine if students from different school district types scored significantly different. He determined that for testing years 1992, 1994, 1996, 1998, 2000, and 2001 4th grade students in urban and rural schools performed significantly worse in reading than their peers in suburban schools. In New York state, Sipple, Benjamin & Faessler (2003) found that consistent across all performance indicators (graduation rate, percent diploma, percent IEP, percent stayers, percent leavers), rural

schools have greater success in educating comparable proportions of poor students than either urban or suburban districts.

"Small, rural school districts often experience great difficulty in attracting and retaining well-qualified teachers, due to lower salaries and other issues" (Tyler, 2003, p. 27). Hiring and retaining highly qualified teachers is a difficult task for rural and urban school districts. In Ohio, urban districts report difficulty retaining teachers because suburban districts "poach" teachers by offering higher salaries or signing bonuses (Opfer, Olejownik, & Ellis, 2004).

Currently in Ohio, 45 of the 612 districts qualify as rural. If a school district is classified as rural they have extended time to hire teachers to be in accordance with NCLB mandate of "hiring highly qualified teachers". However, there is no extension for hard to staff urban districts (Richard, 2004).

"The yardstick of adequacy in mass education—the expectation that all the children of all the citizens of a nation will attend school—is the expectation that schools everywhere will function in the same way to serve all students. This is a modern phenomenon closely associated with the steady economic growth that has characterized the development of cities, but many rural areas have not experienced growth during the recent decades" (Howley, 1988, p. 1). In, 2000, approximately 28 percent of rural students in Pennsylvania were eligible for free and reduced lunch. From 1997 to 2000 the percentage of students eligible for free lunch decreased by 7 percent. Conversely, in the urban school districts in 2000, 33 percent of the students were eligible for free or reduced lunch. Between 1997 and 2000, the percentage of urban students eligible for

free or reduced lunch increased 7 percent. In Ohio, across rural and suburban school districts teacher attrition for 2003 was just over 10 percent; however, major urban school districts suffered a 20 percent teacher attrition rate (Condition of Teacher Supply and Demand in Ohio, 2004).

Each district location (rural, urban, suburban), has innate characteristics that may have a relationship to the achievement within the district. This could indicate that students living within these districts are exposed to cultural expectations specific to the district location. These spoken or unspoken expectations could have a relationship with district achievement.

2.4 District Organizational Structure

This section will review the literature with regard to the relationship that class size and certified teachers has with district achievement. The literature review on class size will present previous studies conducted on the relationship between class size and student achievement. The section on teacher certification will discuss teacher quality with regard to teacher preparation, certification, knowledge of pedagogy, and knowledge of subject matter.

2.4.1 Class Size

"The search for substantial achievement effects of reducing class size is one of the oldest and most frustrating for educational researchers. The search is approaching the end of its first century; eventually, it may rival the search for the Holy Grail in both duration and lack of results" (Slavin, 1989, p. 99). Parents and teachers have the notion that small class size is beneficial to student achievement; however, literature suggests

this sentiment is not so simple to define. Many researchers have concerns about the research design of studies on class size and student achievement (Slavin, 1989; Cooper, 1989; Ehrenberg, Brewer, Gamoran, & Willms, 2001). In addition, to design issues, researchers also have concerns regarding cost effectiveness of smaller classes and teacher techniques (Ehrenberg, Brewer, Gamoran, & Willms, 2001).

Other issues with class size research are concerned with whether the alleged gain in achievement is sustainable over time (Ehrenberg, Brewer, Gamoran, & Willms, 2001). Moreover, there is debate over the magic number needed to attain a positive relationship between class size and student achievement (Pritchard, 1999; Slavin, 1989), and.

Glass and Smith (1978) was one of the first studies of class size as it relates to student achievement to capture attention of educational researchers. Their study performed a meta-analysis on the outcomes of 77 studies that included 725 comparisons between a smaller and a larger class on a measure of student achievement. The study included a range of subject matter and approximately half of the observations included elementary students. The size of the class varied from comparison to comparison; for example, in 197 comparisons, class sizes between 24 and 34 students were compared to classes with 35 or more students. They discovered that 60 percent of the comparisons favored smaller classes. Moreover, when comparisons between classes with 18 students were compared to classes with 28 students, the percentage of comparisons favoring smaller classes rose to 69 percent (Cooper, 1989). Overall, the primary findings for

Glass and Smith (1978) claimed student achievement significantly improved for classes containing 15 or fewer students.

Results from Smith and Glass (1978) were challenged by the Educational Research Service (ERS) (1978) on the basis of design flaw (Slavin, 1989). ERS argued that internal validity in Glass and Smith's meta-analysis was compromised because some of their comparisons were made using classrooms with one or two students, which is not representation of a school classroom, it is a tutoring session. The ERS conducted its own correlational study to research the relationship of class size and student achievement (Ehrenberg, Brewer, Gamoran, & Willms, 2001). Their review examined 24 studies involving grades kindergarten through eighth grade, 14 studies at the high school level, and three general studies. The review concluded that no guidelines for an optimal class size were apparent. However, ERS did claim that class size did have a positive relationship with student achievement and offered 19 students as an acceptable class size, even if the research was less than adequate (Cooper, 1989).

The search for a relationship between class size and student achievement pressed onward. Robinson and Whittebols (1986) revisited the earlier ERS (1978) study using cluster analysis to find a magic number or evidence of a relationship between the two variables. Their review broke the literature into clusters according to grade-levels and subjects. They categorized the reviewed studies as significantly favoring smaller classes, no significant differences, and significantly favoring larger classes. Then they counted the number of studies in each category without taking into account the variation of the studies or quality of the research (Slavin, 1989). This later

study reported that the effects of class size are consistent in grades kindergarten through third grade; they are slightly consistent in fourth through eighth grades, but virtually non-existent in high school (Cooper, 1989; Slavin, 1989; Ehrenberg, Brewer, Gamoran, & Willms, 2001).

Slavin (1989) criticizes these studies citing careless design flaw as the basis for faults with internal validity.

> "Most of the studies [regarding class size] cited are correlations; researchers simply computed a correlation between class size and achievement, sometimes controlling for other variables and sometimes not. One problem inherent to this type of study is that in studying the natural range of variation, there are rarely many very large or very small classes. Few people familiar with the research in this area would expect much difference between class sizes of 30 and 25, yet the correlational studies are usually focused on differences in this range" (p. 102).

One of the first state-wide controlled experiments to determine the relationship between class size and student achievement was the Tennessee Student/Teacher Achievement Ratio (STAR) program in 1985. The project selected kindergarten through grade three classrooms in rural, urban, and suburban school districts from across the state of Tennessee to participate in the experiment. In addition, a control group of classrooms were selected to be able to compare student achievement in average size classrooms. The within school design dictated that each school have sufficient enrollment in each grade to have one small class (13-17 students), one regular class (22-25 students) and one regular class with a full-time aide. Student outcomes

were measured by SAT achievement scales in math and reading, the BSF performance tests (beginning in first grade) and the SCAMIN self-concept and motivation scales. In all school types (rural, urban, and suburban) students in small classes outperformed students in regular average size classes. At the end of the first year of the project, results for kindergarten showed an advantage for small classes in achievement over regular average size classes, but no significant advantage over classes with a teacher's aide. The results for first grade indicated that students in small classes significantly outperformed in regular average classes and classes with a teacher's aid. In second grade, students in small classes continued to outperform students in regular classes and regular sized classes with a full-time aide. Last, third grade students in STAR outperformed third grade students in regular average size classrooms and classrooms with teacher's aides (Word, Johnston, Bain, Fulton, Zaharias, Achilles, Lintz, Folger, & Breda, 1990).

However, even the controlled STAR experiment results do not serve as an oracle for higher student achievement. Longitudinal results from the project indicate that small classes do have a relationship with achievement in kindergarten in Tennessee, but does not have a relationship with achievement as students' progress in grade (Word, Johnston, Bain, Fulton, Zaharias, Achilles, Lintz, Folger, & Breda, 1990). Moreover, a separate study reports small class size does not have a relationship with achievement as much as family background effects. Therefore the incremental benefits may not exceed the associated costs of implementing smaller classes throughout a school district (Akerhielm, 1994). Eherenberg, Brewer, Gamoran, and Willms (2001) report that

children in small classes in early grades are more likely to develop working habits and learning strategies that would enable them to take better advantages of learning opportunities in later grades.

Another problem of reducing class size is that teachers do not necessarily change their teaching style to maximize the advantage of having a reduced number of students in class (Word, Johnston, Bain, Fulton, Zaharias, Achilles, Lintz, Folger, & Breda, 1990; Pritchard, 1999). The STAR program offered professional development programs to teachers involved in the class size experiment; however, exit interviews with participating teachers revealed that teachers admitted not changing their teaching styles for the reduced number of students in class (Word, Johnston, Bain, Fulton, Zaharias, Achilles, Lintz, Folger, & Breda, 1990).

The research on the relationship of class size with student achievement is inconclusive; however, a few findings are common among researchers: a reduction in class size is beneficial in kindergarten through third grade, and a reduction in class size alone will not improve student achievement (Word, Johnston, Bain, Fulton, Zaharias, Achilles, Lintz, Folger, & Breda, 1990; Pritchard, 1999; Eherenberg, Brewer, Gamoran, and Willms, 2001).

The implication of class for the achievement gap and the present study is to determine if class size is a significant contributor to the distribution of district mean for Caucasian and African American on Ohio's 2003/2004 4^{th} grade reading proficiency exam.

2.4.2 Teacher Certification

One of the many influences that have a measurable effect on student achievement is teacher certification. A growing body of research suggests that schools can make a difference, and a substantial portion of that difference is attributable to high quality teachers (Darling-Hammond, 2000b; Stone, 1999). This growing body of research examines how independent variables related to teacher preparation and certification impacts student outcomes. Quantitative analyses indicate that measures of teacher preparation and certification are by far the strongest correlates of students' achievement in reading and mathematics, both before and after controlling for student poverty and language status (Darling-Hammond, 2000a). Also growing in popularity is alternative licensure because it helps to fill hard to staff positions (Feistritzer, 1993; Ng, 2003). Even more exciting is value-added assessment which allows stakeholders to discern student's achievement gain from particular teachers regardless of the student's prior knowledge (Stone, 1999).

Darling-Hammond (2000a) found that teacher quality characteristics such as certification and degree in the field to be taught are significantly and positively correlated with student outcomes. Certification or licensing status is a measure of teacher qualification that combines aspects of knowledge about subject matter and about teaching and learning. Each state has its own licensing requirements for each subject areas and grade-level and certification status is not easily transferable from one state to another (Feistritzer, 1993). A standard certificate generally means that a teacher has been prepared in a state-approved teacher education program at the undergraduate

or graduate level and has completed either a major or a minor in the field(s) to be taught plus anywhere from 18 to 40 education credits, depending on the state and the certificate area, including between 8 and 18 weeks of students teaching. Most states now also require one or more tests of basic skills, subject matter knowledge, and/or teaching knowledge or skills as the basis for the initial or continuing license or for admission to teacher education (Darling-Hammond, 2000a).

In recent years, people in careers other than teaching have expressed an interest in the profession (Feistritzer, 1993). These individuals are able to teach but must complete specified coursework to obtain a teaching state teaching certificate. While uncertified and in the process of completing the coursework, these individuals are able to teach in classrooms. This is advantageous for districts administrators who were having difficulties hiring highly qualified teachers because degree-holding individuals who desire to teach have a tendency to teach in hard to staff urban school districts (Feistritzer, 1993). Moreover, "the use of alternate routes of certification gives promise of increasing the representation of minorities in the nation's teaching force. Since the programs inception in New Jersey in 1985, 20 percent of the teachers certified through alternative routes have been minority" (Feistritzer, 1993, p. 24). Polinard, Wrinkle, and Meier (1995) report that presence of a higher percentage of African American teachers has a positive relationship to African American student outcomes in Texas. But, other research reports that the relationship between teacher and student ethnicity and student outcomes is mixed (Ferguson, 1998 in Jencks & Phillips).

In an Ohio study by Gilbertson, Wahrman, West, Zigler, and Johnson (2005), indicate that a majority of alternative certified teachers' staff high need subject areas like special education, math and science. The same study revealed that 40 percent of Ohio's alternative licensure teachers teach in urban school districts. This may indicate that alternative licensure in Ohio is helping to staff districts where tradition licensure teachers may not prefer to work when compared to other districts. Ng (2003) argues that oversimplification of the staffing high need subject areas with alternatively certified teachers will result in high attrition from the profession because the route of alternative licensure places individuals in the classroom without prior training; they learn on the job. This approach does not prepare them for the rigors of classroom management, or provide them with a background in pedagogy.

Knowledge of pedagogy has been found to have a positive relationship with student achievement. Pedagogical course work experience through a full teacher preparation program covers classroom management, planning lessons aligned to state curriculum standards, and provides background on various types of content facilitation. For example, Ferguson and Womack (1993) assessed teacher effectiveness in a study of more than 200 graduates of a single teacher education program. The team used 13 dimensions of teaching performance of education and subject matter coursework, NTE subject matter test scores, and GPA in the student's major. Coursework in education was found to be the strongest predictor of teacher performance. While GPA in the major and NTE specialty scores did predict teaching performance, they explained a much lower percentage of the variance. Preparation in professional education has also

been found to be positively associated with increased teacher sensitivity, effectiveness in dealing with diverse student needs and the ability to teach in a style that facilitates higher order learning (Ashton & Crocker, 1987; Ferguson and Womack, 1993). Studies have also shown that teachers without knowledge of classroom management skills have more difficulties managing routine tasks than teachers with training in these skills (Darling-Hammond, 1991; Ashton and Crocker, 1987; Everson, Hawley and Zlotnik, 1985; Ferguson and Womack, 1993).

In addition to pedagogy course work, student in teacher preparation programs are required to enroll in classes related to subject area. The logic is that to teach a subject effectively the teacher must be an expert in the field. For teachers, a measure of subject expertise comes in two forms: college course hours completed in the subject, and earned scores on the subject area portions of teacher certification exams.

There is support for the assumption that subject matter knowledge could be related to teacher effectiveness, the findings are not as strong and consistent as one might suppose. Studies of teachers' scores in multiple states on the subject matter tests of the National Teacher Examinations (NTE) have found no consistent relationship between this measure of subject matter knowledge and teacher performance as measured by student outcomes Darling-Hammond, 2000a). Research has shown the relationship to be curvilinear; there is a positive relationship to a certain threshold, but eventually the relationship begins to decrease in influence (Darling-Hammond, 2000b).

Of course, it makes sense that demonstrated knowledge of the material to be taught is essential for effective teaching but that after a certain competency is

demonstrated the effect of greater expertise would decrease beyond some minimal demands of the curriculum being taught. Conversely, studies of course taking in subject area have more frequently been found to be related to teacher performance than have scores on subject matter tests. To that end, due to the multiple-choice format of national teacher certification exams it can be inferred these measures only capture a small sliver of knowledge on the subject area in question. For example, if an individual has completed a teacher preparation program with a subject area body of knowledge different from that being tested on the subject area certification exam, the individual will not test well, thus misrepresenting extent of subject training (Darling-Hammond, 2000b).

While these studies suggest that there are aspects of teaching effectiveness that may be related to teacher education, certification status, and experience, they do not reveal much about what it is about teachers' behaviors or abilities that makes the difference in how their students perform (Darling-Hammond, 2000b).

2.5 Summary

This section will provide a summary of the literature while making predictions for the outcome of the present study.

Given the research on district student characteristics, district context influences, and district organizational structure, would it be expected to observe that district student characteristics will have the greatest relationship with district achievement on the 2003/2004 4th grade Ohio reading proficiency test. According to the literature, it would be expected that this study determine that the percent disadvantaged students in the

district is higher for the districts encompassed in the distribution of district means for African American because school districts with high concentrations of African American students tend to be poor and poor students tend to be African American (Caldas & Bankston, 1997). To that end, it would also be expected to determined that for the district distribution of African American means, percent attendance would be lower than for the district distribution of Caucasian means because factors found to have a relationship with school absence have a relationship to low-income and minorities. For example, health issues (Milton, Whitehead, Holland, & Hamilton, 2004; Fowler, Davenport, & Garg, 1992; Parcel, Gilman, Nadar, & Bunce, 1979), family structure (Taylor & Lopez, 2004; Jeynes, 2003). In addition poor school infrastructure has been found to have a relationship with poor school attendance (Branham, 2004), and more low-income students live in areas with school buildings in disrepair than upper-class students (Kober, 2001).

With regard to district context, it would be expected that in large urban districts there would be high concentrations of minorities and poverty and that the interaction of poverty and location would result in a low district mean achievement score. This can be expected in this study because The Conditions of Teaching (2002) report indicated that urban school districts have large concentrations of minority students and more negative attitudes toward scholastic achievement. To that end, in small rural districts we would expect higher percentages of disadvantaged students than suburban districts, but less of a minority population within the district (Rivkin, 1994). In all cases it would be expected that the distribution of means for Caucasian and the distribution of means for

African American encompassed from suburban districts would be higher than those distributions from urban and rural districts. This is because attending school with peers who come from families with higher education and occupational family backgrounds has a significant positive relationship on academic performance (Bankston & Caldas, 1996).

Last, with regard to district organizational structure it would also be expected to observe that teacher certification will have a significant relationship with the distribution of African American means and Caucasian means. This is because Darling-Hammond (2000a) found that teacher certification was a significant positive contributor to achievement. Also, it would be expected to observe that average class size have a small magnitude, if found to be significant, of influence on the distribution of Caucasian and distribution of African American district means. This is because past research as produced studies with internal validity issues (Slavin, 1989), and this study will examine average district class size. This study will not be able to determine the relationship of class size with individual achievement.

CHAPTER 3

METHODOLOGY/FINDINGS

3.1 Introduction

This chapter has two purposes: (1) to provide a methodological design by which to address research questions posed in chapter one and (2) present the findings of those empirical analyses. Student characteristics, district context, and district organizational structure, as discussed in chapter two may have a relationship with district level achievement and may have a relationship to the achievement gap between African American and Caucasian 4th grade reading proficiency. In accordance with the research questions, the methodology deals with the relationship each category of independent variables has with the district mean score for Ohio's 2003/2004 4th grade reading achievement of African American and Caucasian. The first category of variables, student characteristics, represent student socioeconomic status and frequency of school attendance as measured by percent absent for the district and percent disadvantaged students in the district. The second category of variables, district context, will measure the interrelated conditions that are fixed attributes within the district. The relationship of district context with African American and Caucasian achievement will be measured by district location and district size. Finally, the third category of variables, district organizational structure, refers to the way districts organize their learning environments.

This will be measured by percentage of certified teachers within the district and class size.

3.2 Study Period

This study intends to research the relationships of school district level variables with achievement for Caucasian and African American using the district mean score on Ohio's 2003/2004 reading proficiency exam. The unit of analysis is the Ohio school district. District level data are collected and analyzed for the 2003/2004 academic year for Ohio's fourth grade reading proficiency test administered by the Ohio Department of Education. Through proficiency tests, the Ohio Department of Education collects student level data for each school district in Ohio. For this research the Ohio Department of Education collected student data, then stratified the data by race to compile district level mean for the 2003/2004 4^{th} grade reading proficiency scores for Caucasian and African American.

3.3 Data Set

The sample includes 608 school districts across the state of Ohio. Four districts were excluded from the study; the excluded districts are geographically isolated from the rest of Ohio domiciled on small islands in Lake Erie. Also excluded were data from charter and community schools operating within Ohio school districts across Ohio. District means for Caucasian and African American students in districts that have ten or less Caucasian or African American 4^{th} graders reported to have taken the 2003/2004 reading test living within the district are excluded from the study. This is because Ohio privacy law prohibits proficiency test scores to be publicly released if there are less then

ten students within a certain group. The state feels a student may be able to be identified if there are ten or less individuals in the group.

Within the 608 school districts included in this study live a combined total of 118,797 Caucasian and African American 4th grade students. Of the total number of Caucasian and African American 4th grade students, 99,060 are Caucasian and 19,737 are African American.

The data set is displayed for examination in Appendix A of this document. As mentioned earlier in this study, the dataset was provided for this analysis by the Ohio Department of Education. The dependent variables are the reported district mean scores for Caucasian and African Americans 2003/2004 4th grade reading proficiency for 608 of Ohio school districts. This section will first provide an overview of the districts that make-up the dependent variables in the dataset used for this analysis.

The first subsection will discuss the means of the districts. The second subsection will discuss the standard deviations of the means of the districts. The third subsection will discuss the number of Caucasian and African Americans that make up the population of 4th graders who took the 2003/2004 reading proficiency test in the districts.

Information on the Dataset: Range of District Means

The following information on district means is summarized below in Figure 3.1.

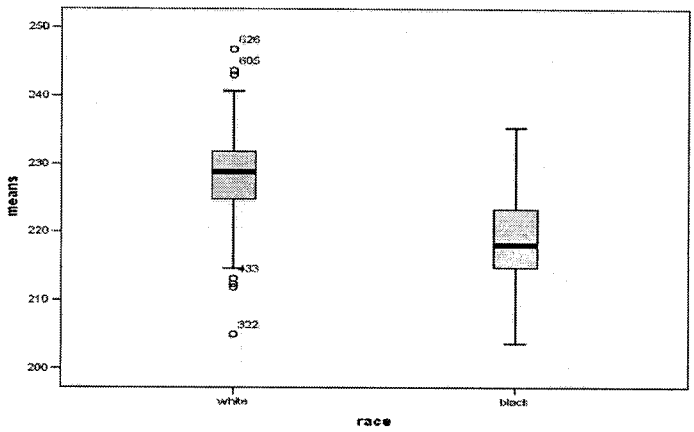

Figure 3.1. Side by side boxplots of the distribution of district means for 2003/2004 4th grade reading proficiency scores for Caucasian and African American for all districts across Ohio. White N=606; Black N=119.

For all districts across Ohio the N for district means for Caucasian is 606. The median for the distribution of district means for Caucasian is 228 and the mode is 223. The range of the distribution for Caucasian means for all districts across Ohio is 42. For all districts across Ohio the N for district means for African American is 119. The median for the distribution of district means for African American is 218.11, and the mode is 217. The range of the distribution for African American for all districts across Ohio is 31.

For all districts across Ohio, the greatest district mean reported for Caucasian is 246.83, SD=16.34; this district reports an N for Caucasian of 155. In this district, the reported mean for African American is 227.18, SD=18.30; this district reports an N for African American of 180. The range of means for this district is 19.65. The lowest district mean reported for Caucasian is 205.00, SD=19.77; this district reports an N for

Caucasian of 11. In this district the mean reported for African American is 216.60, SD=24.01; this district reports an N for African American of 35. The range of means for this district is 11.60.

For all districts across Ohio the, the greatest district mean reported for African American is 235.39, SD=17.23; this district reports an N for African American of 23. In this district, the reported mean for Caucasian is 231.38, SD=21.59; this district reports an N for Caucasian of 170. The range of means for this district is 4.01. The lowest district mean reported for African American is 203.69, SD=14.90; this district reports an N for African American of 13. In this district the reported mean for Caucasian is 230.87, SD=21.60; this district reports and N for Caucasian of 52. The range of means for this district is 27.18.

This paragraph will explain district level mean scores of Caucasian for districts in Ohio that are able to report district means for both Caucasian and African American. The following information on district means is summarized below in Figure 3.2.

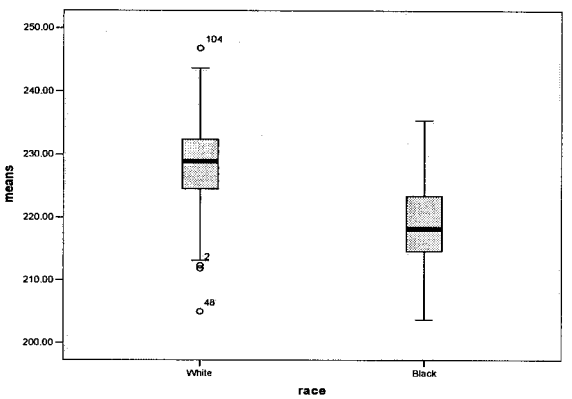

Figure 3.2. Side by side boxplots of the distribution of district means for 2003/2004 4th grade reading proficiency scores for Caucasian and African American for those districts that are able to report means for both Caucasian and African American. N=117.

The N for districts in Ohio that are able to report means for both Caucasian and African American is 117. The median for the distribution of district means for Caucasian is 228.91 and the mode is 229.14. The range of the distribution for Caucasian means for all districts across Ohio is 41.83. For African American the median for the distribution of district means in Ohio that are able to report means for both Caucasian and African American for is 218.23, and the mode is 211.12. The range of the distribution for African American for all districts across Ohio is 31.70. The highest district mean reported and the lowest district mean reported for Caucasian is the same as mentioned above when all districts were included in the data set.

Information on the Dataset: Range of Standard Deviations

The following information is summarized below in Figure 3.3.

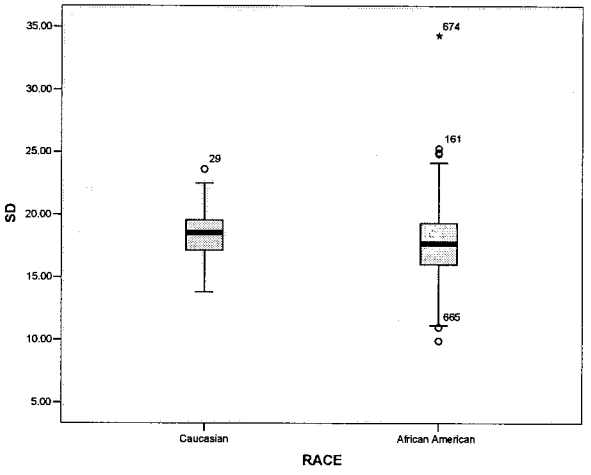

Figure 3.3. Distribution of Standard Deviations for the distribution of Caucasian and African American means for all districts across Ohio. Caucasian N=606; African American N=119.

For all districts across Ohio, the greatest district standard deviation reported for Caucasian is 25.28, mean=214.64; this district reports an N for Caucasian of 25. This district did not report a mean for African American. For all districts across Ohio, the lowest district standard deviation reported for Caucasian is 11.43, mean=277.66; this district reports an N for Caucasian of 47. This district did not report a mean for African American.

For all districts across Ohio, the greatest district standard deviation reported for African American is 34.32, mean=218.76; this district reports an N for African American of 54. In this district the reported district standard deviation for Caucasian is 13.89, mean=229.39; this district reports an N for Caucasian of 174. The range of the standard deviation for this district is 20.43. The lowest district standard deviation reported for African American is 9.91, mean=220.00; this district reports an N for African American of 12. In this district the reported standard deviation for Caucasian mean is 15.08, mean=235.28; this district reports and N for Caucasian of 219. The range of the standard deviation for this district is 5.17.

The following information is summarized below in Figure 3.4.

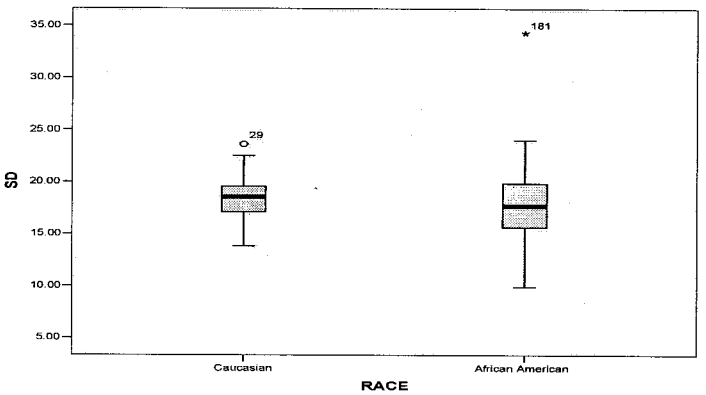

Figure 3.4. Distribution of Standard Deviations for the distribution of Caucasian and African American means for districts that are able to report means for both Caucasian and African American. N=117.

This paragraph will explain district level standard deviations for Caucasian for districts in Ohio that are able to report district means for both Caucasian and African American. The district that reported the highest standard deviation for Caucasian was 23.62, mean=227.61; this district reported an N for Caucasian of 145. This district reported a standard deviation for African American mean of 15.39, mean=214.63; the reported N for African American in this district is 86. The range for standard deviation in this district is 8.23. The lowest standard deviation for Caucasian for districts that are able to report district means for both Caucasian and African American is 13.81, mean=231.54; the reported N for Caucasian in this district is 104. In this district the standard deviation for the African American mean is 15.20, mean=208.94; the reported N for African American in this district is 14. The range for the standard deviations of the means in this district is 1.39.

Information on the Dataset: Range of N

The following information is summarized below in Figure 3.5.

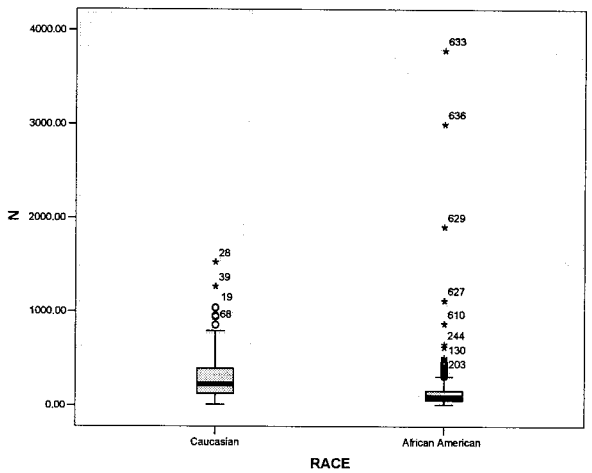

Figure 3.5. Distribution of N for the distribution of Caucasian and African American means for all districts across Ohio. Caucasian N=99,060; African American N=19,797.

For all districts across Ohio, school districts reported a total of 118,797 4th grade African American and Caucasian students who took the 2003/2004 reading proficiency exam. Of that total, 99,060 were Caucasian and 19,797 were African American. For all districts across Ohio, the greatest district N reported for Caucasian is 1,526; this district reports a district mean for Caucasian of 222.13, SD=20.75. In this district the reported N for African American is 3,002; this district reports a district mean for African American of 214.58, SD=19.77. The range of N in this district is 1,476. For all districts across Ohio, the lowest N reported for Caucasian is 11; this district reports a district mean for Caucasian of 205.00, SD=19.77. In this district the reported N for African American is 35; this district reports a mean of 216.60, SD=24.01. The range of

N in this district is 24. For all districts across Ohio, the greatest district N reported to African American is 3,787; this district reports a mean for African American of 214.19, SD=21.11. In this district the reported N for Caucasian is 944; the reported mean for Caucasian is 220.79, SD=19.03. The range of N for this district is 2,843. The smallest N reported for school districts in Ohio for African American is 11; the mean for this district for African American is 214.27, SD=14.42. In this district the reported N for Caucasian is 93; this district reported a district mean for Caucasian of 221.22, SD=17.79. The range of N for this district is 82.

This paragraph will explain district reported N for Caucasian for districts in Ohio that are able to report district means for both Caucasian and African American. The following information summarized below in Figure 3.6.

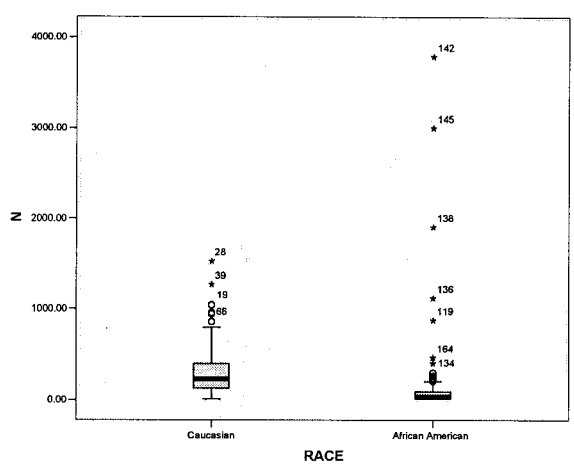

Figure 3.6. Distribution of N for the distribution of Caucasian and African American means for all districts across Ohio. Caucasian N=36,150; African American N=19,132.

In these districts the total N of all Caucasian and African American who took the 2003/2004 4th grade reading proficiency exam is 45,282. Of that total, the number for Caucasian is 36,150, and the number for African American is 19,132. The highest district N reported and the lowest district N reported for Caucasian is the same as mentioned above when all districts were included in the data set.

3.4 Variables for Analysis

The dataset for this analysis includes information about district level student characteristics, district context, and district organizational structure. Literature suggests key predictor variables for student characteristics are: percent disadvantaged students in the school district and student attendance. However, literature also suggests that district level achievement is complex and it is possible that other variables have a relationship to district achievement. Thus, a regression analysis will be used to investigate the questions of interest, and will consider the relationships of district context and district organizational structure in addition to student characteristics. Regression analysis allows for the consideration of variables singly and also in interaction with each other. The statistical analysis will be conducted using SPSS 12.0 software.

The outcome variables for this analysis are the district mean scores for the 2003/2004 fourth grade reading proficiency test for African American and Caucasians. In the analysis, these two continuous variables are referred to as "meanblack" and "meanwhite". A regression analysis was conducted with each outcome variable to discern the relationship between the predictor variables and the outcome variables. The

analysis was conducted in this manner because race could not be used as a categorical variable because the district mean scores for fourth grade reading are aggregated to the district level; therefore, race could not be categorically separated from the scores because the district mean does not represent individual cases, it represents the overall mean of the district.

Other variables included in the analysis are classified as predictor variables designated into three groups: student characteristics, district context, and district organizational structure. The student characteristic group includes the continuous variables percent disadvantaged students in the district and district percent student attendance. These variables represent district characteristics that may have a relationship with overall district performance.

The next grouping of variables is district context; this encompasses the categorical variable district location. This variable was included in the analysis because literature suggests schools in suburban districts perform better than schools in rural or urban districts. For this study categories for district type and location are taken from the Ohio Department of Education's district typology rating system which has eight classifications for identifying Ohio school districts. This typology rating is summarized below in Table 3.1.

0	Kelly's Island LSD, North Bass Island LSD, Middle Bass Island LSD, Put-in-Bay Island LSD, College Corner LSD
1	Rural/agricultural – high poverty, low median income.
2	Rural/agricultural – small student population, low poverty, low to moderate median income
3	Rural/Small Town – moderate to high median income
4	Urban – low median income, high poverty
5	Major Urban – very high poverty
6	Urban/Suburban – high median income
7	Urban/Suburban – very high median income, very low poverty
8	Joint Vocational School Districts

Table 3.1. Ohio District Typology Rating

In the state rating system category 0 refers to the four school districts located on islands in Lake Erie. These four districts will not be included in this analysis. As for the other seven classifications, category one refers to districts located in rural/agricultural areas with high poverty and low median income; category two refers to districts also located in rural/agricultural locations but with the additional designations of a small populations, low poverty, and low to moderate median income level. Ohio district typology category three refers to rural/small town school districts with moderate to high median incomes.

Next, Ohio's district typology rating four refers to districts in urban areas with low median income and high poverty. Category five refers to districts located in major urban areas with very high poverty.

Last, Ohio's district typology category six refers to districts located in an urban/suburban location with a high median income; category seven refers to districts in

urban/suburban locations with very high median income and very low poverty. Category eight refers to joint vocational school districts; this category is not in the data.

For the present study Ohio's district typology ratings have been collapsed into three categorical variables: rural, urban, and suburban. This is so the school districts can be analyzed by geographic location yet have a varied economic status within the district. The rural variable encompasses all school districts that are categorized by the state of Ohio as a rural district. Urban includes all district categorized by the state of Ohio as either urban or major urban areas. Finally, the suburban variable encompasses districts designated as urban/suburban. For the present study there are 338 rural districts, 117 urban districts and 153 suburban districts. It is important to note that these artificial groupings may add noise to the analysis.

The next group of variables examined in the study refer to district organization. The intent of these variables is to ascertain the organizational aspect of the district. The variables chosen to represent this are overall average district class size and percent certified teachers for kindergarten through eighth grade in the district in all subject areas. District class size was calculated by dividing the total number of students in the district by the number of teachers in the district. It is also important to note that this calculation of class size may not be a true representation of class size for the districts, thus may add noise to the analysis.

3.5 Study Design

The specified research question: *What is the relative relationship between student characteristics, district context, and district organizational decisions on the*

mean district achievement of African American and Caucasian for 4th grade reading proficiency scores in Ohio, asks for a description of the relationship between variables. *And which of these three classifications of variables contributes the most variability in the mean district achievement to African American and Caucasian 4th grade reading proficiency scores in Ohio?*, further suggests a quantification of the role the variables' relationship to the district mean reading achievement of fourth grade African American and Caucasian scores in Ohio. Taken together the response to these questions will provide an explanation of the relationship based upon the data, and to the extent that the data actually explains the relationship between the variables. To this end, I have chosen to use a regression analysis under the general linear model, which McNeil, Newman and Kelly (1996) referred to as the GLM when these authors stated, "The GLM...is [a] flexible statistical procedure...that provides a way of considering variables that relate to the behavior the researcher is investigating" (p. 10).

3.6 Descriptives

The following subsections offer descriptive statistics for the data set. The first subsection will discuss the statistics for all school districts across Ohio. The second subsection will discuss the statistics for only those school districts that are able to report district means for both Caucasian and African American.

	Distribution for Caucasian				Distribution for African American			
	disadvan	attendance	certeach	classsize	disadvan	attendance	certeach	classsize
Overall								
Min	0.00	90.00	69.00	11.00	0.00	90.00	82.00	11.00
Max	100.00	98.00	100.00	25.00	100.00	97.00	100.00	25.00
Mean	22.72	95.18	98.73	16.17	31.37	94.79	98.38	15.82
SD	16.04	0.94	2.98	1.86	21.43	1.11	2.63	2.01
Valid N (Listwise)	606.00	606.00	606.00	606.00	119.00	119.00	119.00	119.00
Rural								
Min	0.00	93.00	69.00	11.00	6.00	93.00	95.00	13.00
Max	59.00	98.00	100.00	22.00	44.00	95.00	100.00	17.00
Mean	21.67	95.24	98.64	16.25	30.60	93.80	97.28	15.50
SD	12.77	0.92	3.40	1.77	17.00	2.07	2.07	1.92
Valid N (Listwise)	338.00	338.00	338.00	338.00	4.00	4.00	4.00	4.00
Urban								
Min	0.00	90.00	82.00	12.00	0.00	90.00	82.00	12.00
Max	100.00	97.00	100.00	21.00	100.00	97.00	100.00	20.00
Mean	38.78	94.49	98.50	15.57	46.25	94.21	97.81	15.47
SD	19.67	0.95	2.73	1.76	19.02	1.04	3.21	1.80
Valid N (Listwise)	115.00	115.00	115.00	115.00	59.00	59.00	59.00	59.00
Suburban								
Min	0.00	93.00	84.00	11.00	0.00	93.00	93.00	11.00
Max	44.00	97.00	100.00	25.00	44.00	97.00	100.00	25.00
Mean	12.97	95.57	99.11	16.42	15.75	95.46	99.05	16.21
SD	8.93	0.69	1.95	2.02	10.09	0.74	1.67	2.17
Valid N (Listwise)	153.00	153.00	153.00	153.00	56.00	56.00	56.00	56.00

Table 3.2. Descriptive Statistics and Frequencies

Table 3.2 shows the descriptive statistics for the data set. Examining Table 3.2 it is evident the mean for percent disadvantaged students in the district is higher for the distribution of African American district means (mean=31.37, SD=21.43) than the distribution of means for Caucasian (mean=22.72, SD=16.04). For the attendance variable, the mean for Caucasian is higher at 95.18, standard deviation of .94, than for African American with a mean of 94.79, standard deviation of 1.11. The mean for the percent of teachers in kindergarten through eighth grade certified on all courses to teach in the district is almost equal for the distribution of African American and Caucasian with 98.38, standard deviation 2.63, and 98.73, standard deviation, 2.97 respectively. Finally class size for districts that report African American means and districts that report Caucasian means is also similar. The mean for class size for the districts that

report African American means is 15.82, standard deviation 2.01, and class size for districts that report Caucasian means is 16.17, standard deviation of 1.86.

Examining by district location Table 3.2 indicates that examining school districts across Ohio four rural school districts, 59 urban districts, and 56 suburban school districts report district mean scores for African American. To that end, 338 rural districts, 115 urban districts, and 153 suburban districts report district mean scores for Caucasian.

Examining the descriptive statistics by the distribution of African American means and the distribution of Caucasian means, it is clear that with regard to the distribution of Caucasian means, those values reported from rural school districts had a mean percent disadvantaged in the district of 21.67, SD=12.77, and a minimum of less than ten percent to no disadvantaged students in the district to a maximum of 59 percent of students in the district classified as disadvantaged. The mean for percent attendance for Caucasian means reported in rural school districts in Ohio is 95.24, SD=.92. The range for percent attendance in rural districts for Caucasian means is five. The mean for percent of teachers certified to teach for all courses for Caucasians in rural school districts in Ohio is 98.64, SD=3.40. For the distribution of Caucasian means, those districts that reported means from a rural district setting had a minimum percent of teachers certified to teach for all courses of 69 and the maximum of 100. Class size for the distribution of means for Caucasian reported from a rural school district have a minimum of 11 students in class to a maximum of 22 students in class. This results in a mean of 16.25, SD=1.77 students in class for the distribution of Caucasian means

reported from rural school districts in Ohio. These descriptives are difficult to compare to the distribution of African American means reported from rural districts because only four rural districts report mean scores for African American fourth graders as compared to 338 school districts that reported Caucasian means for the 2003/2004 reading proficiency test.

The mean for percent disadvantaged in the school district for the distribution of Caucasian means reported from urban school districts across Ohio is 38.78, SD=19.67, and for the African American distribution the mean is 46.25, SD-19.02. The range for both distributions is 100 to indicate that some urban districts do not have disadvantaged students while some urban districts have 100 percent disadvantaged students. The range of percent attendance for both distributions from urban school districts is seven. The mean for the two distributions from urban district settings is very close in value at 94.49, SD=.95, for the Caucasian distribution, and 94.21, SD=1.04 for the African American distribution. The range for percent of teachers certified to teach for all courses in urban districts is 18 for both the distribution of Caucasian means and the distribution of African American means, and the mean is 98.5, SD=2.73 for the Caucasian distribution and 97.81, SD=3.21 for the African American distribution. Average class size in the district for the urban districts in the Caucasian distribution has a mean of 15.57 students in class. This variable has a minimum of 12 students to a maximum of 21 students per class. For the distribution of African American means reported from an urban school district the average class size is 15.47 with a range of eight students.

Finally, suburban school districts have the smallest percentage of disadvantaged students in the school districts for both the distribution of Caucasian means and the distribution of African American means, with a mean percent disadvantaged of 12.97, SD=8.93, and 15.75, SD=10.01, respectively. Percent attendance for suburban districts in the distribution of Caucasian students is 95.57, SD=.69. Percent attendance for suburban districts in the distribution of African American means is 95.46, SD=.74. The range for the percentage of teachers certified to teach for all courses for the distribution of Caucasian means is 16, with a mean of 99.11, SD=1.95. For the distribution of African American means the range for the percentage of teachers certified to teach for all courses is seven, with a mean of 99.05, SD=1.67. Last, the range for average class size in the district for both distribution of means is 34, with a mean of 16.42, SD=2.02 for Caucasian the distribution and 16.21, SD=2.17 for the African American distribution.

Pearson correlations in Table 3.3 reveal the direction and the strength of the relationship between variables.

	meanwhite	disadvan	attendance	dissizeloc	rural	urban	suburban	certeach	classsize
meanwhite	1.00								
disadvan	-0.44	1.00							
attendance	0.46	-0.58	1.00						
dissizeloc	0.29	-0.14	0.09	1.00					
rural	-0.16	-0.07	0.07	-0.92	1.00				
urban	-0.23	0.48	-0.36	0.18	-0.55	1.00			
suburban	0.39	-0.35	0.25	0.89	-0.65	-0.28	1.00		
certeach	0.09	0.01	-0.01	0.06	-0.04	-0.04	0.07	1.00	
classsize	0.18	-0.23	0.11	0.01	0.05	-0.16	0.08	0.07	1.00

	meanblack	disadvan	attendance	dissizeloc	rural	urban	suburban	certeach	classsize
meanblack	1.00								
disadvan	-0.39	1.00							
attendance	0.33	-0.58	1.00						
dissizeloc	0.30	-0.61	0.57	1.00					
rural	-0.02	-0.01	-0.17	-0.48	1.00				
urban	-0.32	0.69	-0.52	-0.77	-0.19	1.00			
suburban	0.32	-0.69	0.58	0.95	-0.18	-0.94	1.00		
certeach	0.21	-0.21	0.07	0.24	-0.08	-0.21	0.24	1.00	
classsize	0.19	-0.31	0.24	0.17	-0.03	-0.17	0.18	0.20	1.00

Table 3.3. Pearson correlations for variables for all Ohio school districts

By observing the Pearson correlations, it is evident that for both dependent variables, meanwhite and meanblack living in a rural or urban school district has a negative relationship to district achievement. In contrast, both meanwhite and meanblack dependent variables have a positive relationship with being located in a suburban district. Attendance correlates positively with both dependent variables, but correlates a little stronger with meanwhite (r=.46) than with meanblack (r=.33). Percentage of teachers in the district certified to teach all subjects in kindergarten through eighth grade has a .21 relationship with the meanblack dependent variable and only a .09 relationship with the meanwhite dependent variable. Percent disadvantaged in the district correlates at -.58 for both meanwhite and meanblack. A difference in the correlations is for the variables attendance and suburban. For meanwhite the correlation between the two variables is .25, and for meanblack the correlation is .58.

Descriptives for the Dataset for all Districts that are able to Report District Means for Both Caucasian and African American

Below in Table 3.4 summarizes the descriptive statistics for the distribution of district means for districts in Ohio that are able to report means for both Caucasian and African American.

	disadvan	attendance	certeach	classsize
Overall				
Min	50.00	90.30	82.30	11.00
Max	100.00	96.80	100.00	25.00
Mean	32.32	94.78	98.49	15.83
SD	21.09	1.07	2.53	1.98
Valid N (Listwise)	117.00	117.00	117.00	117.00

Table 3.4. Descriptives for districts that report mean reading scores for both Caucasian and African American (N=117).

In these districts, the mean for percent disadvantaged in the district is 32.32, SD=21.09 and a range of 50. The mean for percent attendance in the district is 94.78, SD=1.07. The minimum district reporting for this predictor is 90.30 and the maximum is 96.80. For certified to teach for all courses in kindergarten through grade eight in the district, the district mean is 98.49, SD=2.53. The range for this predictor is 17.70. Last, the district mean for average class size in the district is 15.83, SD=1.98. The minimum for the districts reported an average class size of 11.00 and the maximum reported average class size for schools districts that are able to report mean scores for both Caucasian and African American 25.00. Of course, we would expect these values to be the same for both the distributions of Caucasian and African American means because for this variable, they are the same districts.

Pearson correlations for districts that are able to report scores for both Caucasian and African American are summarized in Table 3.5. Pearson correlations reveal the direction and the strength of the relationship between variables.

	meanwhite	disadvan	attendance	dissizeloc	rural	urban	suburban	certeach	classsize
meanwhite	1.00								
disadvan	-0.55	1.00							
attendance	0.62	-0.59	1.00						
dissizeloc	0.62	-0.64	0.57	1.00					
rural	-0.24	-0.02	-0.18	-0.49	1.00				
urban	-0.52	0.73	-0.51	-0.77	-0.19	1.00			
suburban	0.61	-0.73	0.57	0.95	-0.18	-0.93	1.00		
certeach	0.26	-0.28	0.12	0.25	-0.09	-0.22	0.25	1.00	
classsize	0.19	-0.35	0.32	0.23	-0.03	-0.23	0.24	0.18	1.00

	meanblack	disadvan	attendance	dissizeloc	rural	urban	suburban	certeach	classsize
meanblack	1.00								
disadvan	-0.38	1.00							
attendance	0.37	-0.59	1.00						
dissizeloc	0.31	-0.64	0.57	1.00					
rural	-0.02	-0.02	-0.18	-0.49	1.00				
urban	-0.34	0.73	-0.51	-0.77	-0.19	1.00			
suburban	0.34	-0.73	0.57	0.95	-0.18	-0.93	1.00		
certeach	0.21	-0.28	0.12	0.25	-0.09	-0.22	0.25	1.00	
classsize	0.22	-0.35	0.32	0.23	-0.03	-0.23	0.24	0.18	1.00

Table 3.5. Pearson correlations for variables for districts that report mean reading scores for both Caucasian and African American.

By observing Pearson correlations, it is evident that for both dependent variables a district location of rural and urban has a negative relationship to achievement. In contrast, having a district located in a suburban setting correlates positively for both dependent variables; .61 for meanwhite and .34 for mean black. In addition, percent disadvantaged in the district has a negative relationship with achievement. Both meanwhite and meanblack dependent variables have a positive relationship with living in a suburban district. Attendance correlates positively with both dependent variables, but correlates a little stronger with meanwhite (r=.62) than with meanblack (r=.37). Percentage of teachers in the district certified to teach all subjects in kindergarten through eighth grade has a .21 relationship with the meanblack dependent variable and a

.26 relationship with the meanwhite dependent variable. Class size correlates with meanwhite at .19, and meanblack at .22.

3.7 Bivariate Scatterplots

Bivaraite scatterplots of the outcome variables and each predictor variable are shown in the appendix as Item 2. From these plots, it can be discerned that there is a suggestion for linearity in all cases for both dependent variables, so no data transformations of the data were performed. The data points are clustered with a few data points lying outside the random clusters. For meanblack, two districts fall outside of the data cluster: district number 27 and 397. District 27 falls outside of the data cluster in the percent disadvantaged, percent attendance, district location, and class size. This district is a high performing school district; it has less than ten disadvantaged, the African American district mean reading scores is higher than the Caucasian district mean fourth grade reading score, it is a high performing urban school district, and 100 percent of the teachers are certified to teach in all subjects for kindergarten through eighth grade. However, they have a lower percentage of attendance. District 397 also falls outside of the data cluster; this school district reports 48 percent of the student population as disadvantaged. It is a low performing urban school district, but 100 percent of the teachers are certified to teach and it boasts a high attendance percentage. Bivariate scatterplots for the meanwhite dependent variable indicate different districts outside of the data cluster. District 440 falls outside of the data cluster for all of the predictor variables: Percent disadvantaged, percent certified teachers in all subjects for k-8, percent attendance, district location, and district class size. It is a rural district that

has a greater N for African American than Caucasian; percent disadvantaged is low, class size is small, attendance is low, and percent certified teachers is high. District 128 is a high performing suburban district that falls outside of the data clusters. Percent disadvantaged is low in the district, percent attendance is between 94 and 96 percent, 100 percent of the teachers are certified to teach, and has average class size for a suburban school district.

3.8 Model Building

Based upon observations made from the descriptive statistics and review of the literature, an analysis plan as displayed below in Table 3.6, was developed to help prioritize variables to build a regression model to answer the research questions.

Priority	Predictor	Comment
High	Percent disadvantaged in the district (Question predictor)	Students tend to take on the characteristics of other students in the school buildings. If there is a concentration of low-income students in the district then chances are that achievement will be low.
	Percent attendance in the district (Question predictor)	Literature indicates that the more days students attend school the better overall achievement of that student.
Medium	Class size (Control variable)	No real relationship has been found with relation to class size and student achievement. Studies have indicated that low-income students perform better in small classes.
	Number of certified teachers in district (Control variable)	NCLB dictates that schools may only hire highly qualified/certified teachers in the name of student achievement.
Low	District location (Control variable)	Some studies indicate that students perform differently in different districts. But this is more related to SES than district control.
Interactions	Percent disadvantaged * class size	Literature indicates that low-income students perform better in small classes in early grades.
	percent disadvantaged * urban district location	Bickley and Howell 2000 indicated a significant relationship with student achievement.
	disadvantaged * attendance	Literature indicates a relationship between low-income and low school attendance.

Table 3.6. Data analysis plan for entering predictors into regression model.

The variables classified as student characteristics were given the highest priority because prior research has found a strong relationship to students' characteristics including socioeconomic status and absenteeism rate (Caldas, 1996). Another important predictor variable is the location of the school district because many school districts in Ohio are residentially segregated by socioeconomic status (Rivkin, 1994) which may have a relationship to achievement in districts. The remaining variables are considered to be control variables which frequently convey characteristics of the research subjects (Gay & Airasian, 2000). These control variables are classified in this study as district organizational structure: average class size for the district, and the percentage of teachers certified to teach for all subjects in kindergarten through eighth grade. Variable interactions are also important to consider for this analysis. Prior research indicates that Bickley and Howell (2000) determined a significant relationship between the interaction of district size and percent disadvantaged in the school district with student achievement.

In building all of the linear regression models, the variables were added individually according to the priorities established for the analysis. The large disparity in sample size between Caucasian and African American district level mean scores makes it important to first examine the distribution of school districts that are able to report district means for both Caucasian and African American. Then a best fit model for the distribution of Caucasian scores will be examined as well as a best fit model for the distribution of African American scores. Table 3.7 displays the taxonomy for the multiple regression models for Caucasian for school districts that report means for both

Caucasian and African American, and Table 3.8 displays the taxonomy for the multiple regression models for African American for school districts that are able to report both Caucasian and African American district means.

Models for meanwhite for districts with both African American and Caucasian students

	M1	M2	M3	M4	M5	M6	M7
disadvan	-0.29 **			-0.19	-0.24 *	-0.14	-0.26 **
attendance	0.45 ***			0.33 ***	0.34 ***	0.38 ***	0.48 ***
certeach		0.22 *		0.10	0.08	0.11	0.14 ~
classsize		0.11		-0.10	-0.11	-0.07	-0.08
rural							
urban			4.99 ~	1.52 ***	1.57 ***	0.33 ~	
suburban			12.91 ***	1.84 ***	1.79 ***	0.59 **	
disurban				0.47 **	0.49 **		
disrural							
dissuburban				-0.09			
R-sqrd	0.43	0.05	0.38	0.52	0.52	0.48	0.44
SSE	2898.25	4954.72	3250.20	2303.60	2314.89	2527.16	2793.13
dfE	110.00	110.00	110.00	104.00	105.00	106.00	108.00

Key: ~p<.10; *p<.05; **p<.01; ***p<.00

Table 3.7. Taxonomy of multiple regression models for meanwhite for school districts that are able to report means for both African American and Caucasian fourth grade reading scores: Standardized parameter estimates for a nested taxonomy of OLS-fitted regression models that describe the relationship between fourth grade reading proficiency scores in Ohio and percent disadvantaged students in the district, percent student attendance, rural, urban, suburban, controlling for average class size, and percent of teachers certified to teach all subject k-8. (N=117).

Models for meanblack for districts with both African American and Caucasian students

	M1	M2	M3	M4	M5	M6	M7
disadvan	-0.24 *			-0.02	-0.12	-0.18	-0.12
attendance	0.23 *			0.21 ~	0.23 *	0.23 *	0.23 *
certeach		0.18 *		0.18 *	0.16 ~	0.16 ~	0.16 ~
classsize		0.15 ~		0.07	0.05	0.05	0.05
rural							
urban			-0.10	0.22	-0.14		-0.09
suburban			0.23	0.10	-0.06		-0.01
disurban				-0.02			0.02
disrural							
dissuburban				-0.21			
R-sqrd	0.16	0.05	0.09	0.16	0.16	0.17	0.16
SSE	3302.38	.4157.632	3992.77	3127.80	3177.97	3195.70	3177.68
dfE	110.00	110.00	110.00	104.00	106.00	108.00	105.00

Key: ~p<.10; *p<.05; **p<.01; ***p<.00

Table 3.8. Taxonomy of multiple regression models for meanblack for school districts that are able to report means for both African American and Caucasian fourth grade reading scores: Standardized parameter estimates for a nested taxonomy of OLS-fitted regression models that describe the relationship between fourth grade reading proficiency scores in Ohio and percent disadvantaged students in the district, percent student attendance, rural, urban, suburban, controlling for average class size, and percent of teachers certified to teach all subject k-8. (N=117).

As indicated in Table 3.7 models four through seven are nested models to indicate that a more restricted model was obtained for the analysis from a less restricted model by imposing a set of constraints on the less restrictive model. To that end, Table 3.8, models five and six are nested within model four. The goal of model building is to produce a final model that is parsimonious and yields a high R-squared for each of the dependent variables: meanwhite and meanblack for those districts that are able to report means for both Caucasian and African American. It is important to note that the models for meanblack do not fit the data.

In addition, the same procedure was utilized when building regression models to include all of Ohio's school districts. Predictor variables were added individually according to priorities established in the analysis plan. Table 3.9 displays the taxonomy for model building for the distribution of Caucasian means for all school districts across Ohio that is able to report Caucasian mean scores. Also, Table 3.10, displays the taxonomy for model building for the distribution of African American means for all school districts across Ohio that are able to report African American mean scores

Models for meanwhite - all districts in Ohio

	M1	M2	M3	M4	M5	M6	M7	M8
disadvan	-0.44 ***	-0.25 ***	-0.25 ***	-0.23 ***	-0.17 ***	-0.15 *	-0.17 ***	-0.15 *
attendance		0.32 ***	0.32 ***	0.32 ***	0.31 ***	0.30 ***	0.31 ***	0.31 ***
certeach			0.10 **	0.09 **	0.07 *	0.08 *	0.07 *	0.07 ~
classsize				0.09 **	0.09 **	0.11 **	0.09 **	0.10 **
rural					-0.06	-0.05		
urban							0.05	0.11
suburban					0.20 ***	0.24 *	0.25 ***	0.29 ***
disurban								-0.07
disrural						-0.01		
dissuburban						-0.05		-0.05
R-sqrd	0.19	0.26	0.26	0.27	0.32	0.32	0.32	0.32
SSE	14237.24	13082.08	12919.63	12790.46	11822.47	11328.28	11822.47	11469.74
dfE	604.00	603.00	602.00	601.00	599.00	573.00	599.00	583.00

Key: ~p<.10; *p<.05; **p<.01; ***p<.00

Table 3.9. Taxonomy of multiple regression models for meanwhite for all districts across Ohio: Standardized parameter for a nested taxonomy of OLS-fitted regression models that describe the relationship between fourth grade reading proficiency scores in Ohio and percent disadvantaged in the district, percent student attendance, rural, urban, controlling for average class size, and percent of teachers certified to teach all subjects k-8 (N=606).

Models for meanblack - all districts in Ohio

	M1	M2	M3	M4	M5	M6	M7	M8
Intercept								
disadvan	-0.39 ***	-0.30 **	-0.27 **	-0.26 ~	-0.23 ~	-0.14	-0.23 ~	-0.07
attendance		0.15	0.16	0.16	0.16	0.13	0.16	0.21 ~
certeach			0.15 ~	0.14 ~	0.14	0.19 *	0.14	0.18 *
classsize				0.04	0.04	0.10	0.04	0.07
rural					0.02	0.01		
urban							-0.06	-0.22
suburban					0.04	0.21	-0.03	0.11
disurban								0.06
disrural						0.03		
dissuburban						-0.17		-0.19
R-sqrd	0.15	0.15	0.17	0.16	0.15	0.15	0.15	0.16
SSE	3783.45	3715.87	3624.28	3617.37	3613.74	3411.88	3613.74	3128.95
dfE	117.00	116.00	115.00	114.00	112.00	108.00	112.00	106.00

Key: ~p<.10; *p<.05; **p<.01; ***p<.00

Table 3.10. Taxonomy of multiple regression models for meanblack for all districts across Ohio: Standardized parameter estimates for a nested taxonomy of OLS-fitted regression models that describe the relationship between fourth grade reading proficiency scores in Ohio and percent disadvantaged in the district, percent student attendance, rural, urban, controlling for average class size, and percent of teachers certified to teach all subjects k-8 (N=119).

3.9 Best Fit Models

This section will provide a discussion of the best fitted models for meanblack and meanwhite for all districts across Ohio, and for districts that are able to report district means for both Caucasian and African American.

The first subsection will describe the determined best fit model for Caucasian means for districts that are able to report means for both Caucasian and African American. The second subsection will discuss the best fit model for African American means for those districts that are able to report means for both Caucasian and African American. The third subsection will discuss best fit models for Caucasian means for all districts across Ohio. The last subsection will discuss the best fit models for African American means for all districts across Ohio.

Meanwhite for districts that are able to report means for both Caucasian and African American

The regression equations for meanwhite were created by adding predictor variables one at a time to obtain both a parsimonious regression that explains the highest percent of variability in the dependent variable. Model five was determined best fit for the distribution of Caucasian means for those districts that are able to report mean scores for both Caucasian and African American:

$Y_{meanwhite} = \beta_1 X_{disadvan} + \beta_2 X_{attendance} + \beta_3 X_{certeach} + \beta_4 X_{classsize} + \beta_6 X_{urban} + \beta_7 X_{suburban} + \beta_8 X_{disurban} + \varepsilon$. In this model, Y equals the district mean proficiency scores for Caucasian in school districts that are able to report mean scores for both Caucasian and African American, $\beta_1 X_{disadvan}$ represents the slope and predictor for percent disadvantaged in the school district, $\beta_2 X_{attendance}$ represents the slope and the predictor for percent attendance in the district, $\beta_3 X_{certeach}$ represents the slope and predictor for percentage of certified teachers in the district, $\beta_4 X_{classsize}$ represents the average class size for the district, $\beta_6 X_{urban}$ represents the slope and the predictor for being located in an urban district setting, $\beta_7 X_{suburban}$ represents the slope and the predictor for being located in a suburban district setting, $\beta_8 X_{disurban}$ represents the interaction of the predictors urban and percent disadvantaged in the district, and ε represents the residual error. This model resulted in an adjusted Rsqrd of .52 to determine the model account for 52 percent of the variation in the dependent variable.

Overall, model building was guided by priorities that were set in the analysis plan. Table 3.11 summarizes general linear hypothesis (GLH) testing procedures used

to verify that model five is the best fitting model for Caucasian students living in school districts that contain both Caucasian and African American students.

Model for meanwhite		SS	df	MS	F	Sig.	Delta Rsqrd
6	Regression	2369.08	4.00	592.2722	.90	0.00 a	
7 *	Subtest Models (urban, suburban)	265.97	2.00	132.99	5.58	0.01 b	0.05
	Regression	2635.05	6.00	439.17			
5 *	Regression	2847.32	7.00	406.7618	.45	0.00 c	
4	Subtest Models (dissub)	11.29	1.00	11.29	0.51	0.48 d	0.00
	Regression	2858.61	8.00	357.33			
Models for meanblack							
6 *	Regression	816.20	4.00	204.05	6.90	0.00 e	
5	Subtest Models (urban, suburban)	17.73	2.00	8.86	0.30	0.75 f	0.00
	Regression	833.92	6.00	138.99			

a. Predictors: (Constant), disadvan, attendance, certeach, classsize
b. Predictors: (Constant), disadvan, attendance, certeach, classsize, urban, suburban
c. Predictors: (Constant), disadvan, attendance, certeach, classsize, urban, suburban, disurban
d. Predictors: (Constant), disadvan, attendance, certeach, classsize, urban, suburban, disurban, dissub
e. Predictors: (Constant), disadvan, attendance, certeach, classsize
f. Predictors: (Constant), disadvan, attendance, certeach, classsize, urban, suburban

Table 3.11. General Linear Hypothesis test for models with districts that report both African American and Caucasian district means.

An advantage to using GLM is that it reduces the risk of Type I error in the model (Keppel, 1991). It is important to note that the final model for Caucasian students, was tested against Model 4 using the null hypothesis $\beta_{dissub} = 0$. In this case the null hypothesis was retained to indicate using Model five because the predictor rural was found to not be different from zero and therefore does not contribute to the variability of the dependent variable and should be taken out of the model to keep a parsimonious regression. To that end, the slopes for being located in an urban or suburban district were tested with the null hypothesis $\beta_{urban} = 0$ and $\beta_{suburban} = 0$. The null hypothesis was rejected to indicate these slopes contribute significantly to the variation in the dependent variable.

Meanblack for districts that are able to reports means for both Caucasian and African American

The regression equations for meanblack were created by adding predictor variables one at a time to obtain both a parsimonious regression that explains the highest percent of variability in the dependent variable. Model six was determined best fit for the distribution of African American means for districts that are able to report means for both Caucasian and African American:

$Y_{meanblack} = \beta_1 X_{disadvan} + \beta_2 X_{attendance} + \beta_3 X_{certeach} + \beta_4 X_{classsize} + \varepsilon$. In this model Y equals the district mean proficiency scores for the distribution of African American means, β_0 represents the constant, $\beta_1 X_{disadvan}$ represents the slope and predictor for percent disadvantaged in the school district, $\beta_2 X_{attendance}$ represents the slope and the predictor for percent attendance in the district, $\beta_3 X_{certeach}$ represents the slope and predictor for percentage of certified teachers in the district, $\beta_4 X_{classsize}$ represents the average class size for the district, and ε represents the residual error. Rsqrd for this model is .17 to indicate that 17 percent of the variability in the dependent variable is explained by the model.

General linear hypothesis (GLH) testing procedures for the distribution of African American means are summarized in Table 3.11. GLM results indicated that it was appropriate to remove the location variable for all types of school district locations. Models five and six were tested with the null hypotheses: $\beta_{urban} = 0$, $\beta_{suburban} = 0$. The null hypotheses were retained to indicate the model with less predictors is the better fit for a parsimonious regression and control for Type I error. This is logical because the

African American models that include the district location predictors, these predictors did not yield significance.

Meanwhite for all school districts across Ohio

The regression equations for meanwhite were created by adding predictor variables one at a time to obtain both a parsimonious regression that explains the highest percent of variability in the dependent variable. Model seven was determined best fit for the distribution of Caucasian means for all school districts in Ohio that are able to report Caucasian means:

$Y_{meanwhite} = \beta_1 X_{disadvan} + \beta_2 X_{attendance} + \beta_3 X_{certeach} + \beta_4 X_{classsize} + \beta_6 X_{urban} + \beta_7 X_{suburban} + \varepsilon$.

In this model, Y equals the district mean proficiency scores for the distribution of Caucasian means districts that are able to report means for both Caucasian and African American, $\beta_1 X_{disadvan}$ represents the slope and predictor for percent disadvantaged in the school district, $\beta_2 X_{attendance}$ represents the slope and the predictor for percent attendance in the district, $\beta_3 X_{certeach}$ represents the slope and predictor for percentage of certified teachers in the district, $\beta_4 X_{classsize}$ represents the average class size for the district, $\beta_6 X_{urban}$ represents the slope and the predictor for being located in an urban school setting, $\beta_7 X_{suburban}$ represents the slope and the predictor for being located in a suburban school setting, and ε represents the residual error. This model resulted in an adjusted Rsqrd of .32 to determine the model account for 32 percent of the variation in the dependent variable.

General linear hypothesis (GLH) testing procedures for the distribution of Caucasian means for all districts that are able to report means for Caucasian are summarized in Table 3.12.

Model for meanwhite	SS	df	MS	F	Sig.	Delta Rsqrd
7 * Regression	5497.01	6.00	916.17	46.67	0.00 a	
8 Subtest Models (disurban, dissub)	15.54	2.00	7.77	0.40	0.67 b	0.00
Regression	5512.55	8.00	689.07			

a. Predictors: disadvan, attendance, certeach, classsize, urban, suburban

b. Predictors: (Constant), disadvan, attendance, certeach, classsize, urban, suburban, disurban, dissub

Table 3.12. General Linear Hypothesis test for models for all districts across Ohio.

General Linear hypothesis results indicated that it was appropriate to remove the interaction variables: disurban and dissub. Models seven and eight were tested with the null hypotheses: $\beta_{disurban} = 0$, $\beta_{dissub} = 0$. The null hypotheses were retained to indicate the model with less predictors is the better fit for a parsimonious regression and control for Type I error. This is logical because the Caucasian models that include the interaction predictors did not yield significance.

Meanblack for all school districts across Ohio

The regression equations for meanblack were created by adding predictor variables one at a time to obtain both a parsimonious regression that explains the highest percent of variability in the dependent variable. Model 4 was determined best fit for the distribution of African American means for all districts that are able to report means for African American across Ohio:

$Y_{meanblack} = \beta_1 X_{disadvan} + \beta_2 X_{attendance} + \beta_3 X_{certeach} + \beta_4 X_{classsize} + \varepsilon$. In this model Y equals the district mean proficiency scores for the distribution of African American means, β_0 represents the constant, $\beta_1 X_{disadvan}$ represents the slope and predictor for percent

disadvantaged in the school district, $\beta_2 X_{attendance}$ represents the slope and the predictor for percent attendance in the district, $\beta_3 X_{certeach}$ represents the slope and predictor for percentage of certified teachers in the district, $\beta_4 X_{classsize}$ represents the average class size for the district, and ε represents the residual error. Rsqrd for this model is .16 to indicate that 16 percent of the variability in the dependent variable is explained by the model.

GLH procedures were not conducted to test for the significance of the categorical variables: urban and suburban. These predictor variables did not show initial significance during model building; therefore it was determine that district location did not contribute to the variability of African American district mean test scores for 2003/2004 fourth grade reading proficiency in Ohio.

3.10 Assumption Check/Sensitivity Analysis

In a regression analysis the assumptions of homoscedasticity, normality, and independence are related to the residuals created when the predicted Y is subtracted from the observed Y. The closer the predicted and observed Y's are in value, the better fit of the regression line. The goal is to have the smallest residuals for an Ordinary Least Squares (OLS) regression model.

Influential data points were identified through a sensitivity analysis and the results are summarized in the appendix as Item 3. It is important to conduct this analysis because the presence of an outlier will have an effect on the sum of the squared residuals and ultimately impact the standard error of the estimates, which in turn have an effect on the t-statistic for the variable. In addition, outliers may influence the

intercept of the regression line, but not the parameter slopes. It is acceptable in a normal distribution to have five percent of the data points qualify as outliers.

In the present study, seven school districts were determined to be outliers: five for the distribution of Caucasian mean scores, and two for the distribution of African American mean scores: district numbers 31, 37, 128, 440, 275, 27, and 397 respectively. These influential cases were systematically taken away from the data set and new analyses were conducted to determine if the absence of these cases changed the Rsqrd and the sum of the squared residuals. In each case there was not much change in the slopes of the predictors, Rsqrd or sum of the squared residuals. Therefore, all influential data points were kept in the data set in order to present original model results for the state of Ohio district means for Caucasian and African American on the 2003/2004 4^{th} grade reading proficiency exam.

Homoscedasticity was visually checked by plotting each of the raw residuals for all fitted models against each predictor variable and against the predicted Y values (Yhat). Remaining cognizant of the null hypothesis for homoscedasticity, *the residual distribution has equal variances*, it was checked that the vertical spread of the residuals was approximately equal at every level of the predictor and the predicted values. Two districts appeared as extreme data points: district number 128 and 440. Both of these districts influence on the data set were checked in the sensitivity analysis; therefore, after reviewing the sensitivity analysis, it was determined to keep these two school districts in the data set.

Normality was visually checked with using a histogram of the un-standardized predicted values by the standardized residuals using the null hypothesis, *the residual distribution is normally distributed.* The histograms were normally distributed with the exception of cooksD. CooksD summarizes the overall impact of each data point on the regression line. The distribution of cooksD indicated a positive skew in the distribution, so normality was again checked with a Q-Q plot to determine the influential data cases. The Q-Q plot revealed districts 128, 440, and 37 as the influential data points. Again, checking the sensitivity analysis revealed that each of these districts were tested in the sensitivity analysis. The analysis determined that removing these data points from the data set did not change the slopes of the predictors or the overall model Rsqrd. Again, all data points were kept in the final data analysis; this is because even with the inflated value for the sum of the squared residuals being driven by our influential data points, these extreme values are not extreme enough to render our parameter estimates unstable.

The assumption of residual independence is difficult to check and is usually assumed with a data set that is assumed to have independence. The data set for this study consists of district level means from the 2003/04 Ohio fourth grade reading proficiency test. The district means are calculated from individual student 4^{th} grade test scores in that particular district. Testing conditions for each student are tightly controlled. Students are not permitted to talk or ask the test proctor questions that would bias student responses while the test is being administered. Therefore, while the data are not randomly selected from a population, it can be assumed the data set meets

the assumption of independence. To that end, it can be assumed that residuals are also independent.

3.11 Findings

This section will present the findings from the best fitted models for the district means for Caucasian and African American on the 2003/2004 4th grade reading proficiency test. This section is organized according to the research questions. This first section will answer the first research question. The second section will answer the second research question.

Research Question 1. What is the relative relationship between district level student characteristics, district context, and district organizational decisions on the district achievement of Caucasian and African American means for the 2003/2004 4th grade reading proficiency test scores in Ohio?

The standardized regression coefficients will be explained in the text of this analysis. The findings that answer this question will be organized as follows. First to be presented will be for the overall achievement disparity between Caucasian and African American district means for those districts that are able to report means for both Caucasian and African American. Next, the findings for the achievement gap between district means by district location will be presented for those districts that are able to report district means for both Caucasian and African American. Third, the findings will be presented for the achievement gap of district means for all districts across Ohio. Last, the findings for the achievement disparity will be presented by district location for all districts across Ohio.

Overall Caucasian/African American District Achievement Gap for districts that are able to report means for both Caucasian and African American

To calculate the overall achievement disparity between the distribution of means for Caucasian and the distribution of means for African American for districts that are able to report mean scores for both Caucasian and African American, the following models were used:

$Y_{meanwhite} = \beta_1 X_{disadvan} + \beta_2 X_{attendance} + \beta_3 X_{certeach} + \beta_4 X_{classsize}$

$Y_{meanblack} = \beta_1 X_{disadvan} + \beta_2 X_{attendance} + \beta_3 X_{certeach} + \beta_4 X_{classsize}$

Table 3.13 summarizes results from the above model for the distribution of Caucasian means.

	All Districts Across Ohio		Districts that are able to report means for both Caucasian and African American	
	Meanwhite	Meanwhite	Meanwhite	Meanwhite
disadvan	-0.23 ***	-0.17 ***	-0.26 **	-0.19
attendance	0.32 ***	0.31 ***	0.48 ***	0.33 ***
certeach	0.09 **	0.07 *	0.14 ~	0.10
classsize	0.09 **	0.09 **	-0.08	-0.10
rural				
urban		0.05		1.52 ***
suburban		0.25 ***		1.84 ***
disurban				0.47 **
disrural				
dissuburban				-0.09
R-sqrd	0.27	0.32	0.44	0.52
SSE	12790.46	11822.47	2793.13	2303.60
dfE	601.00	599.00	108.00	104.00

Key: ~p<.10; *p<.05; **p<.01; ***p<.00

Table 3.13. Best fitted models for the distribution of means for Caucasian.

This model yielded an Rsqrd of .44 to indicate that 44 percent of the variability in the district level mean for Caucasian is explained by the model. The percent of disadvantaged students in the district is a significant predictor for the dependent variable. On average, a one standard deviation increase in the percent disadvantaged in the school district would be expected to observe a .26 standard deviation decrease in the district mean for the 2003/2004 4^{th} grade reading proficiency test in districts that are able to report means for both Caucasian and African American while holding all other variables constant. Percent attendance is also a significant predictor variable; its relationship to the dependent variable is that on average, a one standard deviation increase in the district percent attendance would expect to yield a .48 increase in the dependent variable, holding all other variables constant. At the district level, the percentage of teachers certified to teach for all courses is significant at $p<.10$. On average, a one standard deviation increase in the percentage of teachers certified to teach for all courses in the district indications are that it would have a .14 standard deviation increase on the dependent variable, holding all other variables constant. Last, the data indicates that a one standard deviation decrease in the average class size in the district would expect to yield a .08 standard deviation decrease in the dependent variable while holding all other variables constant; however, this predictor is not significant in the model.

Table 3.14 summarizes the regression model for the distribution of African American means for districts that are able to report mean scores for both Caucasian and African American, yielded a Rsqrd of .17.

	All Districts Across Ohio		Districts that are able to report means for both Caucasian and African American	
	Meanwhite	Meanwhite	Meanwhite	Meanwhite
disadvan	-0.23 ***	-0.17 ***	-0.26 **	-0.24 *
attendance	0.32 ***	0.31 ***	0.48 ***	0.34 ***
certeach	0.09 **	0.07 *	0.14 ~	0.08
classsize	0.09 **	0.09 **	-0.08	-0.11
rural				
urban		0.05		1.57 ***
suburban		0.25 ***		1.79 ***
disurban				0.49 **
disrural				
dissuburban				
R-sqrd	0.27	0.32	0.44	0.52
SSE	12790.46	11822.47	2793.13	2314.89
dfE	601.00	599.00	108.00	105.00

Key: ~p<.10; *p<.05; **p<.01; ***p<.00

Table 3.14. Best fitted models for the distribution of means for African American.

This indicates that 17 percent of the variability in the dependent variable can be attributed to the predictors in the model: percent of disadvantaged students in the district, percent attendance for the district, the percentage of students certified to teach for all courses for kindergarten through eighth grade in the district, and the average class size. Conversely, percent disadvantaged in the district and average class size were not significant predictors. To that end, percentage of certified teachers for all courses was significant at the p<.10 level. Percent attendance for the district was significant at p<.05. According to the data, a one standard deviation increase in the percent of disadvantaged students would have a relationship of an on average .18 standard deviation decrease in the district mean scores for the distribution of African American means for the 2003/2004 4th grade reading proficiency test, holding all other variables

constant. On average, for a one standard deviation increase in the percent attendance for the district it would be expected to witness a .23 standard deviation increase in the dependent variable, holding all other variables constant. A one standard deviation increase in the percent of certified teachers for all courses it would be expected to observe an on average a .16 standard deviation increase in the dependent variable holding all other variables constant. Last, a one standard deviation decrease in average class size would indicate a .05 increase in the dependent variable, holding all other variables constant.

Caucasian/African American district Achievement Gap for districts that are able to report district means for both Caucasian and African American by District Location

The following will be an explanation of the regression coefficients yielded in this section of the analysis of the achievement disparity between the district means of Caucasian and African American for urban and suburban districts across Ohio that are able to report mean scores for both Caucasian and African American. However, it is important to mention that this analysis does not include Ohio's school districts designated as rural. Only four of Ohio's 338 rural school districts were able to report district means for African American 4^{th} grade. This is not a large enough sample size to generate unbiased estimates for African American means reported from rural districts; therefore, rural school districts will not be explained in findings, but only used as a reference variable.

To calculate the achievement disparity between the district means of Caucasian and African American reported from urban school districts that are able to report means for both Caucasian and African American, the following models were used:

$Y_{meanwhite} = \beta_1 X_{disadvan} + \beta_2 X_{attendance} + \beta_3 X_{certeach} + \beta_4 X_{classsize} + \beta_6 X_{urban} + \beta_7 X_{suburban} + \beta_8 X_{disurban} + \varepsilon$

$Y_{meanblack} = \beta_1 X_{disadvan} + \beta_2 X_{attendance} + \beta_3 X_{certeach} + \beta_4 X_{classsize} + \beta_6 X_{urban} + \beta_7 X_{suburban} + \beta_8 X_{disurban} + \varepsilon$

As indicated in Table 3.13 this model yielded an Rsqrd of .52 for the distribution of Caucasian means reported from urban school districts that are able to report means for both Caucasian and African American. On average, a one standard deviation increase in the percent attendance for the district would expect to yield a .24 standard deviation decrease in the 2003/2004 district mean 4th grade reading proficiency for Caucasian holding all other variables constant. This predictor is significant at the $p<.05$ level. Percent attendance is significant at the $p<.001$ and on average it can be inferred that a one standard deviation increase in the percent attendance for the district will indicate a .34 standard deviation increase in the dependent variable, holding all other variables constant. The predictors' percent certified to teach for all courses and average class size is not significant in this model, but a one standard deviation increase in this predictor variable would expect to yield a .08 standard deviation increase in the dependent variable, holding all other variables constant. To that end, a one standard deviation decrease in average class size for the district would on average, would impact the dependent variable with a .11 standard deviation decrease, holding all other

variables constant. On average, the relationship of a district being located in an urban setting with reference to a suburban or rural setting would indicate a 1.52 standard deviation increase in district mean score for the 2003/2004 4th grade reading proficiency test for Caucasian, holding all other variables constant; this relationship is significant at $p<.001$. On the other hand, the relationship of being located in a suburban setting is significant at $p<.001$ in reference to being located in an urban or rural setting. On average, the relationship of being located in a suburban school setting with the dependent variable is indicated with by an expected 1.84 standard deviation increase, holding all other variables constant. To that end, on average the interaction of the district being located in an urban setting and a one standard deviation increase in the percentage of disadvantaged students in the district would indicate a .49 standard deviation increase in the dependent variable, holding all other variables constant; this interaction is significant at $p<.01$.

For the distribution of African American means the model is a little different because the Rsqrd is only .16 to indicate that the model only accounts for 16 percent of the variation in district mean scores for 2003/2004 4th grade reading proficiency for African American. These results are summarized in Table 3.14. The model indicates a one standard deviation increase in percent disadvantaged students in the district would be expected to observe an on average .18 standard deviation decrease in district level mean scores for 2003/2004 4th grade reading proficiency for African American, holding all other variables constant; this predictor is not significant. Conversely, percent attendance for the district is significant at $p<.05$. On average, a one standard deviation

increase in the percent attendance for the district would appear to indicate a .23 standard deviation increase in the dependent variable, holding all other variables constant. The percent of teachers certified to teach for all courses is significant at $p<.10$. On average a one standard deviation increase in this predictor variable would expect to observe a .16 standard deviation increase in the dependent variable, holding all other variables constant. For the distribution of African American means, the predictors, average class size, living in an urban or a suburban school district with reference to a rural district, and the interaction of urban and percent disadvantaged in the district are not significant in this model. It is indicated that a one standard deviation decrease in the average class size would be reflected and on average .05 increase in the dependent variable, holding all other variables constant. On average, with reference to a district being located in a suburban or a rural setting, being located in an urban setting would indicate a .09 standard deviation decrease in the dependent variable, holding all other variables constant. To that end, with reference to the district being located in an urban or a rural setting, the relationship of being located in a suburban district has an on average .01 standard deviation decrease in the dependent variable, holding all other variables constant. Last, the interaction of being located in an urban district with a one standard deviation increase in the percentage of disadvantaged students would expect to yield, on average, a .02 increase in the dependent variable, holding all other variables constant.

Overall District Level Caucasian/African American Gap on 2003/2004 4th Grade Reading Proficiency

The standardized regression coefficients will be explained in the text of this section. To calculate the overall achievement gap between Caucasian and African American district means on the 2003/2004 Ohio 4th grade reading proficiency test in all school districts across Ohio, the following regression models were used:

$$Y_{meanwhite} = \beta_1 X_{disadvan} + \beta_2 X_{attendance} + \beta_3 X_{certeach} + \beta_4 X_{classsize} + \varepsilon$$

$$Y_{meanblack} = \beta_1 X_{disadvan} + \beta_2 X_{attendance} + \beta_3 X_{certeach} + \beta_4 X_{classsize} + \varepsilon$$

Table 3.13 displays the results from the above model for the distribution of Caucasian means. The regression model for the distribution of Caucasian means on the 2003/2004 4th grade reading proficiency across all districts across Ohio yielded an Rsqrd of .27. This indicates that 27 percent of the variability in the district level mean for the 2003/2004 4th grade reading proficiency for Caucasian is explained by the model. In this model, two predictors were significant at $p<.001$: percent disadvantaged in the school district and percentage of district attendance. On average, the data indicates that a one standard deviation increase in the percent of disadvantaged students in the district would reflect a .23 standard deviation decrease in the dependent variable, holding all other variables constant. To that end, a one standard deviation increase in percent attendance for the district would expect to yield on average a .32 standard deviation increase in the dependent variable, holding all other variables constant. A one standard deviation increase in percent certified to teach for all courses in kindergarten through eighth grade would indicate an on average .009 standard deviation increase in

the district level mean for 2003/2004 4th grade reading proficiency for Caucasian, holding all other variables constant. Last, on average a one standard deviation decrease in class size would indicate a .009 standard deviation increase the dependent variable, holding all other variables constant. Percent certified to teach and average class size are significant at $p<.01$.

For the distribution of African American means, the above model yielded an Rsqrd of .16 to indicate that 16 percent of the variability in district means for the 2003/2004 4th grade reading proficiency test across all Ohio school districts are explained by the model. A summary of these findings is displayed in Table 3.14. Two predictors in this model were significant at $p<.10$: percent disadvantaged in the school district and percent certified to teach for all courses in kindergarten through grade eight. A one standard deviation increase in the percentage of disadvantaged students in the district would indicate an on average .26 standard deviation decrease in the dependent variable. A one standard deviation increase in the percent of teachers certified to teach for all courses would reflect an on average impact of a .14 standard deviation increase in the dependent variable, holding all other variables constant. Percent attendance for the district and average class size were not significant in this model. However, according to the data, with a one standard deviation increase in the percent attendance it would be expected to observe a .16 standard deviation increase in the dependent variable, holding all other variables constant. Last, on average a one standard deviation decrease in district average class size would expect to yield a .04 standard deviation increase in district level means for African American on the 2003/2004 4th grade

reading proficiency test across all Ohio school districts, holding all other variables constant.

District Level Caucasian/African American Achievement Gap for Urban and Suburban School Districts Across Ohio

This section will explain the regression coefficients yielded in this part of the analysis of the district level achievement gap between the distribution of means for Caucasian and the distribution of means for African American in all of Ohio's school districts with the exception of Ohio's rural school districts. As mentioned, only four of Ohio's 338 rural school districts report district means for African American 4th graders. This is not a large enough sample size generate unbiased estimates for those districts; therefore, rural school districts will not be explained but used only as a reference variable.

To calculate the contributions of the predictor variables to the district mean for Caucasian and African American on the 2003/2004 4th grade reading proficiency test, the following models were used:

$$Y_{meanwhite} = \beta_1 X_{disadvan} + \beta_2 X_{attendance} + \beta_3 X_{certeach} + \beta_4 X_{classsize} + \beta_6 X_{urban} + \beta_7 X_{suburban} + \varepsilon$$

$$Y_{meanblack} = \beta_1 X_{disadvan} + \beta_2 X_{attendance} + \beta_3 X_{certeach} + \beta_4 X_{classsize} + \beta_6 X_{urban} + \beta_7 X_{suburban} + \varepsilon$$

To determine the relative contributions of each regression weight, the coefficients will be explained using the standardized coefficient. Regression estimates for the distribution of Caucasian means is summarized in Table 3.13, and the regression estimates for the distribution of African American means are summarized in Table 3.14.

Table 3.13 indicates that the above model yielded an Rsqrd of .32 for the distribution of Caucasian means. Percent disadvantaged students in the district is significant at $p<.001$ and the data indicates that on average a one standard deviation increase in the percent disadvantaged in the school district would reflect a .17 standard deviation decrease in the dependent variable, holding all other variables constant. Percent attendance for the school district is significant in the model at $p<.001$ and the data indicate that a one standard deviation increase in the percent of attendance for the district would indicate an on average .31 standard deviation increase in the dependent variable, holding all other variables constant. On average, a one standard deviation increase in the percent certified to teach for all courses in kindergarten through eighth grade in the district would expect to yield a .07 standard deviation increase in the 2003/2004 district mean for 4^{th} grade reading proficiency scores for Caucasian, holding all other variables constant. Percent of teachers certified to teach is significant at $p<.05$. On average, a one standard deviation decrease in the district average class size would expect to yield a .09 standard deviation increase in the dependent variable, holding all other variables constant, and this predictor is significant at $p<.01$. With reference to the district being located in a rural or a suburban setting, a district location of urban would expect to yield a .05 standard deviation increase in the dependent variable, holding all other variables constant; however, this predictor is not significant in this model. Last, with reference to the district being located in an urban or a suburban setting, the data indicate that a district location of suburban would contribute a .25 standard deviation

increase in the 2003/2004 district mean for 4th grade reading proficiency scores for Caucasian, holding all other variables constant.

Conversely, for the distribution of African American district mean scores, the above model yielded an Rsqrd of .15. Table 3.14 offers a summary of these results. This indicates that 15 percent of the variability in the 2003/2004 district mean scores for 4th grade reading proficiency for African American students is explained by the model. Percent disadvantaged students in the district was the only predictor significant in this model with $p<.10$; all other predictors in this model were not significant. On average, a one standard deviation increase in the percentage of disadvantaged students in the district would expect to yield a .23 standard deviation decrease in the 2003/2004 district mean scores for 4th grade reading proficiency for African American, holding all other variables constant. On average, a one standard deviation increase in the percent attendance for the district would indicate a .16 standard deviation increase in the dependent variable, holding all other variables constant. The data would indicate that a one standard deviation increase in the percentage of teachers certified to teach for all courses in kindergarten through eighth grade would expect to yield an on average .14 standard deviation increase in the dependent variable, holding all other variables constant. On average, a one standard deviation decrease in average class size for the district would reflect an impact of a .04 standard deviation increase in the dependent variable, holding all other variables constant. With reference to the district being located in a rural or a suburban setting, being located in an urban setting would reflect a .06 standard deviation decrease in the dependent variable, holding all other variables

constant. Last, with reference to being located in a rural or an urban setting, being located in a suburban setting would expect to yield a .03 decrease in the 2003/2004 district mean scores for 4th grade reading proficiency for African American, holding all other variables constant.

Research Question 2. Did student characteristics, district context, or district organizational structure contribute the greatest variability to the district achievement of Caucasian and African American on the 2003/2004 4th grade reading proficiency exam?

To determine the contribution of variability of student characteristics, district organizational structure and district context to the district mean scores for Caucasian and African American 4th graders on the 2003/2004 reading proficiency exam, each set of variables were modeled in the regression equation. The following section will provide explanation of the analysis. The first part of the section will explain the models for those school districts that are able to report scores for both Caucasian and African American. The second part of the section will explain the models that encompassed all districts across Ohio.

Caucasian/African American District Mean Scores for Ohio's 2003/2004 Reading Proficiency Exam for districts that are able to report means for both Caucasian and African American

Caucasian Results

A summary of results for the models addressing each set of variables that contribute to the district mean score for Caucasian 4th grade on the 2003/2004 reading proficiency exam for districts that are able to report district means for both Caucasian and African American are offered in Table 3.15.

	meanwhite - only districts with both Caucasian and African Americans			meanblack - only districts with both Caucasian and African Americans		
	Student Characteristics	District Organization	District Context	Student Characteristics	District Organization	District Context
disadvan	-0.29 **			-0.24 *		
attendance	0.45 ***			0.23 *		
certeach		0.22 *			0.18 *	
classsize		0.11			0.15 ~	
urban			4.99 ~			-0.10
suburban			12.91 ***			0.23
R-sqrd	0.43	0.05	0.38	0.16	0.05	0.09
SSE	2898.25	4954.72	3250.20	3302.38	4157.63	3992.77
dfE	110.00	110.00	110.00	110.00	110.00	110.00
Valid N (Listwise)	112.00	112.00	112.00	112.00	112.00	112.00

Key: ~p<.10; *p<.05; **p<.01; ***p<.00

Table 3.15. Taxonomy of multiple regression models for district in Ohio that are able to report district means for both Caucasian and African American: Standardized parameter for a nested taxonomy of OLS-fitted regression models that describe the relationship between fourth grade reading proficiency scores in Ohio and percent disadvantaged in the district, percent student attendance, rural, urban, controlling for average class size, and percent of teachers certified to teach all subjects k-8. N=117.

The regression model to ascertain the proportion of variance that is attributed to student characteristics yield an Rsqrd of .43. This indicates that 43 percent of the variability in to the district mean score for Caucasian on the 4th grade 2003/2004 reading proficiency exam for districts that are able to report means for both Caucasian and African American is explained by the model. This model included the predictors percent disadvantaged in the school district and percent attendance for the district; each

of these predictors were significant at p<.01, and p<.001, respectively. In this model, a one standard deviation increase in the percentage of disadvantaged students in the district would be expected to yield, on average, a .29 standard deviation decrease in the to the district mean score for Caucasian 4th grade on the 2003/2004 reading proficiency exam for districts that are able to report means for both Caucasian and African American, holding all other variables constant. On average, a one standard deviation increase in the percent attendance for the district would indicate a .45 standard deviation increase in the dependent variable, holding all other variables constant.

Next, the model to measure the amount of variance in to the district mean score for Caucasian on the 2003/2004 4th grade reading proficiency exam for districts that are able to report means for both Caucasian and African American that can be attributed to district context yielded an Rsqrd of .38. The analysis revealed, with reference to being located in a rural or an urban setting, being located in a suburban district setting can expect to contribute, on average, 12.91 standard deviation increase in the dependent variable. Being located in a suburban district is significant at p<.001. To that end, with reference to being located in a rural or an urban setting, a school district located in an urban setting can expect to yield a 4.99 standard deviation increase in the district mean score for Caucasian for districts that are able to report means for both Caucasian and African American, on average. In this model, a school district being located in an urban setting is significant at p<.10.

Last, the regression model to ascertain the contribution of variability of the district mean score for Caucasian on the 2003/2004 4th grade reading proficiency exam

for districts that are able to report means for both Caucasian and African American, district organizational structure yielded an Rsqrd of .05. This indicates that only five percent of the variability in the dependent variable can be attributed to the predictors in this model: percent of teachers certified to teach for all courses in kindergarten through eighth grade, and average class size for the district. The predictor, certified to teach for all courses, is significant at $p<.05$. A one standard deviation increase in the dependent the percent of teachers certified to teach for all courses in kindergarten through grade eight, would indicate an on average .22 standard deviation increase in the dependent variable, holding all other variables constant. In addition, a one standard deviation decrease in the average class size for the district would indicate an on average .11 standard deviation increase in the district mean score for Caucasian for districts that are able to report means for both Caucasian and African American, holding all other variables constant. However, this predictor is not significant in this model.

African American Results

A summary of results for the models addressing each set of variables that contribute to the district mean score for African American on the 2003/2004 4th grade reading proficiency exam for districts that are able to report means for both Caucasian and African American are offered in Table 3.15.

The regression model to ascertain the contribution of student characteristics for districts that are able to report means for both Caucasian and African American for the 4th grade 2003/2004 reading proficiency yielded an Rsqrd of .16. This indicates that only 16 percent of the variability in the district mean score for African American on the

2003/2004 4th grade reading proficiency exam for districts that are able to report means for both Caucasian and African American can be explained by the model. Both of the predictors in this model, percent disadvantaged in the school district and percent attendance for the district, are significant at $p<.05$. On average, a one standard deviation increase in the percent disadvantaged students in the district would likely yield a .24 decrease in the district mean score for African American, holding the other variable constant. In addition, a one standard deviation increase in the percent attendance for the school district would indicate a one standard deviation increase in the dependent variable of .23, holding all other variables constant.

The model to ascertain the contribution of district context variables to the district mean score for African American on the 2003/2004 4th grade reading proficiency exam for districts that are able to report means for both Caucasian and African American yielded an Rsqrd of .09. With reference to a school district being located in a rural or an urban setting, a district location in a suburban location can be expected to contribute, on average, a .23 standard deviation increase in the dependent variable, holding all other variables constant. In addition, with reference to a school district being located in a rural or a suburban district, being located in an urban school setting would be expected to contribute a .10 decrease in the dependent variable.

Last, the model to ascertain the contribution of variability of district organizational structure to the district mean score for African American on the 2003/2004 4th grade reading proficiency exam in districts that are able to report means for both Caucasian and African American yielded an Rsqrd of .05. This indicates that

only five percent of the variability in district mean score for African American on the 2003/2004 4th grade reading proficiency exam in districts that are able to report means for both Caucasian and African American can be explained by the predictors in the model: the percent of teachers certified to teach for all courses in kindergarten through grade eight and average class size for the district. The predictor, percent certified to teach for all courses is significant at $p<.05$. On average, a one standard deviation increase in the percent of teachers to teach for all courses would be expected to yield a .18 standard deviation increase in the dependent variable, holding all other variables constant. Average class size for the district is significant at $p<.10$. A one standard deviation decrease in the average class size for the school district would indicate a .15 standard deviation increase in the dependent variable.

Contribution of Variability to Caucasian/African American District Mean Scores for Ohio's 2003/2004 Reading Proficiency Exam for all School Districts across Ohio

Caucasian results

A summary of results for the models addressing each set of variables that contribute to the district mean score for Caucasian on the 2003/2004 4th grade reading proficiency exam are offered in Table 3.16.

	meanwhite			meanblack		
	Student Characteristics	District Organization	District Context	Student Characteristics	District Organization	District Context
disadvan	-0.25 ***			-0.30 **		
attendance	0.32 ***			0.15		
certeach		0.08 *			0.18 *	
classsize		0.18 ***			0.15 ~	
urban			-0.13 ***			-0.10
suburban			0.35 ***			0.23
R-sqrd	0.26	0.04	0.16	0.15	0.05	0.09
SSE	13082.08	16925.11	14689.89	3715.87	4168.03	3994.26
dfE	603.00	603.00	603.00	116.00	116.00	116.00
Valid N (Listwise)	605.00	605.00	605.00	118.00	118.00	118.00

Key: ~p<.10; *p<.05; **p<.01; ***p<.00

Table 3.16. Taxonomy of multiple regression models for all districts across Ohio: Standardized parameter estimates, approximate p-values, and associated goodness of fit statistics for a nested taxonomy of OLS-fitted regression models that describe the relationship between fourth grade reading proficiency scores in Ohio and percent disadvantaged in the district, percent student attendance, rural, urban, controlling for average class size, and percent of teachers certified to teach all subjects k-8. Caucasian N=606; African American N=119.

The regression model to ascertain the contribution of student characteristics for all school districts across Ohio that are able to report means for Caucasian for the 4th grade 2003/2004 reading proficiency yielded an Rsqrd of .26. This indicates that 26 percent of the variability in the district mean score for Caucasian, for all districts across Ohio that can report means for Caucasian, can be explained by the model. Both of the predictors in this model (percent disadvantaged in the district and percent attendance for the district) are significant at p<.001. On average, a one standard deviation increase in the percent disadvantaged in the school district would expect to yield a .25 standard deviation decrease in the dependent variable, holding all other variables constant. To that end, a one standard deviation increase in the percent attendance for the school district would expect to yield an on average .32 standard deviation increase in the district mean score for Caucasian on the 2003/2004 4th grade reading proficiency exam, holding all other variables constant.

Next, the regression model to ascertain the contribution of district context for all school districts across Ohio that are able to report Caucasian means for the 2003/2004 4th grade reading proficiency yielded an Rsqrd of .16. This indicates that only four percent of the variability in the dependent variable, can be explained by the model. With reference to being located in a rural or an urban setting, a school district being located in a suburban setting would expect to yield on average a .35 standard deviation increase in the district mean score for Caucasian, holding all other variables constant. Both predictors, being located in a suburban and an urban setting, are significant at $p<.001$. On average, with reference to being located in a rural or a suburban location, a district located in an urban setting can be expected to yield a .13 standard deviation decrease in the dependent variable, holding all other variables constant.

Last, the model to discern the contribution of district organizational structure for all school districts across Ohio that are able to report means for Caucasian on the 4th grade 2003/2004 reading proficiency yielded an Rsqrd of .04. This model included the predictors percent of teachers certified to teach for all courses in the district and average class size for the district. These variables are significant at $p<.05$ and $p<.001$, respectively. On average, a one standard deviation increase in the percentage of teachers certified to teach for all courses in kindergarten through eighth grade would expect to increase the dependent variable by .08 of a standard deviation, holding all other variables constant. To that end, on average, a one standard deviation decrease in the average class size for the district would expect to yield a .18 standard deviation increase in the dependent variable, holding all other variables constant.

African American Results

A summary of results for the models addressing each set of variables that contribute to the district mean score for African American on the 2003/2004 4th grade reading proficiency exam are offered in Table 3.16.

The model to ascertain the contribution of student characteristics to the overall variability of the district mean score for African American on the 2003/2004 4th grade reading proficiency test for districts that are able to report district means for African American yielded an Rsqrd of .15. This indicates that 15 percent of the variability in the dependent variable, district mean score for African American on the 2003/2004 4th grade reading proficiency exam, is explained by the model. Significant at $p<.01$, a one standard deviation increase in the percent disadvantaged in the school district you expect to yield a .30 standard deviation decease in the dependent variable, holding all other variables constant. The other predictor in this model to ascertain student characteristics, percent attendance for the district, did not yield statistical significance. However, percent attendance can be explained as, a one standard deviation increase in the percent attendance for the school district would be expected to indicate a .15 standard deviation increase in the dependent variable, holding all other variables constant.

Next, the model to ascertain the contribution of district context to the district mean score for African American on the 2003/2004 4th grade reading proficiency for districts that are able to report district means for African American yielded an Rsqrd of .09. In this model, neither of the predictor variables yielded statistical significance.

However, with reference to living in a rural or an urban setting, being located in a suburban setting would expect to predict a .23 standard deviation increase in the district mean score for African American on the 2003/2004 4th grade reading proficiency for districts that are able to report means African American, on average. With reference to the school district being located in a rural or a suburban setting, a district being located in an urban setting would on average be expected to yield a .10 standard deviation decrease in the dependent variable.

Last, model to ascertain the contribution of the district organizational structure to the mean score for African American 4th grade students on the 2003/2004 reading proficiency exam for all districts are able to report means for African American yielded an Rsqrd of .05. This indicates only five percent of the variance in the dependent variable can be explained by the model. Both predictor variables are significant in the model: percent certified to teach for all courses in kindergarten through grade eight ($p<.05$), and average class size for the district ($p<.10$). On average, a one standard deviation increase in the mean of percent of teachers certified to teach for all courses would be expected to yield a .15 standard deviation increase in the dependent variable. To that end, a one standard deviation increase the average class size for the district would be expected to yield, on average, a .15 standard deviation increase in the mean score for African American on the 2003/2004 4th grade reading proficiency exam for districts that are able to report means for African American.

CHAPTER 4

DISCUSSION

4.1 Introduction

The purpose of this chapter is to provide a discussion of the findings. This thesis addresses two related research questions, both of which fit together under the broader question of how school districts impact elements that contribute to the achievement disparity between African American and Caucasian district mean scores on the 2003/2004 4th grade Ohio reading proficiency exam. The study provided an empirical analysis of achievement inequality using Ohio district mean scores for 4th grade reading proficiency collected from the 2003/2004 reading proficiency exam.

This chapter will present limitations for the study, and conclusions from the study. The conclusions will be presented in subsections by predictor. The variables will be discussed in this order: percent disadvantaged in the district, percent attendance for the district, percent teachers certified to teach for kindergarten through grade eight in the district, average class size for the district, districts located in an urban location, the interaction of percent disadvantaged and located in an urban setting, and districts located in a suburban location.

4.2 Limitations of the Study

A limitation of this study is that many rural school districts in Ohio have less than 10 African American students per district. State privacy law prohibits the release of scaled scores of student groups with less than ten students per group. Therefore, district mean scores for those districts that report having less than 10 African American or less than 10 Caucasians 4th graders in the district, have to be counted for this analysis as having no African American or Caucasian in the district. Those particular districts will be categorized as not having a mean score to represent reading achievement. The study employed the mean district level scores for 608 Ohio school districts as the unit of analysis. (There are 612 districts in Ohio, four will not be used because they are very small, isolated districts on islands in Lake Erie). Ohio has many more Caucasian students than African American students; therefore, a limitation of this study is a small distribution of districts that are able to report mean scores for African American as compared to the distribution of districts that are able to report mean scores for Caucasian.

Another limitation of the study is the use of district means as the dependent variables. This limitation takes two forms: lessened variability in the individual proficiency scores, and each district was counted as one unit, not weighted according to size of the district.

As mentioned in the previous section, the use of district level means lessens both the within district and between district variations. The within district variation is lessened because using the means mutes the variability of student level scores. This

could confound the results because it could be expected that district level performance could have a relationship to the types of students that live in the district. The between district variation is compromised because in this study each district was considered to have the same weight in the analysis (a weight of one). This could confound the results of the study because school districts in Ohio vary in size, and it could be expected that size would have a relationship to district performance.

The muting of variation in the overall data set by using district means could lessen the yielded standard errors. This is important to note because small standard errors are more likely to reveal significant test statistics. Therefore, an artificially low standard error could have the potential to yield a Type I error. A Type I error in this analysis would indicate that this study yielded significance when actually there is no significance due to muted within and between district variability.

4.3 General Conclusions from Findings

The goal of this research was to address the relationship that certain aspects of school districts have with the district mean of 4th grade reading scores for Caucasian and African American on Ohio's 2003/2004 4th grade reading proficiency exam. To achieve this goal I asked two questions in this study:

- What are the relative relationships between district level student characteristics, district contextual issues, and district organizational decisions on the district mean score for African American and Caucasians on Ohio's 2003/2004 reading proficiency test?

- Which of these classifications of variables contributes the most variability to the district mean achievement of African American and Caucasians on the 2003/2004 4th grade reading proficiency scores in Ohio?

To answer these questions, variables were selected to measure each of the three aspects of school districts. Student characteristics for the district were measured by percent disadvantaged students in the district, and by percent attendance for the district. District context was measured by Ohio's district typology rating system for school districts. For this study district location classifications were labeled as rural, urban, and suburban; they were used as dummy variables. District organizational structure was measured by percentage of the teachers in the district that were certified to teach for all courses in kindergarten through eighth grade, and the average class size for the school district.

This section will first discuss the achievement gap between the distribution of Caucasian means and the distribution of African American means for those districts that are able to report means for both distributions. The next section will discuss the achievement gap between the distribution of Caucasian means and the distribution of African American means across all Ohio districts. Then this section will discuss each variable used in the best fit models: percent disadvantaged in the school district, percent attendance for the school district, a school district being located in an urban and a suburban location, the interaction of rural and percent disadvantaged in the district, percent of teachers certified to teach for all courses in k-8, and average class size for the district.

Achievement Gap between the distribution of Caucasian and African American means

This section will discuss the achievement gap between the distribution of means for Caucasians and the distribution of means for African American. First the achievement gap between the two distributions for all districts across Ohio will be discussed. These results are summarized below in Figure 4.1. Then, the achievement gap between the two distributions of means will be discussed for only those districts that are able to report means for both Caucasian and African American. These results are summarized below in Figure 4.2.

The findings for Ohio's 4th grade district mean 2003/2004 reading proficiency scores indicate that for districts that are able to report means for both Caucasian and African American there is an average achievement disparity of 9.58, SD=.74, in favor of Caucasian. The range of the on average differences in achievement is 3.40. The gap is the most narrow when the percent disadvantaged in the district is high, and the biggest disparity occurs when the percentage of disadvantaged students in the district is low, holding all other variables constant. In this case, the highest percentage of disadvantaged students is 100 percent and the lowest is zero. These differences are on average 7.24 and 10.64 respectively.

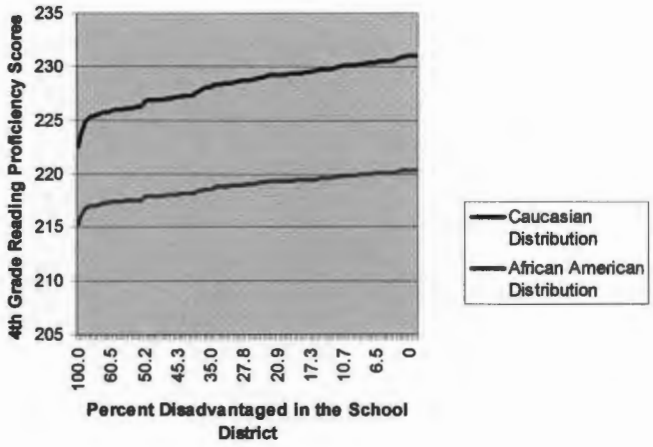

Figure 4.1. Overall Achievement Gap between the distribution of Caucasian and African American means in Districts that are able to report means for both Caucasian and African American by Percent disadvantaged in the school district, holding all other variables constant. N=117.

This paragraph will discuss the achievement gap between the distribution of means for Caucasian and the distribution of means for African American for only those districts that are able to report means for both ethnicities. As stated, these results are summarized in Figure 4.1. The findings for Ohio's 4th grade district mean 2003/2004 reading proficiency scores indicate that for districts across Ohio there is an on average achievement gap of 21.08, SD=.08, in favor of Caucasian means. The on average range of these scores is .40; the achievement disparity is closest in score when percent disadvantaged in the district is high and farthest away from each other when the percent disadvantaged in the district is low. In this case, the highest percentage of disadvantaged students in the district is 100 percent and the lowest is zero. These on average differences are 20.78 and 21.18, respectively.

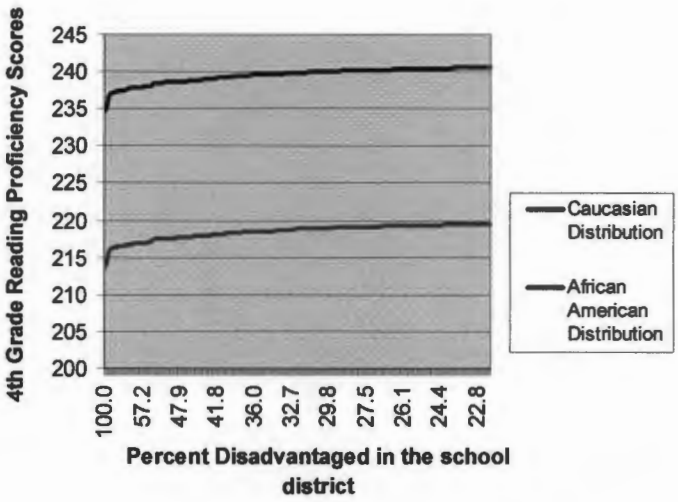

Figure 4.2. Overall Achievement Gap between the distribution of Caucasian and African American means for all districts across Ohio. Caucasian N=606; African American N=119.

Percent disadvantaged in the school district

For the distribution of Caucasian district means, percent disadvantaged in the school district was significant in the model that employed only those districts that are able to report district means for both Caucasian and African American and in the model that employed all districts across Ohio. Percent disadvantaged in the school district was the only predictor significant for the distribution of African American district means when all Ohio districts were included in the analysis. However, this predictor was not significant for the distribution of African American means when only those districts that are able to report mean scores for both Caucasian and African American were used in the analysis.

Overall, for both the distribution of Caucasian means and the distribution of African American district means, this predictor was a negative contributor to the district

mean on the 2003/2004 4th grade reading proficiency exam. This finding is consistent with the findings of Bankston and Caldas (1996). Their study concluded that school environments with a disproportionate number of students from low-income families can potentially have a negative influence on district test scores (Bankston & Caldas, 1996, p. 548).

Percent attendance for the school district

This analysis of the achievement gap between Caucasian and African American district means for the 2003/2004 4th grade reading proficiency, indicates that for Caucasian means percent attendance for the school district is the largest contributor to district achievement when district location variables are not included in the model. To that end percent attendance for the district is the only predictor that was significant across all models for both Caucasian and African Americans for districts that are able to report district means for both Caucasian and African American. However, percent attendance did not yield significance for African American district means when all districts were included in the analysis.

Attendance is the strongest predictor of district mean scores for the distribution of Caucasian means on the 4th grade reading proficiency test when all districts are included in the analysis. Therefore, it can be inferred from the data that on average the distribution of Caucasian means have a significant relationship with attendance for all 606 districts that are able to report means for Caucasian.

In models that included only those school districts containing both Caucasian and African American students, percent attendance for the school district was the only

predictor that was significant across all models for both Caucasian and African Americans. This finding is consistent with the findings in a similar study conducted with Louisiana schools (Caldas, 1993). On a practical level, this finding underscores the powerful impact attendance has on reading achievement on the 4th grade proficiency test. This finding could indicate that efforts to increase attendance in these districts are likely to yield some increase in district level 4th grade reading scores for both Caucasian and African American.

When all districts were included in the analysis, percent attendance for the district did not yield significance for the African American means. This could be because of the disparity between in N between the distribution of means for African American and the distribution of means for Caucasian. Also, percent attendance could be an unstable variable because attendance records are handled by many personnel within the district. The more personnel who have contact with attendance records has the potential to contribute greater variability to the records.

Percent of teachers certified in the district to teach for all courses for kindergarten through grade eight

With the exception of Caucasian means when all districts were included in the model ($p<.05$), the predictor certified to teach for all courses for kindergarten through grade eight either yielded mildly significant results ($p<.10$), or not significant results. This could be because at the district level, this variable becomes too muted. Therefore, its relationship with individual student achievement becomes flattened when the unit of

analysis is district means. Significant results could be masked because this analysis used the district percentage as the value for the predictor.

As noted in chapter two, Darling-Hammond (2000a) found that teacher quality characteristics such as certification and degree in the field to be taught are significantly and positively correlated with student outcomes. Certification or licensing status is a measure of teacher qualification that combines aspects of knowledge about subject matter and about teaching and learning. Quantitative analyses indicate that measures of teacher preparation and certification are by far the strongest correlates of students' achievement in reading and mathematics, both before and after controlling for student poverty and language status (Darling-Hammond, 2000a).

Class Size

In the literature, class size is a long debated issue that has resulted with somewhat controversial results (Slavin, 1989). For the distribution of Caucasian means ($p<.01$) when tested using all districts across Ohio, class size indicated a significant contribution to the district mean score on the 2003/2004 4^{th} grade Ohio proficiency exam. In contrast, for all other models in this analysis, class size did not yield significant results. That is for the distribution of Caucasian and African American district mean scores for districts that are able to report mean scores for both ethnicities, class size did not show to be a significant predictor. In addition, for the distribution of African American district mean scores for all districts across Ohio, class size was not significant. It is important to note that this finding could be a result of the crudeness of the measure of average class size for the district.

It is important to note the possible reasons for non-significance for this predictor. As mentioned above with regard to teacher certification, average class size for the district may not show significance because the relationship that class size may have with district achievement may be too muted at the district level to indicate a significant relationship with the dependent variable. It was surprising this variable did not yield significance when the interaction variable (percent disadvantaged in the district*being located in an urban school district) were entered into the model. This is because the literature indicates smaller class size did have a positive relationship with student outcomes in the Tennessee STAR project (Word, Johnston, Bain, Fulton, Zaharias, Achilles, Lintz, Folger, & Breda, 1990).

School Districts Located in an Urban Setting

With reference to a rural and a suburban district location, being a district located in an urban setting in Ohio when analyzed with districts that are able to report district mean scores for both Caucasian and African American has a positive significant contribution to the district mean for Caucasian. In contrast with reference to being located in a rural or a suburban setting, being located in an urban setting does not contribute significantly to the district mean score for Caucasians when all Ohio school districts are included in the model.

With reference to a school district being located in a rural or a suburban setting, being located in an urban setting does not significantly contribute to the district mean score for African American on the 2003/2004 4th grade reading proficiency test. The following paragraphs describe the achievement gap between the distribution of means

for Caucasian and African American in urban school districts. It is important to remain mindful that in each of the below models for the distribution of African American means, the model only explains 16 and 15 percent of the variance, respectively.

To illustrate these findings for urban districts that are able to report district means for both the distribution of Caucasian means and the distribution of African American means, regression lines were calculated and are plotted in Figure 4.3.

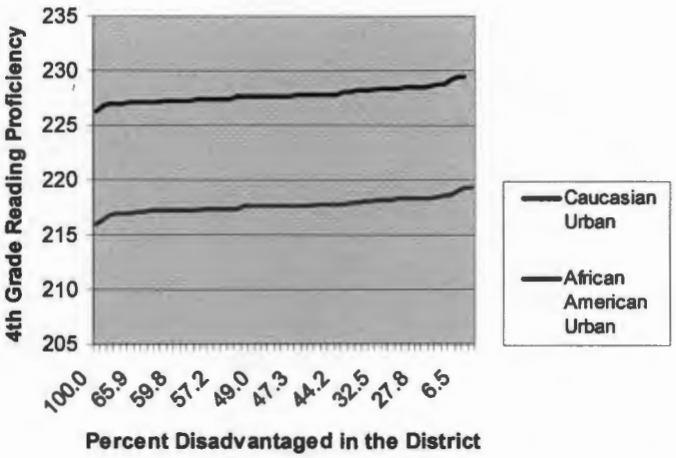

Figure 4.3. Achievement Gap between Caucasian and African American 4th grade reading proficiency in urban districts are able to report means for both Caucasian and African American, holding all other variables constant (N=117)

The findings for Ohio's urban 4th grade district mean 2003/2004 reading proficiency scores indicate that for urban districts are able to report district means for both Caucasian and African American there is an average achievement disparity in favor of Caucasian of 10.03, SD=.06. The on average range of the differences in district achievement is .32. As also mentioned in the overall achievement gap, the

disparity between the two ethnicities is the most narrow when the percent disadvantaged in the district is high, and the biggest disparity occurs when the percentage of disadvantaged students in the district is low, holding all other variables constant. In this case, the highest percentage of disadvantaged students is 100 percent and the lowest is zero. These differences are on average 9.86 and 10.18 respectively.

The regression lines for the distribution of Caucasian means and the distribution of African American mean for all urban best fitted regression equation using un-standardized data and un-standardized regression coefficients. These results are plotted in Figure 4.4.

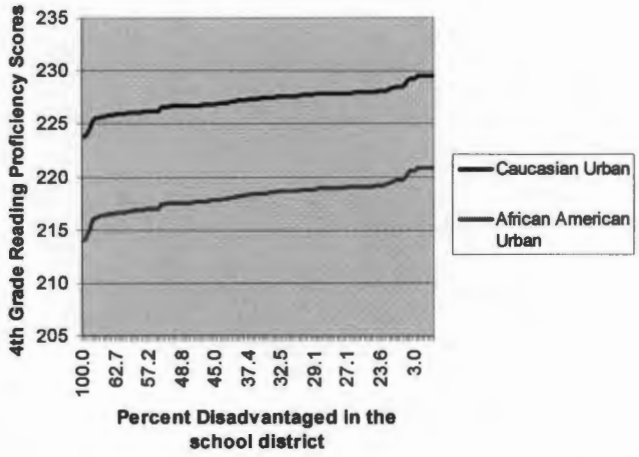

Figure 4.4. Achievement Gap for 4th Grade Reading between the distributions of means for Caucasian and African American for all urban districts by Percent Disadvantaged in the District holding all other variables constant. Caucasian N=115; African American N=59.

These findings for the 2003/2004 district mean scores for 4th grade reading proficiency for Caucasian and African American reported from urban district across

Ohio reveal there is an on average achievement disparity of 9.04, SD=.2, in favor of Caucasian. In these urban districts the highest percentage of disadvantaged students is 100 percent and the lowest is zero. At 100 percent of the students disadvantaged, the on average difference in district achievement between according to the distribution of means for Caucasian and African American is 9.65. When the percentage of disadvantaged students is zero, the on average difference in achievement is 8.65. These values indicate on average the difference in range of achievement in the mean for urban school districts between the distributions for Caucasian and African American on the 2003/2004 4^{th} grade reading proficiency test is one.

Interaction Variable of Percent Disadvantaged in the District and being Located in an Urban District Setting

This predictor was only utilized in the models for the distribution of means for Caucasian and African American for districts that are able to report means for both Caucasian and African American. This is because according to General Linear Hypothesis testing, this variable was indicated to not contribute the variability of the dependent variables. Therefore, to keep a parsimonious regression, it was not a part of the best fit models for the distribution of Caucasian and African American means for all districts across Ohio.

This variable indicates positive significance for the distribution of Caucasian means, but does not indicate significance for the distribution of African American means. As mention earlier in this study, these statistics should be interpreted with caution because all variable used are district level values. This could have an affect of

minimizing the variability of the dataset because individual level characteristics have the potential to become muted when the data are aggregated. This flattening of variability could result in a Type I error; therefore, the estimates rendered in this study should be interpreted with caution.

School Districts Located in a Suburban Setting

With reference to being located in a rural or an urban school district, being located in a suburban school district indicates a significant positive relationship to the district mean for Caucasian in districts that are able to report mean scores for both Caucasian and African American and for all school districts in Ohio that report district means for Caucasian. The difference between the two distributions is that in school districts that are able to report district means for Caucasian and African American, the magnitude of the regression coefficient is far greater than for all districts across Ohio; these coefficients are 1.84 ($p<.001$) and .25 ($p<.001$) respectively.

The designation of suburban for a school district carries the greatest magnitude for the regression coefficients for the distribution of Caucasian means for those district that are able to report means for both Caucasian and African American. This finding is related to findings from McCartin and Freehill (1986). That study found that being Caucasian and living in a suburban environment predicted a school environment related to achievement.

In contrast, being located in a suburban district did not yield significance for the distribution of district means for African American in districts that are able to report

district means for both Caucasian and African American and for all districts across Ohio. This finding underscores the importance of educational research to find what variables have a relationship with African American district level achievement.

The following paragraphs describe the achievement gap between the distribution of means for Caucasian and African American in suburban school districts. It is important to remain mindful that in each of the below models for the distribution of African American means, the model only explains 16 and 15 percent of the variance, respectively.

The regression lines for Caucasian and African American students living in suburban districts that are able to report district means for both Caucasian and African American were calculated using un-standardized data and are plotted in Figure 4.5.

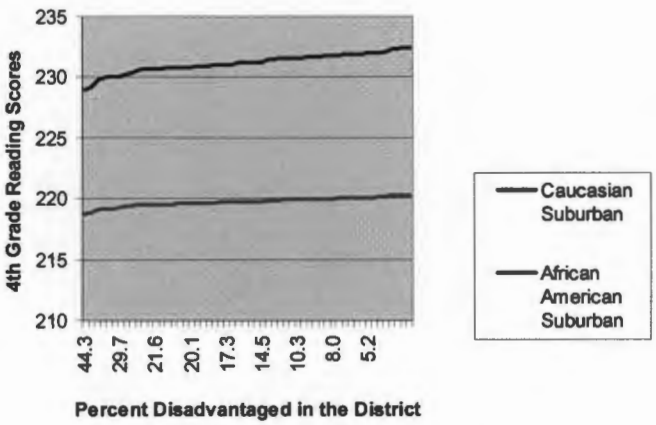

Figure 4.5. Achievement Gap between the distribution of means for Caucasian and African American 4th grade reading proficiency in suburban districts that are able to report means for both Caucasian and African American, holding all other variables constant. N=117.

These findings for Ohio's 4th grade district mean 2003/2004 reading proficiency scores indicate that for suburban districts that are able to report means for both Caucasian and African American there is an average achievement disparity of 11.46, SD=.43. The on average range of the differences in achievement is 1.91. For these suburban districts, the highest percentage of disadvantaged students is 44.3 where there is a 10.23 difference in achievement. The lowest percentage of disadvantaged student is zero where the achievement gap is 12.14, on average. As echoed in the results found for the overall and urban districts that reported means for both Caucasian and African American, the achievement gap is more narrow when the percent disadvantaged in the district is high, than it is when the percentage of disadvantaged students in the district is low, holding all other variables constant.

Figure 4.6 displays the achievement disparity between the two distributions of district means for all suburban school districts across Ohio on the 2003/2004 4th grade reading proficiency test.

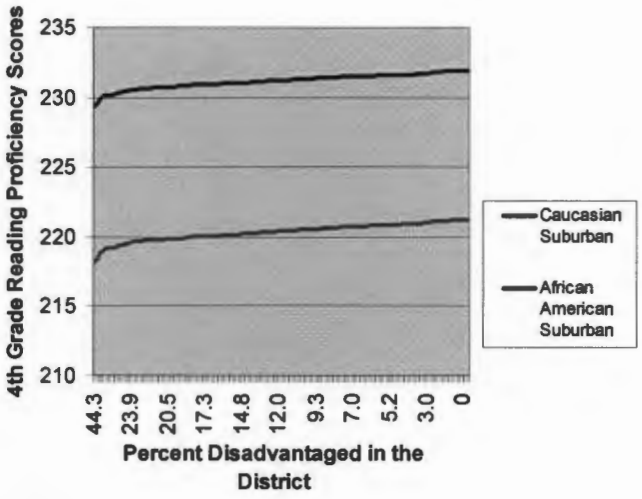

Figure 4.6. Achievement Gap for 4th Grade Reading between the distributions of means for Caucasian and African American for all suburban districts by Percent Disadvantaged in the District holding all other variables constant. Caucasian N=153; African American N=56.

The on average difference in achievement between Caucasian and African American district mean scores on the 2003/2004 4th grade reading proficiency test is 10.81, SD=.09, in favor of the Caucasian distribution. The on average range of the differences in achievement is .44. For these suburban districts, the highest percentage of disadvantaged students is 44.3 percent where there is an 11.12 on average difference in achievement. The lowest percentage of disadvantaged students is zero, where the achievement gap is 10.68, on average, holding all other variables constant.

In every model utilized in this analysis, student characteristics contributed the largest portion of variance to the district mean for the 2003/2004 4th grade reading test scores for the distribution of Caucasian means and the distribution of African American means. To that end, in every model, percent disadvantaged in the district contributed

negatively to district mean achievement, and percent attendance for the district contributed positively to district mean achievement.

This paper has identified significant contributions consistent with findings in previous research, on the achievement disparity between the distribution of Caucasian means and the distribution of African American means. Continued research is necessary to determine in what ways school districts can help ameliorate the achievement gap at the district level. As researched in this paper, social issues related to socioeconomic status contribute to the overall 4th grade district reading achievement of both Caucasian and African American.

CHAPTER 5

SUMMARY, CONCLUSION AND SUGGESTIONS FOR FURTHER RESEARCH

5.1 Introduction

This chapter will discuss further recommendations to help close the district level achievement gap between the distribution of means on the 2003/2004 Ohio 4th grade reading proficiency scores between Caucasian and African American. Each section of this chapter will address the findings for each variable presented in chapter 4. The first variable to be discussed will be percent disadvantaged in the district; the next variable to be discussed will be percent attendance for the district. Then this chapter will discuss percent of teachers in the district certified to teach for all courses in kindergarten through eighth grade. Following that, this chapter will discuss average class size for the district. Last, this chapter will discuss comprehensive district reform to help close the achievement gap in all district locations.

5.2 Summary of Study

This section will provide an overview of the study and the findings. The achievement gap between African American and Caucasian kindergarten through 12th grade students in the United States is a problem that on January 8, 2002, President Bush tried to ameliorate with No Child Left Behind (NCLB). This legislation changed the

federal government's role in kindergarten-through-grade-12 education by asking America's schools to describe their success in terms of what each student achieves on state testing. No Child Left Behind (NCLB), was enacted to provide all students an equal chance at receiving a quality education. According to the U.S. Department of Education, the act is based on four education reform principles: stronger accountability for results; increased flexibility and local control; expand options for parents; and an emphasis on teaching methods that have been proven to work (U.S. Commission on Civil Rights, Office of the General Counsel, 2004).

While these efforts by the federal government are laudable in sentiment and need, this study does not provide evidence that these reform efforts are the only thing that is needed to alleviate the achievement disparity between Caucasian and African American students. In this study, variables related to reform strands of NCLB were analyzed: percent disadvantaged in the district, percent attendance, school district settings, teacher certification, and class size. Evidence that the best fit model in this study for the distribution of African American means only explains 17 percent of the variability in district mean reading proficiency scores is perplexing. With focused reform intended to raise achievement disparities how can these variables account for so little? Conversely, the same model yielded close to half of the variability for the distribution of Caucasian means. This finding indicates that other aspects of school districts need to be examined to ascertain what will contribute to the variability of 4th grade African American district reading proficiency scores.

Even more perplexing is the achievement gaps in suburban school districts where the percent disadvantaged in the district is lower than in urban districts. Research identifies poverty as a significant predictor to achievement (Caldas, 1993; Caldas & Bankston, 1997). Therefore, it would seem logical that districts with low poverty would have less of an achievement gap. This study did not find that to be the case in Ohio among the district mean scores for 4th grade reading proficiency for the 2003/2004 academic year. Achievement gaps were larger in districts with less disadvantaged students in the district. Conversely, achievement disparity was closer in districts with a higher percentage of disadvantaged students in the district.

5.3 Discussion/Suggestions for Further Research

This section will present recommendations for districts to help them close the achievement gap between the distribution of district means for Caucasian and African American on Ohio's 2003/2004 4th grade reading proficiency test.

Percent Disadvantaged in the District

This section will provide recommendations for districts with regard to percent disadvantaged in the district to help them close the achievement gap.

Percent disadvantaged in the school district was a stronger predictor for suburban districts than for urban districts for both the distribution of means for Caucasian and African American, but even with district as the unit of analysis, suburban districts still have a negative relationship with district achievement. School district cannot reform individual families within the district to change their socioeconomic status; however, districts can compensate by changing attitudes of district personnel.

The next paragraph will offer suggestions on how districts can compensate for the percent disadvantaged in the district.

Percent disadvantaged students in the school district had a negative relationship to both distribution of means used in this study. To address this negative relationship, an emerging body of research stemming from the Minority Student Achievement Network (MSAN) has started to aggressively research achievement disparities by not defaulting to the same norms of past research. This research group understands that the percent of disadvantaged students has a relationship with achievement, but they felt researching teacher and student perceptions could offer explanations of the achievement gap that go beyond socioeconomic status of families within the district. One of the first initiatives of the MSAN was to better understand what students of different racial and ethnic groups were experiencing in school that might affect their engagement and achievement (Ferguson, 2002). For example, this research effort asked African American and other minority students about their understanding of their teachers' lessons, how well they comprehended the material they read for school, how they felt their teachers' perceived them as learners. Overall results indicated that African American and other minority students still, 50 years after Brown vs. the Board of Education, suffer some level of racial stereotype about their academic potential that may have a relationship with how they approach their school work which may have a relationship to how they are received by their teachers (Ferguson, 2002). This newly emerging body of research may bring us closer to understanding the differences in

pedagogy and attitude needed to close the achievement disparity between Caucasian and African American students.

Percent Attendance for the District

This section will provide recommendations for districts with regard to percent attendance for the district to help them close the achievement gap.

Percent attendance in this study was stable across districts, and usually significant. In addition, percent attendance is usually associated with individual students at the building level. However, the important of school attendance is underscored by this study because it yielded significance when using district as the unit of analysis. According to this study, percent attendance for the school district has a positive relationship with district level achievement for both the distribution of means for Caucasian and the distribution of means for African American. To that end, the descriptive statistics revealed that the distribution of district means for African American indicated that those districts averaged a lower percentage for district attendance than for districts that reported means for the Caucasian distribution. To help raise achievement for the distribution of African American means it would be wise for the district to establish a clear district goal to increase the percent of student attendance. "Goals planned at the district level have a better chance of longevity and ultimate attainment than goals planned at the school level, this may be because the district is in a better position to sponsor year-long activities" (Desimone, Porter, Garet, & Yoon, 2002, p. 1296). To that end, high performing districts exhibit much more clarity about their educational goals and are far more likely to have defined the district role as support for

schools (Iatarola & Frucher, 2004). Based on the findings from this study, districts that establish a district-wide goal for attendance may be able to raise achievement. Conversely, when district attendance is over 90 percent, it is difficult to try and raise the attendance rating. Another suggestion would be to target individual students who could be identified as having a low rate of attendance.

Percent of teachers certified in the district to teach for all courses for kindergarten through grade eight

This section will provide recommendations for districts with regard to the percent of teachers certified to teach for all courses for kindergarten through grade eight to help them close the achievement gap.

Results from this analysis indicate that at the district level, percent certified to teach for all courses k-8 yielded significant results ($p<.10$), or not significant results. This could be because the district level the relationship between teacher certification and student achievement is muted due to data calculations executed to arrive at district level values.

Hiring qualified teachers is a mandate of No Child Left Behind. Future research on the relationship between teacher certification and student achievement should focus on the building level or even the classroom level as the unit of analysis. This would be a better unit of analysis because the relationship between teacher certification and student achievement would not be muted by statistical calculations executed to arrive at district level data.

Class Size

This section will provide recommendations for districts with regard to class size to help them close the achievement gap.

In this, study class size only revealed significance for the distribution of Caucasian means when all Ohio districts were employed in the analysis. Again, district level significance could be incorrect because the relationship between class size and district achievement could be muted at the district level. Also, with reference to the literature on class size, there is not a clear number of students per class that would have a relationship with district achievement. Future research on class size should focus on the building level or even the classroom level as the unit of analysis. This would be a better unit of analysis because the relationship of class size and student achievement would not be confounded by statistical calculations executed to arrive at district level data.

5.4 Future Research

This section will give direction for future research on the achievement gap. For researchers to statistical analysis to get a better picture of the achievement gap than presented in this study, it would be suggested to employ student data to the classroom or building level. To use either the classroom or the building level as the unit of analysis would better indicate the relationship each of the variables presented in this study have with student achievement. In addition, another suggestion if one still wished to continue this analysis at the district level, it would be prudent to weight each of the districts according to size instead of counting each district to have a weight of one.

Next, it is suggested that future research on the achievement gap that employs the use of class size in the data set, use class size at the building or classroom level instead of the district level. Again, this would provide greater insight into the relationship between class size and achievement.

In conclusion, it is suggested that future research on the achievement gap be conducted using student, classroom, or building as the unit of analysis. However, due to privacy laws, it is difficult to gain access to data at this level. It is much easier to obtain data for school districts because anonymity of students is preserved.

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APPENDIX A

LISTING OF THE DISTRIBUTION OF CAUCASIAN MEANS AND THE DISTRIBUTION OF AFRICAN AMERICAN MEANS FOR THE 2003/2004 OHIO 4TH GRADE READING PROFICIENCY EXAM

Listing of the distribution of Caucasian means and the distribution of African American means for the 2003/2004 Ohio 4th grade reading proficiency exam.

#	Nwhite	Meanwhite	Sdwhite	Nblk	Meanblk	SD blk	Weighted mean 03-04
1	1042.00	226.58	18.91	1119.00	214.93	19.14	220.55
2	176.00	218.34	18.85	40.00	214.93	18.30	217.71
3	242.00	234.40	19.92				234.40
4	236.00	220.78	19.55	36.00	210.19	14.29	219.38
5	175.00	227.34	19.08				227.34
6	231.00	228.71	20.59	35.00	227.21	22.52	228.51
7	162.00	235.92	17.89				235.92
8	76.00	236.62	15.74	18.00	230.94	19.37	235.53
9	59.00	229.12	17.60	206.00	225.88	19.28	226.60
10	111.00	216.87	17.68				216.87
11	161.00	226.60	18.85	11.00	210.64	19.92	225.58
12	166.00	228.20	18.74				228.20
13	91.00	221.49	16.29				221.49
14	439.00	225.47	14.04	18.00	215.76	14.58	225.09
15	135.00	238.01	18.22				238.01
16	191.00	230.85	19.24				230.85
17	315.00	233.73	21.14				233.73
18	84.00	220.34	16.02				220.34
19	498.00	233.55	17.60				233.55
20	160.00	230.07	16.84				230.07
21	99.00	229.52	17.71				229.52
22	165.00	219.39	18.16	11.00	217.91	17.73	219.30
23	37.00	224.53	18.94	34.00	213.85	17.43	219.42
24	436.00	220.72	16.63	263.00	215.51	15.52	218.76
25	173.00	227.52	14.92				227.52
26	500.00	228.39	15.66	25.00	215.92	17.39	227.80
27	170.00	231.38	21.59	23.00	235.39	17.23	231.85
28	582.00	225.43	21.40	1906.00	213.24	18.43	216.09
29	155.00	219.10	17.74				219.10
30	174.00	230.55	16.34				230.55
31	944.00	220.79	19.03	3787.00	214.19	21.11	215.51

#	Nwhite	Meanwhite	Sdwhite	Nblk	Meanblk	SD blk	Weighted mean 03-04
32	72.00	240.04	17.25	402.00	221.46	19.48	224.29
33	1526.00	222.13	20.75	3002.00	214.58	19.77	217.12
34	157.00	219.85	19.89				219.85
35	124.00	231.29	18.47				231.29
36	381.00	226.61	17.15				226.61
37	350.00	212.36	21.45	874.00	205.92	20.43	207.76
38	91.00	228.52	16.29				228.52
39	111.00	229.01	17.82				229.01
40	291.00	228.13	20.97	13.00	226.46	14.80	228.06
41	77.00	231.67	20.40				231.67
42	160.00	232.69	18.51				232.69
43				390.00	215.80	18.21	215.80
44	177.00	225.86	21.05				225.86
45	102.00	220.77	13.43				220.77
46	161.00	219.33	17.48				219.33
47	403.00	226.07	19.03	145.00	212.18	16.58	222.40
48	119.00	223.50	16.25	296.00	212.20	17.14	215.44
49	305.00	224.84	21.41	22.00	220.91	15.56	224.58
50	100.00	233.89	18.29				233.89
51	433.00	227.91	19.63				227.91
52	106.00	222.50	15.50	12.00	222.75	20.41	222.53
53	202.00	229.08	19.25				229.08
54	205.00	225.20	21.18	32.00	219.81	16.02	224.47
55	141.00	227.17	19.53				227.17
56	175.00	228.99	17.72	11.00	218.45	21.47	228.37
57	174.00	229.39	13.89	54.00	218.76	34.32	226.87
58	182.00	222.27	16.85				222.27
59	125.00	232.06	17.93				232.06
60	71.00	228.15	13.30				228.15
61	65.00	237.55	17.08	182.00	223.73	18.25	227.37
62	199.00	224.25	20.35				224.25
63	512.00	229.14	17.53	53.00	221.95	16.05	228.46
64	96.00	234.72	14.50				234.72
65	180.00	227.86	18.88				227.86
66	122.00	228.98	19.32				228.98
67	102.00	225.61	19.75	13.00	225.23	15.74	225.57
68	171.00	231.18	20.07				231.18
69	216.00	231.94	18.48	31.00	217.81	20.53	230.17
70	140.00	228.99	19.52				228.99

#	Nwhite	Meanwhite	Sdwhite	Nblk	Meanblk	SD blk	Weighted mean 03-04
71	478.00	232.00	17.54				232.00
72	391.00	228.06	18.94	14.00	211.86	17.51	227.50
73	406.00	225.75	18.91				225.75
74	339.00	232.38	19.77	12.00	216.50	17.62	231.84
75	162.00	220.03	21.22	175.00	211.12	17.01	215.40
76	25.00	214.64	25.28				214.64
77	245.00	228.89	17.77				228.89
78	126.00	231.32	19.49	18.00	220.16	16.48	229.93
79	266.00	226.65	19.61	222.00	214.63	17.12	221.18
80	287.00	231.65	15.87				231.65
81	107.00	238.22	17.14				238.22
82	241.00	219.32	17.08	150.00	207.93	15.97	214.95
83	25.00	217.00	17.73	240.00	215.25	19.12	215.42
84	115.00	237.60	15.33				237.60
85	216.00	229.25	21.72				229.25
86	355.00	213.15	16.19	25.00	211.12	15.94	213.02
87	93.00	221.22	17.79	11.00	214.27	14.42	220.48
88	270.00	225.76	18.84	54.00	215.20	22.61	224.00
89	200.00	234.75	17.18				234.75
90	233.00	234.41	18.07				234.41
91	499.00	231.22	18.75	16.00	216.50	23.93	230.77
92	330.00	231.71	19.43	12.00	224.08	22.85	231.44
93	402.00	226.69	19.81	100.00	209.66	15.30	223.30
94	96.00	227.23	21.58	166.00	218.23	19.49	221.53
95	270.00	227.20	15.29				227.20
96	115.00	230.14	17.27				230.14
97	99.00	218.88	22.30				218.88
98	516.00	228.91	19.24	22.00	218.73	15.78	228.49
99	25.00	220.96	20.52				220.96
100	134.00	222.21	17.82				222.21
101	230.00	230.11	17.54				230.11
102	176.00	222.72	18.58	24.00	220.17	19.87	222.41
103	318.00	230.36	14.83				230.36
104	30.00	227.17	19.95	62.00	223.34	21.50	224.59
105	263.00	227.26	18.44				227.26
106	213.00	228.82	15.82				228.82
107	310.00	231.35	15.07				231.35

#	Nwhite	Meanwhite	Sdwhite	Nblk	Meanblk	SD blk	Weighted mean 03-04
108	169.00	233.52	16.97				233.52
109	206.00	229.05	20.08				229.05
110	136.00	224.03	19.20				224.03
111	159.00	231.47	15.26				231.47
112	42.00	227.07	21.95	26.00	217.04	19.92	223.24
113	243.00	232.40	15.65				232.40
114	116.00	229.95	18.74	11.00	213.82	19.31	228.55
115	85.00	226.40	17.96	41.00	224.07	19.31	225.65
116	858.00	227.73	18.81	14.00	219.43	12.86	227.59
117	213.00	223.48	19.31	15.00	215.27	21.77	222.94
118	118.00	224.49	20.35				224.49
119	137.00	211.87	22.25	11.00	208.73	17.78	211.64
120	144.00	233.74	22.22	202.00	222.56	21.06	227.22
121	205.00	227.15	21.07				227.15
122	82.00	232.91	19.30				232.91
123	194.00	234.58	20.09				234.58
124	71.00	226.97	16.64				226.97
125	151.00	224.54	16.28				224.54
126	192.00	222.06	16.66				222.06
127	145.00	227.61	23.62	86.00	214.63	15.39	222.78
128	155.00	246.83	16.34	180.00	227.18	18.30	236.27
129	155.00	227.44	17.23				227.44
130	149.00	232.78	16.53				232.78
131	238.00	229.22	20.32				229.22
132	160.00	230.89	19.50	123.00	218.75	18.64	225.61
133	1268.00	224.82	20.28	196.00	215.67	21.90	223.60
134	459.00	216.26	20.75	169.00	213.23	20.24	215.45
135	101.00	236.40	20.08	59.00	231.78	16.77	234.70
136	397.00	225.41	17.24	11.00	214.36	20.40	225.11
137	488.00	229.35	14.41				229.35
138	142.00	222.70	16.66				222.70
139	265.00	243.69	16.51	33.00	228.27	13.14	241.98
140	472.00	230.68	18.37	13.00	217.08	22.72	230.32
141	164.00	234.48	16.74				234.48
142	183.00	230.17	15.85				230.17
143	1041.00	223.60	18.10	1120.00	213.12	16.47	218.17
144	48.00	217.90	17.92				217.90
145	273.00	230.91	17.16	14.00	217.69	11.00	230.26
146	358.00	230.95	15.38				230.95
147	142.00	224.74	21.22				224.74

#	Nwhite	Meanwhite	Sdwhite	Nblk	Meanblk	SD blk	Weighted mean 03-04
148	237.00	227.84	18.55				227.84
149	133.00	226.99	19.51				226.99
150	335.00	235.74	17.76				235.74
151	195.00	230.46	18.49				230.46
152	223.00	227.31	19.84	238.00	221.08	17.90	224.09
153				215	216.5	19.3	216.53
154	165.00	230.34	20.40				230.34
155	123.00	232.80	18.46				232.80
156	48.00	230.70	17.08				230.70
157	795.00	232.76	18.25	139.00	222.16	17.96	231.18
158	224.00	230.36	18.62	18.00	215.22	15.09	229.23
159	274.00	238.74	17.64				238.74
160	122.00	231.25	22.50	51.00	216.41	19.47	226.87
161	88.00	232.97	17.43				232.97
162	110.00	227.74	17.29				227.74
163	563.00	233.41	17.69	16.00	228.06	20.95	233.26
164	191.00	229.60	18.89				229.60
165	250.00	231.50	17.06				231.50
166	525.00	235.30	17.76	31.00	220.58	22.34	234.48
167	115.00	234.26	15.20	18.00	217.69	12.56	232.02
168	266.00	226.87	19.42	43.00	214.90	14.45	225.21
169	155.00	218.99	18.82	464.00	216.51	19.90	217.13
170	248.00	223.08	20.41	38.00	219.42	18.77	222.59
171	59.00	223.93	21.37				223.93
172	287.00	227.80	14.31			10.39	227.80
173	71.00	222.30	13.97				222.30
174	72.00	226.29	15.80				226.29
175	54.00	226.28	17.86				226.28
176	51.00	221.00	16.44				221.00
177	153.00	223.09	20.90				223.09
178	77.00	224.10	20.78				224.10
179	52.00	228.31	17.81				228.31
180	185.00	228.27	17.77				228.27
181	126.00	235.18	17.60				235.18
182	104.00	230.52	18.50				230.52
183	129.00	231.22	19.97				231.22
184	116.00	231.43	11.46				231.43
185	66.00	227.47	15.97				227.47

#	Nwhite	Meanwhite	Sdwhite	Nblk	Meanblk	SD blk	Weighted mean 03-04
186	56.00	224.82	18.06				224.82
187	45.00	220.68	16.72				220.68
188	68.00	228.28	16.91				228.28
189	42.00	216.57	15.16				216.57
190	90.00	230.27	13.74				230.27
191	71.00	225.10	14.57				225.10
192	138.00	229.93	14.96				229.93
193	155.00	226.28	18.59				226.28
194	67.00	226.51	18.16				226.51
195	139.00	229.80	18.99				229.80
196	150.00	231.70	14.31				231.70
197	66.00	224.55	16.43				224.55
198	81.00	216.98	14.75				216.98
199	91.00	226.82	18.22				226.82
200	370.00	231.39	17.77				231.39
201	56.00	228.66	13.94				228.66
202	655.00	229.26	14.71				229.26
203	447.00	233.32	17.20				233.32
204	130.00	225.53	14.48				225.53
205	73.00	222.88	19.58				222.88
206	97.00	224.89	19.35				224.89
207	86.00	226.24	22.14				226.24
208	147.00	226.84	18.96				226.84
209	114.00	222.69	16.98				222.69
210	117.00	226.99	18.40				226.99
211	293.00	230.83	14.30				230.83
212	81.00	233.30	18.86				233.30
213	131.00	224.31	20.71				224.31
214	180.00	231.99	19.58				231.99
215	106.00	230.15	21.21				230.15
216	99.00	233.77	19.97				233.77
217	137.00	233.68	16.65				233.68
218	116.00	227.79	14.60				227.79
219	64.00	222.66	20.49				222.66
220	23.00	231.83	19.07				231.83
221	74.00	221.28	17.76				221.28
222	128.00	230.63	18.84				230.63
223	146.00	225.02	19.78	21.00	210.48	11.14	223.19

#	Nwhite	Meanwhite	Sdwhite	Nblk	Meanblk	SD blk	Weighted mean 03-04
224	45.00	217.02	20.30				217.02
225	147.00	232.47	18.56	14.00	220.43	15.18	231.42
226	82.00	225.63	17.45				225.63
227	86.00	233.37	18.70				233.37
228	76.00	225.87	18.53				225.87
229	162.00	228.35	21.37				228.35
230	114.00	230.78	17.59				230.78
231	147.00	229.46	21.72				229.46
232	110.00	218.23	16.93				218.23
233	108.00	220.26	21.08				220.26
234	82.00	219.98	20.37				219.98
235	78.00	219.53	17.84				219.53
236	67.00	236.58	20.41				236.58
237	68.00	233.32	17.77				233.32
238	20.00	232.00	17.15				232.00
239	41.00	223.20	16.13				223.20
240	110.00	232.65	19.37				232.65
241	56.00	226.81	15.22				226.81
242	89.00	223.10	15.49				223.10
243	103.00	223.44	17.34				223.44
244	82.00	224.43	17.36				224.43
245	272.00	225.48	18.34				225.48
246	93.00	224.02	19.92				224.02
247	257.00	229.52	16.32				229.52
248	548.00	232.54	18.01	58.00	225.23	14.96	231.84
249	1038.00	238.19	18.71	67.00	223.16	20.77	237.28
250	105.00	225.66	16.70				225.66
251	51.00	222.67	22.32				222.67
252	172.00	231.95	18.50				231.95
253	187.00	231.76	18.02				231.76
254	51.00	226.57	15.75				226.57
255	159.00	225.30	16.32				225.30
256	78.00	218.03	16.48				218.03
257	75.00	225.55	15.79				225.55
258	160.00	225.19	16.90				225.19
259	223.00	228.60	18.30				228.60
260	258.00	223.59	15.84				223.59
261	123.00	226.30	19.43				226.30
262	54.00	237.74	22.15				237.74
263	162.00	231.03	18.59				231.03
264	113.00	229.01	14.39				229.01
265	140.00	227.42	19.55				227.42
266	119.00	231.79	19.00				231.79
267	79.00	235.05	18.58				235.05
268	157.00	229.98	18.41				229.98
269	626.00	233.92	18.66				233.92
270	70.00	237.61	17.39				237.61
271	124.00	225.42	14.45				225.42

#	Nwhite	Meanwhite	Sdwhite	Nblk	Meanblk	SD blk	Weighted mean 03-04
272	135.00	231.06	17.02				231.06
273	96.00	221.44	17.79				221.44
274	167.00	224.46	15.92				224.46
275	75.00	226.52	15.30				226.52
276	71.00	216.76	17.42				216.76
277	80.00	229.46	13.95				229.46
278	99.00	229.89	18.81				229.89
279	167.00	229.30	17.77				229.30
280	58.00	226.38	15.43				226.38
281	59.00	231.81	20.10				231.81
282	82.00	228.96	20.60				228.96
283	58.00	229.14	14.04				229.14
284	70.00	228.00	14.02				228.00
285	214.00	236.44	20.41				236.44
286	121.00	230.88	17.81	34.00	222.18	13.61	228.97
287	20.00	236.15	19.94	44.00	223.41	12.36	227.39
288	288.00	240.58	16.82	23.00	231.52	16.64	239.91
289	74.00	220.41	15.29				220.41
290	84.00	230.36	21.63				230.36
291	52.00	240.67	20.71				240.67
292	52.00	232.02	20.41				232.02
293	56.00	225.70	19.72				225.70
294	44.00	238.09	16.92				238.09
295	71.00	230.55	16.79				230.55
296	89.00	228.51	18.80				228.51
297	188.00	227.16	13.90				227.16
298	152.00	226.17	17.83				226.17
299	621.00	235.82	17.12	28.00	223.64	22.28	235.29
300	134.00	232.46	16.11				232.46
301	107.00	232.99	16.07				232.99
302	127.00	224.31	14.52	12.00	210.42	15.67	223.11
303	156.00	229.90	16.91				229.90
304	124.00	223.41	13.82				223.41
305	70.00	233.19	18.89				233.19
306	92.00	232.51	18.21				232.51
307	125.00	230.63	17.75				230.63
308	94.00	223.85	15.07				223.85
309	560.00	235.03	16.79	79.00	226.80	17.14	234.01
310	48.00	230.92	19.92				230.92
311	181.00	224.44	21.42				224.44
312	159.00	230.29	18.62	35.00	219.85	18.12	228.41
313	182.00	220.45	19.22	37.00	209.49	20.17	218.59
314	396.00	229.49	16.91	61.00	220.30	15.02	228.27
315	300.00	222.55	15.14	112.00	217.21	17.00	221.10
316	195.00	228.76	15.43				228.76
317	307.00	232.58	16.96	92.00	225.67	19.37	230.99
318	956.00	232.27	18.61	50.00	212.10	16.66	231.27
319	739.00	234.62	17.66	27.00	225.96	14.58	234.31

#	Nwhite	Meanwhite	Sdwhite	Nblk	Meanblk	SD blk	Weighted mean 03-04
320	86.00	237.68	16.53				237.68
321	87.00	226.11	17.50				226.11
322	24.00	220.00	17.82				220.00
323	35.00	240.31	15.84				240.31
324	85.00	220.89	18.00				220.89
325	104.00	221.55	17.53				221.55
326	80.00	223.80	15.25				223.80
327	92.00	228.49	15.10				228.49
328	214.00	235.83	18.23				235.83
329	219.00	235.28	15.08	12.00	220.00	9.91	234.49
330	50.00	225.82	18.18				225.82
331	68.00	227.96	18.34				227.96
332	165.00	236.13	16.20				236.13
333	487.00	231.32	18.54				231.32
334	41.00	227.95	18.45				227.95
335	116.00	233.06	18.11				233.06
336	171.00	231.45	17.01				231.45
337	155.00	224.90	19.33				224.90
338	88.00	236.39	18.56	35.00	215.74	17.41	230.51
339	513.00	237.17	17.47				237.17
340	544.00	231.31	18.76	142.00	221.02	19.48	229.18
341	456.00	234.69	17.76				234.69
342	248.00	231.67	19.81				231.67
343	146.00	234.03	17.77				234.03
344	45.00	235.33	15.96				235.33
345	33.00	233.76	20.78				233.76
346	48.00	230.19	22.45				230.19
347	89.00	226.83	19.22				226.83
348	55.00	221.80	17.35				221.80
349	67.00	228.37	18.45				228.37
350	18.00	220.56	22.20				220.56
351	47.00	226.21	13.32				226.21
352	45.00	225.91	16.63				225.91
353	79.00	221.97	18.23				221.97
354	53.00	225.40	19.44				225.40
355	37.00	220.00	16.64				220.00
356	30.00	236.00	23.17				236.00
357	96.00	232.89	16.61				232.89
358	68.00	225.34	14.38				225.34
359	49.00	224.84	16.96				224.84
360	70.00	223.49	14.27				223.49
361	96.00	233.38	17.00				233.38
362	171.00	231.41	18.76				231.41
363	196.00	227.24	18.85				227.24
364	48.00	221.50	18.99				221.50
365	89.00	231.63	17.65				231.63
366	63.00	227.29	20.66				227.29
367	99.00	231.16	17.10				231.16

#	Nwhite	Meanwhite	Sdwhite	Nblk	Meanblk	SD blk	Weighted mean 03-04
368	71.00	222.01	17.14				222.01
369	171.00	224.39	15.25				224.39
370	183.00	226.78	16.95				226.78
371	158.00	226.03	14.65				226.03
372	95.00	228.77	16.79				228.77
373	51.00	219.61	14.87				219.61
374	86.00	226.38	14.94				226.38
375	74.00	226.57	16.17				226.57
376	89.00	235.65	15.71				235.65
377	234.00	233.29	17.75				233.29
378	316.00	231.54	16.76				231.54
379	126.00	233.06	17.67				233.06
380	95.00	231.52	18.93				231.52
381	152.00	231.78	19.25				231.78
382	133.00	222.66	22.02				222.66
383	123.00	238.21	17.96				238.21
384	58.00	232.76	20.67				232.76
385	110.00	230.19	19.05				230.19
386	162.00	229.70	20.37				229.70
387	109.00	229.14	19.48	27.00	218.11	17.05	226.95
388	163.00	228.90	16.96				228.90
389	144.00	224.21	14.42				224.21
390	103.00	224.85	17.38				224.85
391	256.00	226.41	16.02				226.41
392	141.00	230.94	18.33				230.94
393	147.00	224.21	14.49				224.21
394	50.00	224.30	14.46				224.30
395	173.00	232.27	17.62				232.27
396	238.00	235.41	16.88				235.41
397	52.00	230.87	21.60	13.00	203.69	14.90	225.43
398	81.00	233.64	19.69				233.64
399	157.00	229.33	19.70				229.33
400	136.00	226.95	15.30				226.95
401	237.00	226.33	18.85				226.33
402	246.00	233.48	22.94				233.48
403	62.00	236.80	17.04				236.80
404	208.00	232.35	17.22	33.00	227.67	15.65	231.71
405	396.00	223.02	16.78	39.00	213.33	15.03	222.15
406	90.00	229.63	15.44				229.63
407	134.00	231.39	18.11				231.39
408	120.00	229.92	17.48				229.92
409	318.00	232.01	18.08	25.00	229.79	19.70	231.84
410	278.00	234.28	16.35	18.00	228.17	17.71	233.91
411	192.00	243.09	17.60				243.09
412	58.00	229.29	14.00				229.29
413	46.00	228.22	15.67				228.22
414	157.00	234.62	16.55				234.62
415	51.00	222.80	15.59				222.80

#	Nwhite	Meanwhite	Sdwhite	Nblk	Meanblk	SD blk	Weighted mean 03-04
416	92.00	237.76	15.58				237.76
417	85.00	235.94	14.40				235.94
418	180.00	229.84	19.98				229.84
419	67.00	238.74	18.42				238.74
420	98.00	222.38	17.69				222.38
421	107.00	223.12	15.22				223.12
422	62.00	224.02	15.13				224.02
423	121.00	224.79	14.24				224.79
424	114.00	227.06	20.09				227.06
425	174.00	231.40	16.01				231.40
426	256.00	234.04	17.80				234.04
427	209.00	234.60	19.24				234.60
428	60.00	221.40	17.45				221.40
429	129.00	218.84	19.75				218.84
430	56.00	224.29	15.56				224.29
431	69.00	234.33	17.25				234.33
432	86.00	230.59	18.74				230.59
433	72.00	237.43	15.24				237.43
434	78.00	235.12	17.14				235.12
435	60.00	234.05	17.80				234.05
436	86.00	231.18	18.61				231.18
437	38.00	226.16	17.58				226.16
438	174.00	228.07	19.38				228.07
439	120.00	225.94	14.37				225.94
440	11.00	205.00	19.77	35.00	216.60	24.01	213.83
441	23.00	217.88	14.17	184.00	216.04	20.08	216.25
442	218.00	222.26	17.92	18.00	223.94	15.70	222.39
443	87.00	232.62	16.94				232.62
444	344.00	236.63	16.26	48.00	226.22	17.40	235.35
445	89.00	228.07	16.12	32.00	218.48	21.74	225.54
446	144.00	230.85	17.96				230.85
447	349.00	235.61	18.87	48.00	228.21	18.93	234.71
448	162.00	226.67	19.63				226.67
449	94.00	223.62	14.79				223.62
450	135.00	225.16	16.58				225.16
451	68.00	225.26	15.58				225.26
452	142.00	226.75	16.76				226.75
453	163.00	225.33	17.43				225.33
454	151.00	223.80	19.61				223.80
455	247.00	227.80	18.70				227.80
456	119.00	228.84	18.25				228.84
457	100.00	230.50	17.38				230.50
458	127.00	227.73	18.26				227.73
459	34.00	219.26	18.73				219.26
460	111.00	235.31	19.11				235.31
461	61.00	235.97	18.35				235.97
462	68.00	215.76	14.49				215.76
463	146.00	237.50	20.49				237.50

#	Nwhite	Meanwhite	Sdwhite	Nblk	Meanblk	SD blk	Weighted mean 03-04
464	70.00	224.67	21.07				224.67
465	165.00	230.33	21.25				230.33
466	219.00	229.59	20.22				229.59
467	103.00	226.84	18.16				226.84
468	34.00	216.85	22.29				216.85
469	112.00	223.96	19.97				223.96
470	155.00	232.75	20.67				232.75
471	65.00	223.64	16.42				223.64
472	202.00	233.22	16.43				233.22
473	173.00	225.03	15.35				225.03
474	174.00	233.42	16.08				233.42
475	99.00	225.04	17.40				225.04
476	89.00	232.02	18.11				232.02
477	151.00	223.08	16.02				223.08
478	155.00	223.67	16.54				223.67
479	122.00	221.29	14.65				221.29
480	77.00	215.71	19.76				215.71
481	129.00	218.89	16.04				218.89
482	86.00	226.93	18.99				226.93
483	43.00	233.67	19.47				233.67
484	43.00	229.00	15.92				229.00
485	25.00	234.24	14.38				234.24
486	66.00	232.46	14.69				232.46
487	29.00	229.89	14.36				229.89
488	37.00	227.27	13.37				227.27
489	101.00	231.05	20.51				231.05
490	44.00	236.43	13.58				236.43
491	47.00	227.66	11.43				227.66
492	125.00	221.38	18.13				221.38
493	94.00	230.00	13.53				230.00
494	182.00	228.32	14.77				228.32
495	38.00	228.82	14.34				228.82
496	211.00	222.49	16.30				222.49
497	63.00	235.82	18.91				235.82
498	107.00	232.36	17.13				232.36
499	76.00	229.30	19.73				229.30
500	92.00	224.73	24.87				224.73
501	88.00	224.57	18.22				224.57
502	95.00	218.11	19.44				218.11
503	148.00	224.62	21.23				224.62
504	114.00	229.03	18.57				229.03
505	76.00	217.49	18.87				217.49
506	68.00	231.15	20.22				231.15
507	71.00	230.03	17.75				230.03
508	35.00	230.06	21.33				230.06
509	50.00	226.72	15.53				226.72
510	95.00	231.72	19.70				231.72
511	93.00	229.40	18.72				229.40

#	Nwhite	Meanwhite	Sdwhite	Nblk	Meanblk	SD blk	Weighted mean 03-04
512	87.00	227.98	19.39				227.98
513	106.00	234.77	19.92				234.77
514	84.00	228.78	19.50				228.78
515	73.00	230.70	17.12				230.70
516	18.00	217.83	12.36				217.83
517	59.00	222.46	19.91				222.46
518	38.00	231.53	16.65				231.53
519	40.00	232.03	18.58				232.03
520	94.00	231.85	16.30				231.85
521	40.00	231.89	16.81				231.89
522	30.00	219.70	16.47				219.70
523	57.00	228.75	15.98				228.75
524	71.00	230.79	16.79				230.79
525	40.00	222.15	24.14				222.15
526	33.00	228.03	11.68				228.03
527	127.00	227.72	18.03	16.00	225.53	19.27	227.48
528	144.00	230.28	17.96				230.28
529	408.00	231.33	14.45				231.33
530	207.00	235.05	16.30				235.05
531	232.00	230.90	17.39				230.90
532	174.00	227.33	16.34				227.33
533	168.00	222.78	16.70				222.78
534	180.00	229.18	16.31				229.18
535	59.00	224.61	17.82				224.61
536	302.00	234.69	18.25	14.00	223.57	20.20	234.19
537	353.00	231.84	17.92	51.00	217.57	18.15	230.03
538	87.00	222.29	17.45				222.29
539	105.00	225.14	14.80				225.14
540	104.00	231.54	13.81	14.00	208.94	15.20	228.86
541	216.00	234.42	17.95	23.00	227.57	11.38	233.76
542	150.00	227.85	18.70				227.85
543	100.00	229.12	19.62				229.12
544	274.00	234.01	18.77				234.01
545	386.00	230.12	14.45				230.12
546	61.00	225.11	17.41				225.11
547	249.00	230.92	15.93	16.00	217.13	14.79	230.08
548	192.00	226.74	13.72				226.74
549	188.00	221.97	18.88				221.97
550	231.00	235.08	16.78	60.00	221.68	13.66	232.32
551	20.00	229.70	22.54				229.70
552	61.00	222.97	16.94				222.97
553	107.00	223.70	20.92				223.70
554	121.00	232.89	15.37				232.89
555	70.00	220.64	15.71				220.64
556	227.00	229.61	13.93	13.00	220.45	11.60	229.11
557	83.00	231.22	18.90				231.22
558	153.00	233.29	19.86				233.29
559	77.00	215.34	18.00	24.00	212.88	18.50	214.76

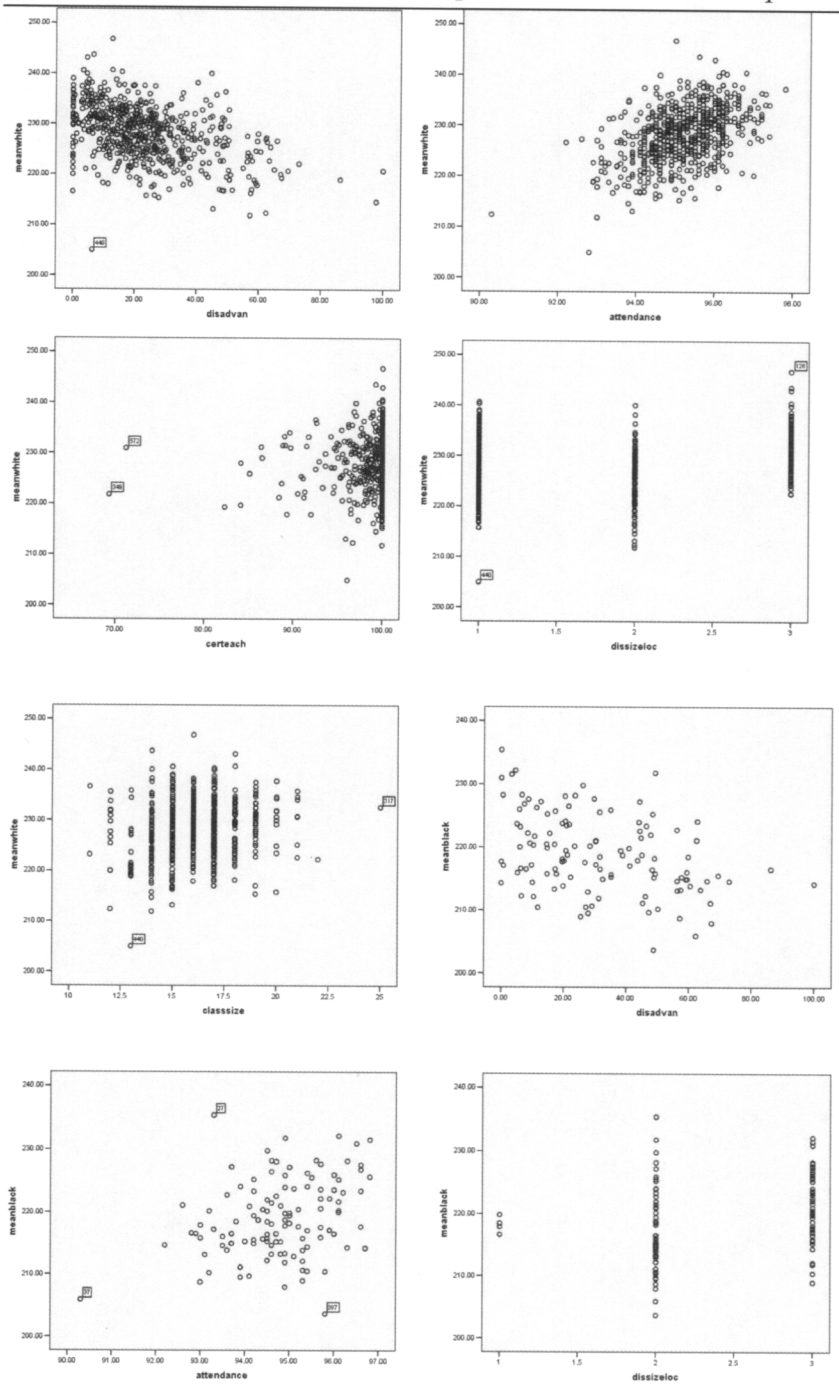
#	Nwhite	Meanwhite	Sdwhite	Nblk	Meanblk	SD blk	Weighted mean 03-04
560	37.00	239.00	16.51				239.00
561	67.00	233.64	19.81				233.64
562	60.00	229.78	18.65				229.78
563	62.00	225.48	16.98				225.48
564	96.00	236.12	18.22				236.12
565	90.00	223.01	15.88				223.01
566	79.00	227.86	14.55				227.86
567	144.00	233.76	16.76				233.76
568	44.00	229.16	17.03				229.16
569	129.00	229.85	18.21				229.85
570	62.00	226.87	17.88				226.87
571	107.00	221.22	18.06				221.22
572	80.00	230.95	19.68				230.95
573	57.00	229.56	13.87				229.56
574	173.00	219.44	19.67				219.44
575	129.00	234.95	19.80				234.95
576	295.00	230.34	14.27				230.34
577	255.00	236.26	18.74				236.26
578	242.00	237.10	17.06				237.10
579	604.00	239.94	17.33	21.00	232.14	17.71	239.68
580	101.00	231.28	14.79				231.28
581	99.00	225.31	22.81				225.31
582	67.00	221.25	18.03				221.25
583	214.00	231.93	21.02				231.93
584	40.00	217.88	15.09				217.88
585	95.00	234.57	16.22				234.57
586	72.00	229.69	13.62				229.69
587	101.00	237.63	18.64				237.63
588	117.00	234.31	18.06				234.31
589	89.00	233.74	16.61				233.74
590	131.00	230.55	21.71				230.55
591	136.00	230.17	17.89				230.17
592	40.00	224.35	12.74				224.35
593	47.00	233.34	14.61				233.34
594	58.00	225.74	14.50				225.74
595	54.00	231.65	18.16				231.65
596	33.00	227.09	17.30				227.09
597	126.00	231.13	16.27				231.13
598	99.00	223.98	19.37				223.98
599	123.00	222.66	15.75				222.66
600	72.00	224.14	16.49				224.14
601	63.00	226.79	16.67				226.79
602	96.00	224.05	15.04				224.05
603	75.00	230.73	17.50				230.73
604	347.00	220.23	24.97				220.23
605	173.00	227.06	21.40				227.06
606	90.00	228.36	18.06				228.36
607	92.00	224.64	16.23				224.64
608	78.00	230.06	20.45				230.06

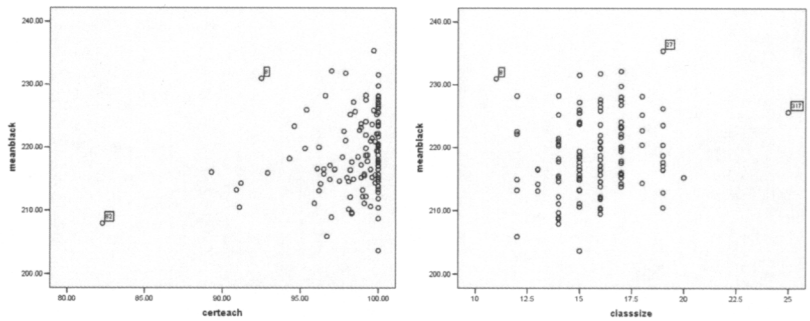
APPENDIX B

BIVARIATE SCATTERPLOTS OF RELATIONSHIP BETWEEN OUTCOME AND PREDICTOR VARIABLES

Item 2.

Bivariate scatterplots of relationship between outcome and predictor variables.




meanblack
240.00
230.00
220.00
210.00
200.00
80.00
85.00
90.00
95.00
100.00
certeach
meanblack
240.00
230.00
220.00
210.00
200.00
10
12.5
15
17.5
20
22.5
25
classsize

APPENDIX C

SENSITIVITY ANALYSIS OF INFLUENTAIL DATA POINTS FOR MEANWHITE AND MEANBLACK MODELS WITH STANDARDIZED PARAMETER ESTIMATES

Item 3.

Sensitivity Analysis of Influential Data Points for meanwhite and meanblack models with standardized parameter estimates.

Cases Omitted	Influence	Disadvan	Attendance	Certeach	Classsize	Urban	Suburban	Rsqrd	SSE
Meanwhite	*	-0.17 ***	0.31 ***	0.07 *	0.09 **	0.05	0.25 ***	0.32	11822.47
37	Low on yhat, press, residual, cook. High on studpres	-0.17 ***	0.30 ***	0.07 *	0.09 **	0.05	0.26 ***	0.26	12783.54
31	yhat,	-0.15 ***	0.32 ***	0.07 *	0.09 **	0.05	0.26 ***	0.32	11800.83
128	High on studpres, press, residual	-0.17 ***	0.32 ***	0.07 *	0.10 **	0.05	0.25 ***	0.32	11567.71
440	Low on yhat, studpres, residual, hat, cook, press.	-0.07 ***	1.62 ***	0.12 *	0.23 *	0.64	3.08 ***	0.32	11488.87
572	High on hat, yhat, cooks, residual.	-0.17 ***	0.31 ***	0.08 *	0.09 **	0.05	0.25 ***	0.32	11810.01
31, 37		-0.16 ***	0.31 ***	0.07 *	0.09 **	0.05	0.26 ***	0.31	11789.23
31, 128		-0.15 ***	0.33 ***	0.07 *	0.09 **	0.05	0.25 ***	0.32	11544.92
31, 128, 440		-0.18 ***	0.30 ***	0.07 *	0.08 *	0.05	0.25 ***	0.32	11221.41
31, 128, 440, 572		-0.18 ***	0.30 ***	0.07 *	0.08 *	0.05	0.25 ***	0.32	11211.34
31, 37, 128		-0.15 ***	0.32 ***	0.07 *	0.09 **	0.05	0.25 ***	0.31	11534.02
31, 37, 128, 440		-0.18 ***	0.29 ***	0.07 *	0.08 *	0.05	0.25 ***	0.32	11205.89
128, 440		-0.20 ***	0.30 ***	0.07 *	0.08 *	0.05	0.25 ***	0.32	11237.35
128, 440, 572		-0.20 ***	0.29 ***	0.07 *	0.08 *	0.05	0.25 ***	0.32	11227.07
440, 572		-0.07 ***	1.62 ***	0.14 *	0.23 *	0.64	3.09 ***	0.32	11477.95
all		-0.18 ***	0.29 ***	0.07 *	0.08 *	0.05	0.25 ***	0.31	11195.79
Meanblack									
none	*	-0.26 ~	0.16	0.14 ~	0.04			0.16	3617.37
27	High on cook, press, studpres.	-0.19 ~	0.24 *	0.15 ~	0.01			0.17	3376.63
397	Low on cook, studpres, press, residual.	-0.16	0.26 *	0.18 *	-0.01			0.16	3089.43
27, 397		-0.12	0.24 *	0.22 *	0.04			0.16	2963.52

Key: ~p<.10; *p<.05; **p<.01; ***p<.00