

**THE EFFECTS OF RACIALLY AND ECONOMICALLY ISOLATED SCHOOLS ON  
STUDENT PERFORMANCE**

By

Ann Moss Joyner  
Cedar Grove Institute for Sustainable Communities, Inc.

and

Ashley Osment,  
Center for Civil Rights  
at the University of North Carolina at Chapel Hill

With

Andy Sharma  
University of North Carolina  
at Chapel Hill

Timothy M. Stallman  
University of North Carolina  
at Chapel Hill

Jessica Pearlman  
University of North Carolina  
at Chapel Hill

Allan M. Parnell  
Cedar Grove Institute for  
Sustainable Communities, Inc.

May 28, 2010

Dedicated in Memorium to Ashely Osment, Nov. 20, 1963 - May 28, 2010

The authors assume all responsibility for interpretations and any errors.

# THE EFFECTS OF RACIALLY AND ECONOMICALLY ISOLATED SCHOOLS ON STUDENT PERFORMANCE

## Executive Summary

Over the past two decades, the United States Supreme Court issued rulings which severely limit the ability of school boards to use race as a factor in student assignment policies as one way to foster diversity. To increase our understanding of the impact of these rulings, the Poverty Race Research and Action Council commissioned this study to address a single question:

*What is the effect on student performance of racially isolated schools?*

In answering this question, we recognized the need to also address the following:

*If the effect on student performance is negative, can better-qualified teachers and other resources make up for the effect of racial isolation?*

Using English I and Algebra I scores for 9th-grade North Carolina public school students on End of Course (EOC) exams for the 2007-2008 school year, we analyzed the performance of the population of North Carolina 9<sup>th</sup> graders as a whole (N = 134,646<sup>1</sup>), and a subpopulation of students in three counties (Pitt, Wayne and Halifax) with high levels of racial and economic isolation. The five school systems in these three counties comprise our “Focus Site” (N = 3,625).

Our decision to study economic as well as racial isolation in student populations was based on North Carolina’s high poverty levels (particularly in urban areas and in the coastal plain and mountains) and the significant impact of economic isolation on student performance.

We controlled for individual student race and ethnicity, economic disadvantage (eligibility for Free and Reduced Price Lunch, or FRPL), and designation as gifted. We also analyzed the effect of school-level characteristics, including teacher experience, teacher training (advanced degrees), teacher accreditation (fully licensed), the percent of students in poverty (FRPL), and the percentage of students who were Black or Latino. The bivariate relationships between racial isolation and test scores provide a clear picture of the effects of racial and economic isolation and the academic cost to students who are enrolled in these schools.

More than 8,000 9<sup>th</sup> graders in North Carolina attend schools that are more than 75% Black, and most of these schools are also high-poverty and low-performing schools. We found that racial concentration, per se, had no significant effect, but that disparities in academic performance were tied to concentration of poverty and the significant disparity in instructional resources (fully-certified teachers and teachers with advanced degrees) present in the highly-segregated schools. Analysis for a Focus Site subpopulation of systems that had a high percentage of high schools with severe levels of racial and economic isolation produced similar findings.

We found that that fully-licensed teachers and teachers with advanced degrees can improve student performance. We found that teachers in North Carolina’s most-segregated schools (more than 75% Black) were significantly less likely to be fully-licensed and significantly less likely to have advanced degrees.

We also found that Black students are much less likely to be designated gifted, and that alternative schools (e.g. schools for exceptional or at-risk students) are likely to be severely

---

<sup>1</sup> The universe of students in the Ordinary Least Squares and Multi-Level Modeling analyses is 103,859, as these methods drop all cases where there is missing data.

## THE EFFECTS OF RACIALLY AND ECONOMICALLY ISOLATED SCHOOLS ON STUDENT PERFORMANCE

segregated (more than 75% Black) and to have teachers who are poorly trained for their students' disabilities and in their subject areas.

We calculated the cost of racial and economic segregation on academic performance in one severely-segregated North Carolina high school. Goldsboro High School, in Wayne County, N.C., was 99.4% Black in a school system that was 56% minority and 81% economically disadvantaged in a County that averages 65.8%. If an attempt was made to counterbalance such economic and racial isolation by improving (such as increased training and tenure of teachers) resources at this single school, the cost per student would be \$1,580 per student (Henry et al. 2008). As Goldsboro High School had 616 students (2007-2008), this equals \$970,000. (It should be noted that our previous research (funded by the Paul Green Foundation) in Wayne County Schools showed that the County's residential patterns did not necessitate racial or economic segregation. In that study, we used Geographic Information Systems to illustrate that school attendance zones could be designed to provide integrated, neighborhood schools.)

Our analysis suggests three complementary strategies for improving academic performance in North Carolina's high schools: (1) create school attendance areas which will create racially and economically balanced schools; (2) require teachers to be fully-licensed; and (3) provide funding to hire teachers with advanced degrees in the subject area taught. In addition, in keeping with the National Research Council's 2002 recommendations, we believe that the state should undertake a thorough review of its policies toward gifted and "special needs" students, and that "educators should be required to first provide special needs students with high-quality instruction and social support in a regular setting before determining whether special services are needed [in order to] make sure that minority students who are poorly prepared for school are not assigned to special education for that reason."

In sum, investments to improve resources can increase academic performance, but these investments are not being made in North Carolina's predominantly-Black schools. Moreover, such efforts can only mitigate *some* of the adverse academic impacts created by attendance at racially and economically isolated schools. Investments to improve resources and the quality of education programs that overcome the effects of economic disadvantages can increase academic performance in the short-term and future employment opportunities in the long-term. Strong academic performance in our schools is critical to the state and nation's competitiveness in a global economy.

### Research Goal

According to Orfield and Lee (2005), "Race is deeply and systematically linked to many forms of inequality in background, treatment, expectations and opportunities. From an educational perspective, perhaps the most important of those linkages is with the level of concentrated poverty in a school." We conducted a pilot project examining the consequences of the racial and economic isolation in public schools across North Carolina and in three distinct North Carolina counties.

In addition, using Geographic Information Systems (GIS), we analyzed two of the counties to assess the degree to which segregation in schools is an artifact of past racial residential segregation patterns or a current choice made by policy-makers which perpetuate segregation.

This is a small-area study which builds on a body of work by Gary Orfield, Helen Ladd, Charles Clotfelder and others.

# THE EFFECTS OF RACIALLY AND ECONOMICALLY ISOLATED SCHOOLS ON STUDENT PERFORMANCE

## Research Methods

National analyses of school segregation have tended to focus on enrollment, relying on surveys at the national level. Our analysis primarily uses state data, comparing racially isolated schools to racially balanced schools. School-based data are from the North Carolina State Department of Public Instruction and prepared by the North Carolina Education Research Data Center at Duke University.<sup>2</sup> Population estimates are based in Census and American Community Survey data. Using these data, we examined key student-level and school-level indicators in order to capture a range of conditions in the school systems.

Our analysis provides (1) descriptive statistics by percent Black in school, (2) t-tests by race for exam outcomes, and (3) Ordinary Least Squares (OLS) and Mixed-Level Modeling (MLM) regressions, where MLM (in this case) is analogous to hierarchical modeling. Both OLS and MLM provide multivariate control for the effects of specified variables, such as the socio-economic status of the students.

There are factors which effect performance which we have not looked at (such as feeder school, parental education level, etc.), but our OLS model achieved R2 of 0.284 for Algebra I scores and 0.311 for English I scores.

## Analytic Sample

Our analysis examined two groups: 1) all 9th graders in North Carolina who completed either the Algebra I or English I exams, and characteristics of their schools; and 2) a subgroup of 9th graders in three Focus counties (Halifax, Pitt, and Wayne), aggregated, with characteristics of their schools. Although the main research question examines the outcomes for Black students, we also included Latino, Asian, Native American, and Multiracial children in the student universe.

While most 9<sup>th</sup> graders take English I, the number of 9th graders taking Algebra I is much smaller. Some students make take Algebra I in middle school, while others take general Math in 9<sup>th</sup> grade. This would affect results, but we selected English I and Algebra I as representative of 9<sup>th</sup> grade core courses.

Note that charter schools are not included, as Community Index Data (% poverty, % scoring at or above level III on End of Grade/End of Course tests) and data regarding Teacher Qualifications are not available for charter schools.<sup>3</sup>

## Background

The current move toward re-segregation in North Carolina's schools is illustrated by the experience of the Charlotte-Mecklenburg School System (CMS). From 1974 to 2002, CMS was under federal court order to use busing or other techniques to achieve racially balanced schools. In 2001, the 4th U.S. Circuit Court of Appeals held that CMS had dismantled its race-based dual system and had eliminated, as much as possible, the vestiges of prior discrimination. This ruling prohibited CMS from continuing to assign students solely based on race. "However, the court did not make any broad pronouncement as to what the school board could do in the future. To the contrary, the appellate court rejected the District Court's attempt to impose such a rule and held that 'a finding of unitariness brings a fresh start for the school board -- an opportunity to operate a

---

<sup>2</sup> [www.pubpol.duke.edu/centers/child/ep/nceddatabcenter/index.html](http://www.pubpol.duke.edu/centers/child/ep/nceddatabcenter/index.html)

<sup>3</sup> As federal policies begin to favor charter schools and more charter schools are created, the lack of data concerning charter school demographics, practices, and policies will make analyses such as this one problematic.

## THE EFFECTS OF RACIALLY AND ECONOMICALLY ISOLATED SCHOOLS ON STUDENT PERFORMANCE

school system in compliance with the Constitution.”<sup>4</sup> During the 2001-02 school year (prior to the ruling), 29.1% of CMS elementary schools were racially isolated (80% or more minority) schools. By the 2005-2006 school year, racial isolation had risen to 49.4%.<sup>5</sup>

In December of 2009, the school board in Wake County<sup>6</sup> voted to eliminate the word “diversity” in its description of its goals. New board member John Tedesco said that the NC Conference of NAACP Branches was “mired in a time when an emphasis on race was needed to overcome the vestiges of legal segregation.” Now, he said, “Wake has transcended race....”<sup>7</sup> This move away from diversity was the first action of the newly-elected Board majority, which had campaigned under the flag of “neighborhood schools.” This change is a reversal of Wake’s former school assignment plan, which considered family income and student proficiency in making student assignments. This policy was considered a national model for creating and maintaining diversity. According to Grant (2009), Wake “reduced the gap between rich and poor, Black and white, more than any other large urban educational system in America.” Unfortunately, Wake’s new school board exemplifies a growing acceptance of increasing levels of segregation, an outcome sanctioned by the nation’s courts.

The Supreme Court’s 1896 *Plessy v. Ferguson* decision allowing segregated schools was overturned in 1954 by *Brown v. Board of Education*. The underlying assumption of *Plessy* was that segregated schools (and other segregated public facilities) were permissible as long as they were equal. In *Brown*, the Supreme Court ruled that segregated schools, by definition, violated Black students’ constitutional rights. Most recently, the Supreme Court has moved away from *Brown*, constraining school boards’ ability to pursue diversity, resulting in the increasing re-segregation of public schools. This study looks at the practical educational effect of this re-segregation (referred to here as racial isolation) and its parallel economic isolation. We consider the question that was *not* asked in 1896: *Can our segregated schools actually be equal?*

To answer this question, *we must consider both racial and economic segregation*. Racial segregation in schools cannot be separated from the issue of poverty. Attending a predominantly-minority school usually means attending a high-poverty school. In addition, integration has been shown to have positive economic consequences for students. In *Diversity Challenged* (2001), Janet Schofield lists the many benefits of integrated elementary and secondary schools, including their long-term economic advantages. She cites academic progress of African American and Hispanic students; reduction of the dropout rate (thus eliminating the substantial negative economic consequences of failing to complete high school); and improvement of long-term occupational consequences for African Americans. These consequences include “a) fostering higher occupational aspirations and more consistent career planning linked to these aspirations; b) increasing earnings modestly, and (c) increasing the likelihood that they will work in professions in which Blacks have traditionally been underrepresented.” These facts summarize several decades of research (Schofield, 1995).

The ability of schools to achieve diversity is threatened. According to Gary Orfield in *Schools More Separate* (2001),

---

<sup>4</sup> Jim Diana, “Courts Don’t Require Resegregation of CMS,” Charlotte Observer, Sept. 12, 2006

<sup>5</sup> “CMS Elementary Schools – Racially Isolated Elementary Schools 2001-2006,” Center for Civil Rights, UNC-CH, excel sheet and graph, via email, March, 2007.

<sup>6</sup> Wake County’s school district includes Raleigh and the suburban towns which ring the city, as well as some rural areas.

<sup>7</sup> “NAACP Renews Schools Crusade,” News and Observer, January 10, 2010.

## THE EFFECTS OF RACIALLY AND ECONOMICALLY ISOLATED SCHOOLS ON STUDENT PERFORMANCE

*“School segregation intensified through the 1990s, during which time three major Supreme Court decisions authorized a return to segregated neighborhood schools. Though the U.S. South is much more integrated now than before the civil rights revolution, it is moving backward at an accelerating pace.”*

This reversal is happening at a time when public opinion favors desegregation, with both Blacks and Whites claiming an extremely high level of acceptance and approval of integrated education (Gallup Poll, 1999).

In 2007, in *Meredith v. Jefferson County Board of Education and Parents Involved in Community Schools vs. Seattle School District No. 1* (hereafter referred to as *PICS*), the United States Supreme Court substantially limited the permissibility of voluntary race-conscious student assignment plans. During the presentation of *PICS*, Justice Kennedy expressed his support for the race conscious *objective* of integrated schools, but also his strong doubts about the permissibility of policies directly turning on the individual race of individual students. In the end, the Court ruled that race cannot be used to decide where individual students go to school — except in limited circumstances.

In *PICS*, the Court made clear that a range of other measures remain available to pursue integration and inclusion in our schools. These include allowing districts to draw race-conscious boundaries based on residential patterns, establishing magnet schools, and locating new schools to reach the race-conscious objective of integration without assignment decisions turning on an individual student’s race. In addition, other individual student characteristics might well be used to achieve other forms of diversity that have the secondary affect of improving racial diversity, including consideration of socioeconomic status, academic proficiency levels, and parental educational attainment.

Many observers believe that the Court’s decision improved the legal landscape by lending much needed clarity to school integration law. Since 1999, school boards and communities had lived under a legal uncertainty as to whether integrated schools served a compelling governmental interest. In *PICS*, five Justices recognized that diversity and avoiding the harm of racial isolation is a compelling governmental interest, and Justice Kennedy’s controlling opinion underscored the Court’s support for pursuing this interest in race-conscious ways.

### Need To Analyze the Effects of Racial Isolation and Correlation with Economic Isolation

In the context of Justice Kennedy’s guidelines, we examine the effects of racial isolation. It is well known that both school-level characteristics and individual characteristics such as race and income impact student performance.

In 2008, Henry et al. considered the effects of racial isolation and other individual- and school-level variables on performance:

*“The distinction is subtle, but here we are considering the effects not of individual students’ backgrounds, but rather the effects of the overall percentage of low-income students in a school, above and beyond the effects of the characteristics of individual students. In other words, prior research indicates that even after taking into account the effects of poverty on individual students, having a **high concentration of low-income students within a school further depresses student learning outcomes in the school** [emphasis added]. In addition to poverty, other peer characteristics have been shown to influence student achievement.”*

# THE EFFECTS OF RACIALLY AND ECONOMICALLY ISOLATED SCHOOLS ON STUDENT PERFORMANCE

They found that the most pronounced effect was End of Grade test scores from the previous years (which begs the question, what influenced those scores?), followed by school resources (e.g. money spent on regular classroom instruction, teacher experience and quality), the schools' racial/ethnic and economic characteristics, and the race/ethnicity of the individual student. While our analysis confirms the findings of Henry et al. 2008, we took a step back and looked at the extent to which lack of diversity “further depresses” student performance in North Carolina, as well as the number of N.C. students negatively affected by the lack of diversity in their schools.

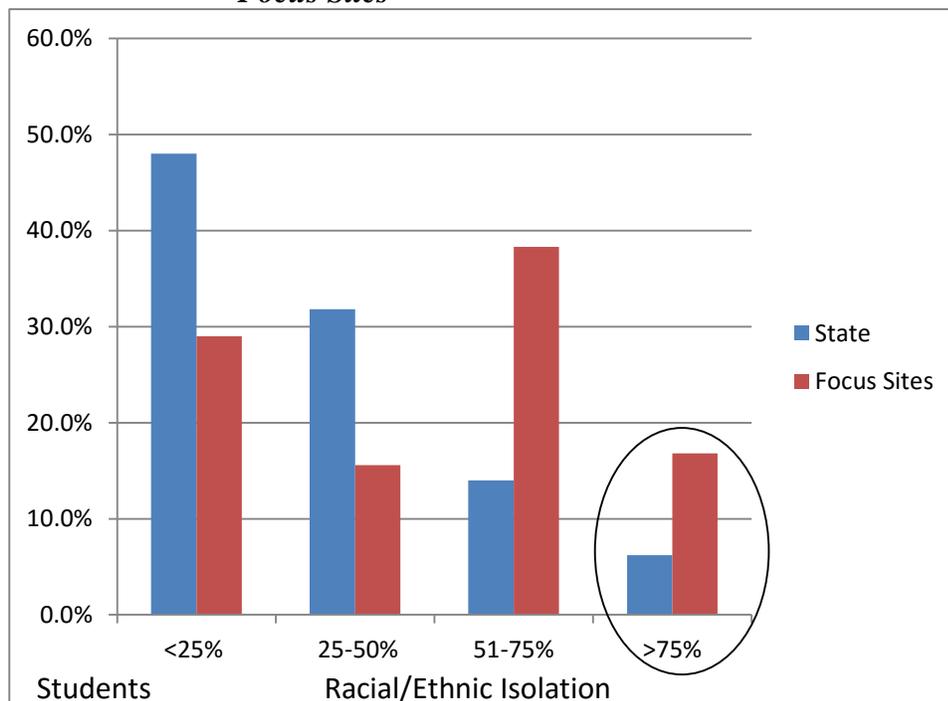
## Results

The results discussed here come from two different types of analyses: quartile and regression. Quartile statistics are purely descriptive, but are informative for illustrating trends. Regression allows us to control for socio-economic disadvantage and other variables.

***Finding 1. In many North Carolina districts, neighborhood schools do not necessitate the creation of racially isolated schools.***

We examined the universe of high schools across North Carolina, as well as a subset of counties where individual school systems reflected a high degree of segregation, selecting three counties to analyze. These Focus Sites include Pitt County, Wayne County, and Halifax County. These locations reflect sites with significant levels of racial and economic isolation at the high-school level. For purposes of our analysis, we considered a school racially isolated if student enrollment exceeded 75% Black students.

***Figure 1. Distribution of 9<sup>th</sup> Grade Students in Racially Isolated Schools in North Carolina and Focus Sites***



Data Source: NC DPI, 2006-2007; Graphic CGISC

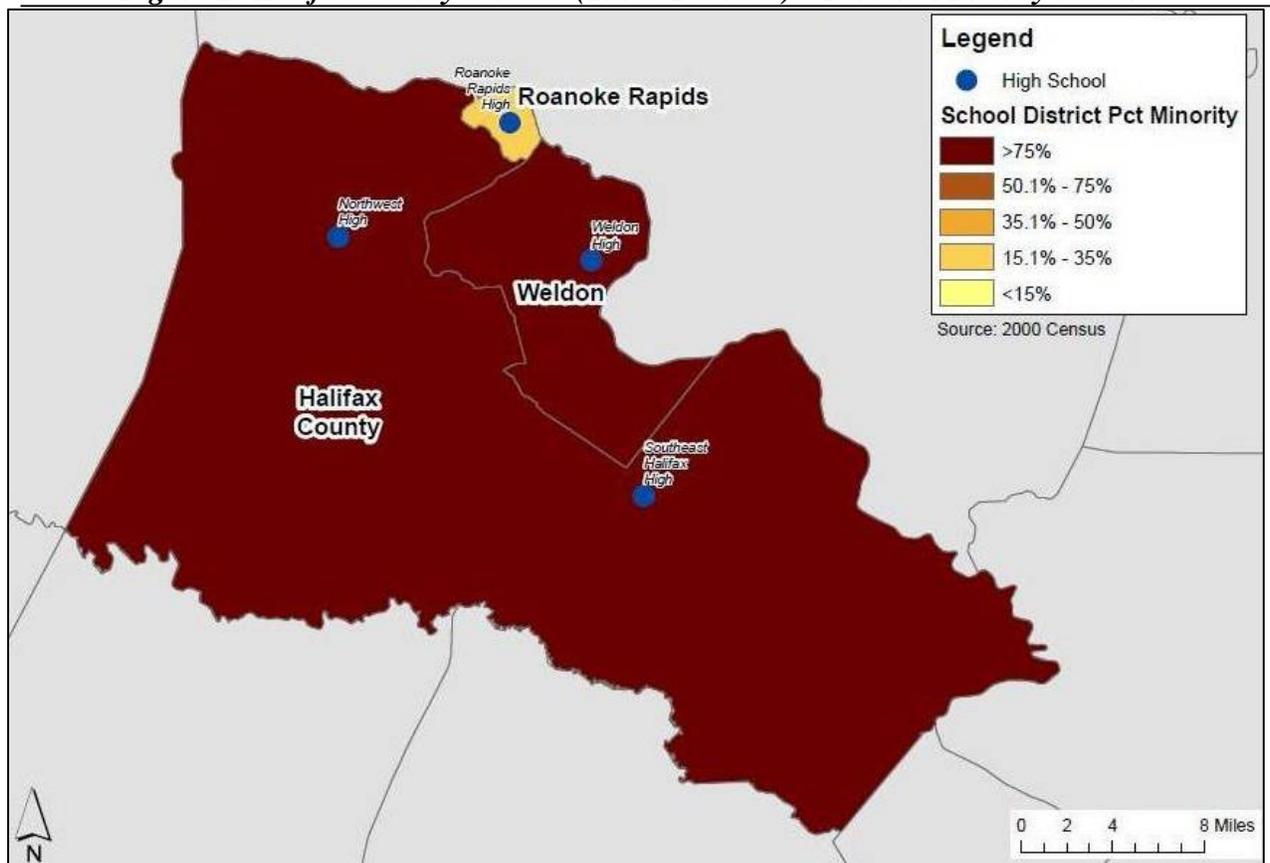
## THE EFFECTS OF RACIALLY AND ECONOMICALLY ISOLATED SCHOOLS ON STUDENT PERFORMANCE

While only approximately 25% of school-age children in North Carolina are Black,<sup>8</sup> the average Black 9<sup>th</sup> grader attends a school that is 46% Black. In the most severely racially isolated schools (those more than 75% Black), the mean Percent Black for high schools is 86%. While the Focus Site counties lie in eastern North Carolina and have a higher percentage of Black school-age children (41.8%),<sup>9</sup> the most segregated schools in these three counties average 93% Black.

This racial isolation is evident when we look closely at individual schools in these counties. For example, Wayne County schools are 44% White, but the system has one high school that is 80% White-non-Hispanic and one that is 99.4% minority.

While the majority of counties in North Carolina have a single, unified school system, Halifax County contains three school systems. The three systems (Halifax County Schools, Roanoke Rapids Graded School District, and Weldon City Schools) each operate unnecessarily racially isolated schools. Racial isolation in the high schools in each system in Halifax County is shown in Figure 2:

**Figure 2: Halifax County Schools (Three Districts) – Percent Minority Students**



Source: Halifax County data digitized by Tim Stallmann for CGISC

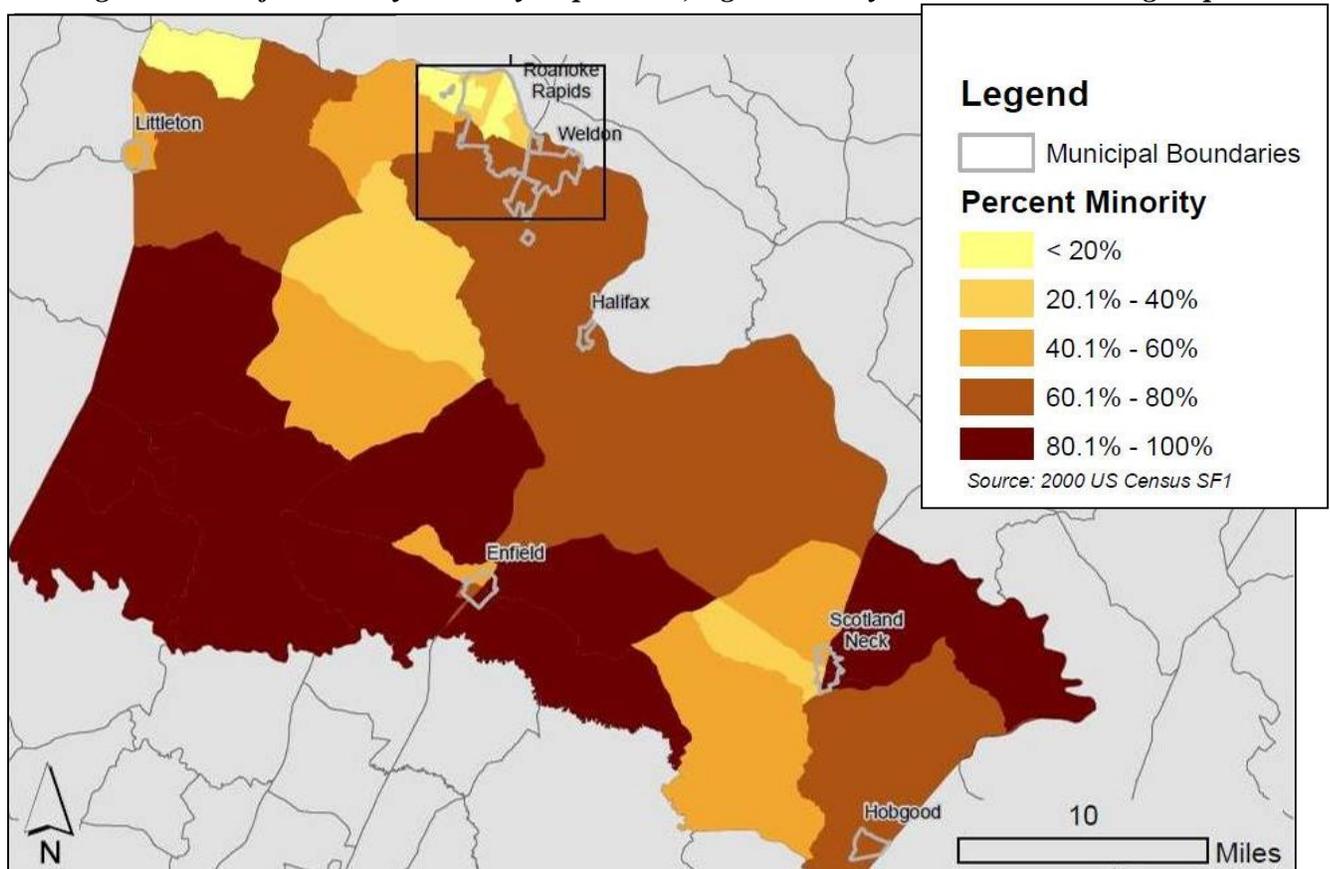
As shown in Figure 3, the population of Halifax County is significantly more balanced than the population of the student populations within the districts (Figure 3). Thus, these differences are not necessarily the result of residential patterns or “neighborhood schools.”

<sup>8</sup> 2006-2008 American Community Survey.

<sup>9</sup> 2006-2008 American Community Survey.

# THE EFFECTS OF RACIALLY AND ECONOMICALLY ISOLATED SCHOOLS ON STUDENT PERFORMANCE

Figure 3. Halifax County Minority Population, Ages 15-19 by Census 2000 Blockgroup

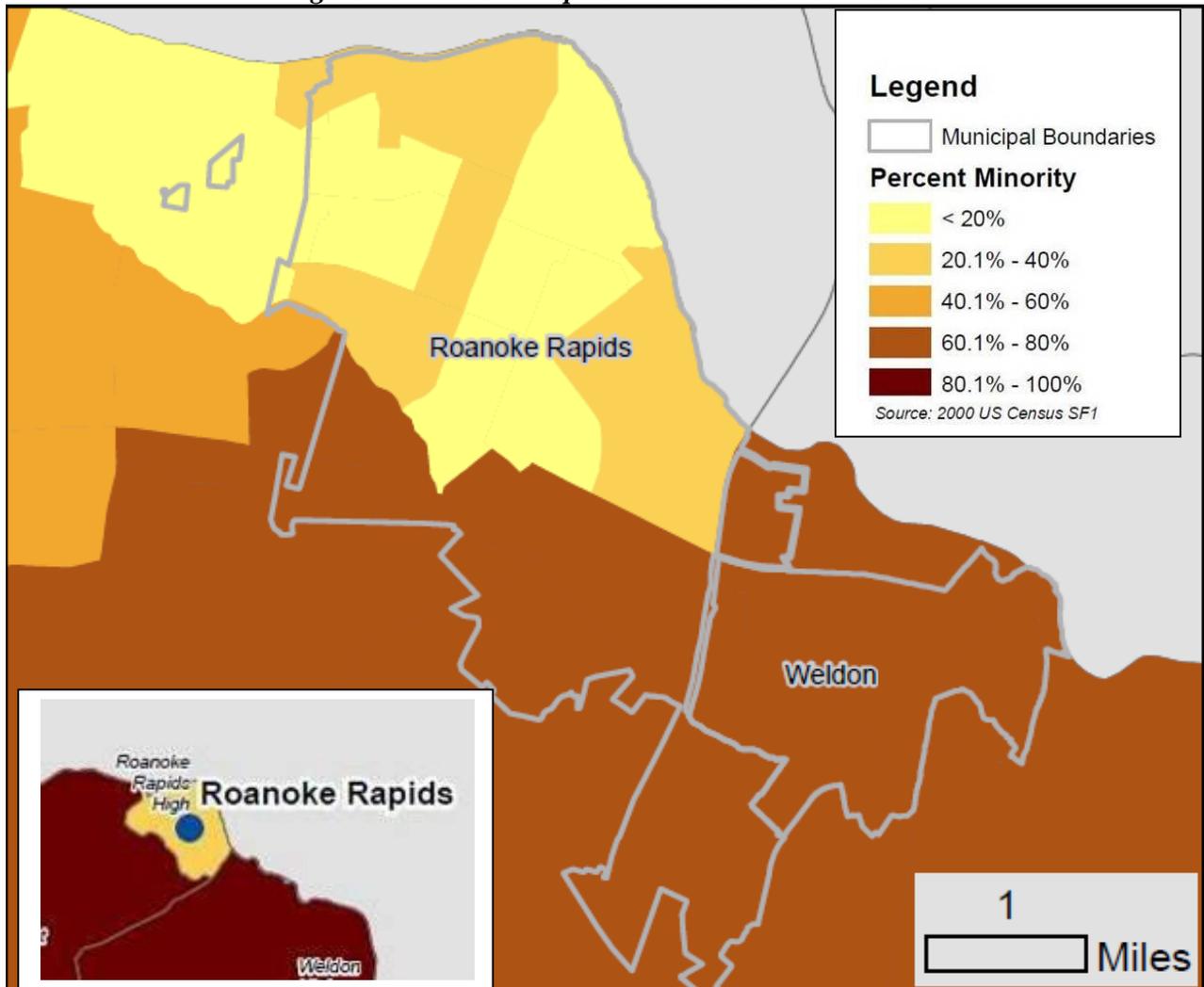


Source: Halifax County data digitized by Tim Stallmann for CGISC

As illustrated in Figure 4, the town of Roanoke Rapids and the Roanoke Rapids school district are not identical. The school district geography is much smaller and Whiter than the town population.

# THE EFFECTS OF RACIALLY AND ECONOMICALLY ISOLATED SCHOOLS ON STUDENT PERFORMANCE

*Figure 4. Roanoke Rapids: Town vs. School District*



Source: Halifax County data digitized by Tim Stallmann for CGISC

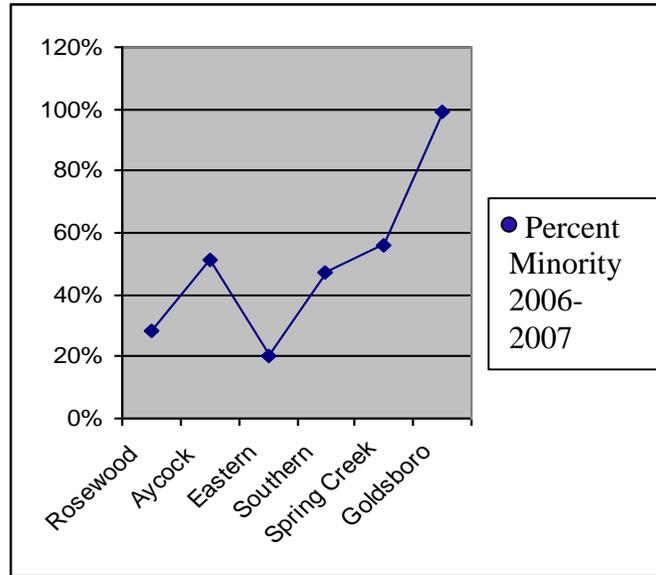
By allowing a district that is predominantly-White (e.g. Roanoke Rapids) to exist surrounded by two school districts that are predominantly-minority, Halifax County and the state have created a tipping point, causing a majority of White students in the majority-minority districts to opt out of their assigned schools. Students with the means to provide their own transportation to private schools (and charter schools, which function here as private schools) abandon the public schools, leaving them with higher proportions of minority students than the population warrants. As occurs in many small and homogeneous school systems, the transfer policies of the No Child Left Behind Act fail to rectify this situation. While Halifax schools have been declared “failing,” thereby allowing students to transfer to other “better” public schools (as defined by No Child Left Behind), there are no “better” public schools in the district. Thus, those who can, leave the county school system.

In Wayne County, which is 48% White-non-Hispanic, 87% of the County’s private school students are White. There are “better-performing” public schools in the district, but they are full, having already filled up with White students who were allowed to transfer. This has created schools that are Whiter than residential patterns would necessitate, and schools with severe levels of racial

## THE EFFECTS OF RACIALLY AND ECONOMICALLY ISOLATED SCHOOLS ON STUDENT PERFORMANCE

isolation (Goldsboro High School is 99.4% Black in a school system that is 44% White-non-Hispanic).

**Figure 5. Wayne County High Schools: Percent Minority**



Data Source: NC DPI, 2006-2007; Graphic CGISC

**Finding 2. More than 20% of North Carolina’s 9<sup>th</sup> Graders Attend Majority-Black Schools**

Just over 28% of the state’s children are Black,<sup>10</sup> yet our analysis of the 2007-2008 school-year data shows more than 20% of North Carolina 9<sup>th</sup> graders attended a school that is majority-Black.

**Table 1. Number of 9<sup>th</sup> Graders in “All Schools with 9<sup>th</sup> Grades” by Percent Black**

	<u>&lt;25%</u>	<u>25-50%</u>	<u>51-75%</u>	<u>≥75%</u>
Number of students (N = 134,646)	64,645	42,796	18,852	8,353

In our Focus Sites, 55% of 9<sup>th</sup> graders attend majority-Black schools, while 17% attend schools that are more than 75% Black:

**Table 2: Number of 9<sup>th</sup> Graders in Focus Site Schools with 9<sup>th</sup> Grades by Percent Black**

	<u>&lt;25%</u>	<u>25-50%</u>	<u>51-75%</u>	<u>≥75%</u>
Number of students (N=3,625)	1,531	818	2,000	879

<sup>10</sup> The mean for 9<sup>th</sup>-graders attending public high schools in North Carolina is higher (31%, see Appendix A Table 3), presumably because those who attend private schools are more likely to be White. As noted above, 87% of the Wayne County’s private school students are White.

## THE EFFECTS OF RACIALLY AND ECONOMICALLY ISOLATED SCHOOLS ON STUDENT PERFORMANCE

Not only do many students attend predominantly-Black schools, but the level of segregation in these schools is severe (see Table 3). In fact, 8,000 9<sup>th</sup> graders or 6% (this is 1 of every 16 9<sup>th</sup> graders) attended a school that is more than 75% Black. (The mean Percent-Black for these severely-segregated schools was 85% with 5% Latino, for a population that was at least 90% minority.) One of every twelve 9<sup>th</sup> graders attends a school that is more than 70% Black, and one of every eight attends a school that is more than 60% Black. This is all the more striking when one considers that a large portion of the state (the mountainous western third) is almost completely White.

**Table 3: Mean Percent of N.C. Black and Latino 9th Graders by School Percent Black**

	<u>&lt;25%</u>	<u>25-50%</u>	<u>51-75%</u>	<u>&gt;75%</u>
Number of students	64,645	42,796	18,852	8,353
Black %	12	38	60	86
Latino %	06	08	09	05

*(Note that the number of students discussed here reflects only 9<sup>th</sup> graders, the data for schools - Percent Black, Percent Poverty, and Teacher-qualification data - holds for all high school students in North Carolina and in our Focus Sites. Thus, many more thousands of students attend schools which are racially isolated than the numbers below indicate.)*

### ***Finding 3: Student Performance Declines in Racially Isolated Schools***

Racial and Economic isolation of schools has negative consequences for the academic performance of North Carolina students, as illustrated in Tables 4 and 5. Exam outcomes by quartiles for percent Black in schools are summarized in these tables. As the School’s Percent Black increases, average Algebra I and English exam scores decrease. Although the descriptive summaries below do not control for possible covariates, they illustrate the essential patterns found throughout this analysis – patterns which show that racial isolation is associated with lower average test scores.

As the schools become more racially isolated, mean End of Course scores decrease by 8 points for Algebra I and almost 7 points for English I.

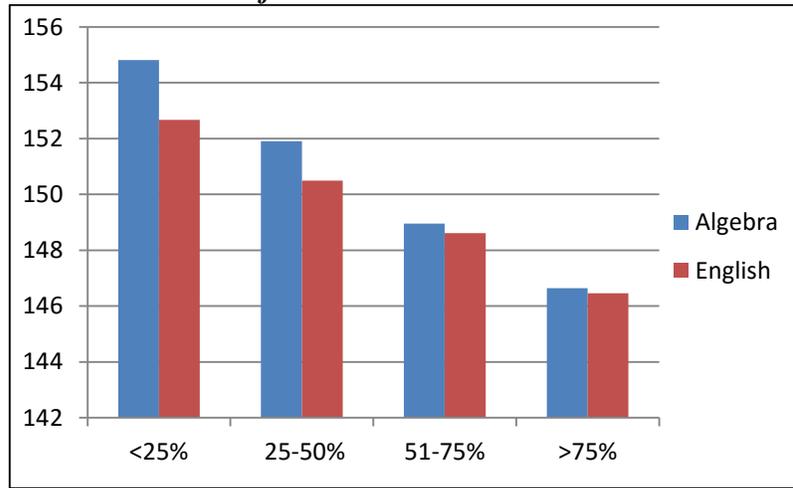
**Table 4. Mean End of Course Exam Scores by Percent Black of School for NC 9th Graders**

	<u>&lt;25%</u>	<u>25-50%</u>	<u>51-75%</u>	<u>&gt;75%</u>
N (students)	64,645	42,796	18,852	8,353
Algebra I	154.8	151.9	149.0	146.6
English	152.7	150.5	148.6	146.5
Black %	12	38	60	86

This effect of racial isolation on performance is illustrated in the graph below:

**THE EFFECTS OF RACIALLY AND ECONOMICALLY ISOLATED SCHOOLS ON STUDENT PERFORMANCE**

**Figure 6. Mean End of Course Exam Scores (All Students) by Percent Black of School for NC 9<sup>th</sup> Graders**



Data Source: NC DPI, 2006-2007; Graphic CGISC

Both Table 4 (the state as a whole), and Table 5 (Focus Sites) show exam scores differ by nearly six to eight points when comparing the lower two quartiles with the fourth quartile, to the disadvantage of those attending predominantly-Black schools.

**Table 5. Mean End of Course Exam Scores by Percent Black of School for North Carolina 9<sup>th</sup> Graders in Focus Site**

	<u>&lt;25% (1)</u>	<u>25-50%</u>	<u>51-75%</u>	<u>≥75%</u>
N (students)	1,531	818	2,000	879
Algebra I	151.6	154.6	150.5	145.1
English	151.9	150.1	145.0	144.6
Poverty %	31	47	44	67
Black %	21	45	56	93
Latino %	07	07	04	01

These findings corroborate a 2008 study by Henry et al., which found

*“higher concentrations of poor and minority students within a high school reduce average EOC scores. In other words, low-income students perform worse on EOC exams when they are in schools with high percentages of other low-income students. Additionally, ... a high percentage of African-American and American Indian students in a school also predict lower test scores.”*

**Finding 4. Differences Between Exam Score Means for Black and White Students Were Statistically Significant**

We conducted t-tests to examine the significance of our findings and found that the differences between White and Black students are statistically significant for both Algebra I and

**THE EFFECTS OF RACIALLY AND ECONOMICALLY ISOLATED SCHOOLS ON STUDENT PERFORMANCE**

English (see Tables 6 and 7). White students average nearly 155 on Algebra I while Black students average 148 points. For English, White students score approximately 153 while Black students score 147. (For both these exams, the range is 118-180.)

**Table 6. Two-Sample t test for Algebra I**

Group	Observations	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
White	59,130	154.78	.038	9.44	154.71	154.86
Black	22,934	147.79	.056	8.50	147.68	147.90
Difference		6.98	.071	6.84	7.12	

**Table 7. Two-Sample t test for English**

Group	Observations	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
White	74,345	152.90	.031	8.68	152.84	152.96
Black	32,106	147.11	.043	7.79	147.03	147.20
Difference		5.78	.056	5.67	5.89	

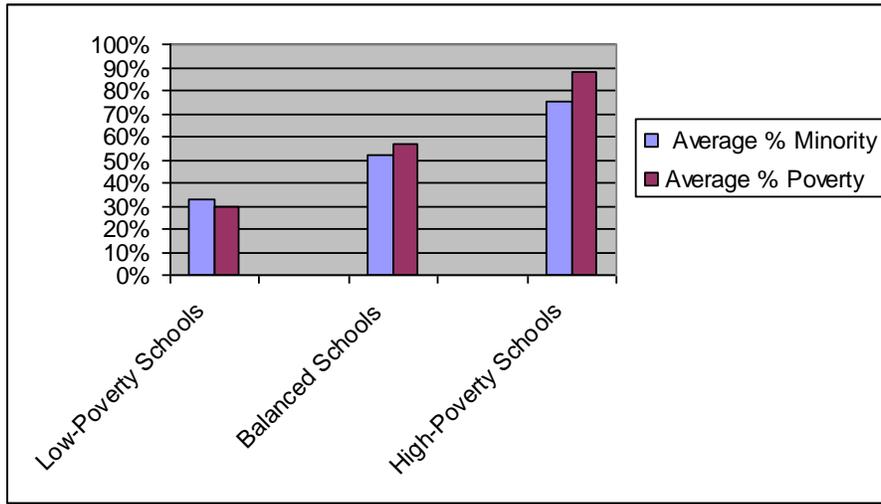
Note that while the differences in academic performance caused by any single factor are statistically significant, many of them are quite small on an absolute level. However, the associations are additive, and we cannot hope to increase student performance and close the achievement gap without examining and addressing all factors associated with that gap (see a discussion of the cost of closing the achievement gap, below).

***Finding 5: Racial Isolation is Associated with Economic Isolation***

Racial imbalance in schools is often associated with economic imbalance as measured by the percent poverty in a school (Poverty). This is illustrated by the linkage of racial and economic isolation in Wayne County schools:

# THE EFFECTS OF RACIALLY AND ECONOMICALLY ISOLATED SCHOOLS ON STUDENT PERFORMANCE

**Figure 7: Comparison of Racial and Economic Isolation in Wayne County Schools 2006-2007**



Data Source: NC DPI, 2006-2007; Graphic CGISC

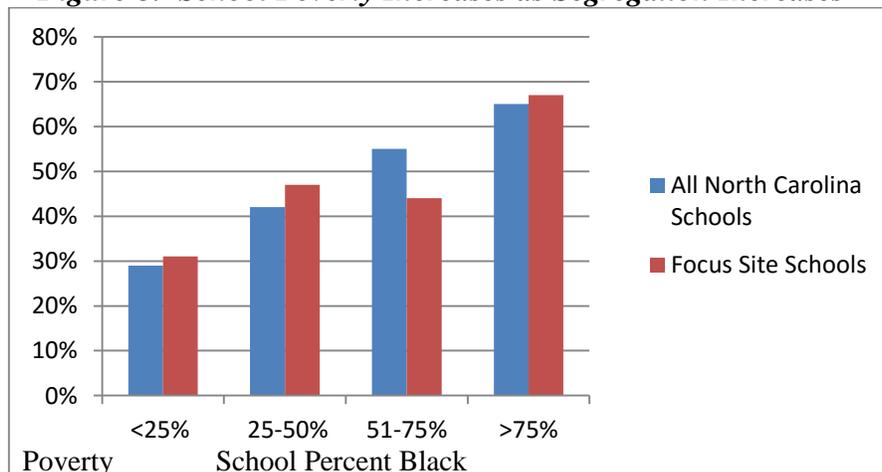
As illustrated by Figure 7, economic disadvantage increases as the degree of segregation increases. This trend holds for both the Focus Sites and for the state, as illustrated by Tables 5 and 8 and Figure 8:

Across the state, more than eight thousand 9<sup>th</sup> graders attend high schools that are more than 75% Black and more than 65% poor, with economic concentration paralleling racial concentration. However, the parallels diminish at the more racially balanced schools.

**Table 8. Percent Poverty Mean for Schools by Percent Black of School**

	<b>Percent Black</b>			
	<u>&lt;25%</u>	<u>25-50%</u>	<u>51-75%</u>	<u>&gt;75%</u>
North Carolina: N =	64,645	42,796	18,852	8,353
All North Carolina Schools	29%	42%	55%	65%
Focus Site Schools	31%	47%	44%	67%

**Figure 8: School Poverty Increases as Segregation Increases**



Data Source: NC DPI, 2006-2007; Graphic CGISC

## THE EFFECTS OF RACIALLY AND ECONOMICALLY ISOLATED SCHOOLS ON STUDENT PERFORMANCE

### *Finding 6: Economic Isolation Has a Negative Effect Distinct From the Individual Effect of Economic Disadvantage*

Not surprisingly, (school) Percent Poverty and (individual) Economic Disadvantage were closely aligned, as illustrated in the descriptive statistics:

**Table 9: Economic Isolation by Percent Black of School for N.C. 9<sup>th</sup> Graders**

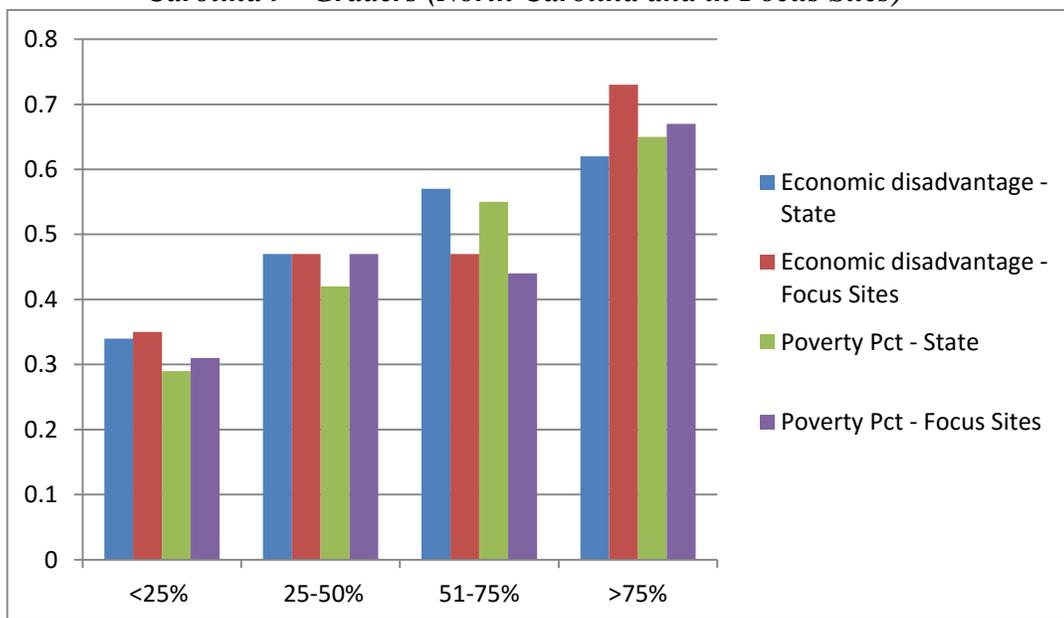
	<u>Percent Black</u>			
	<u>&lt;25%</u>	<u>25-50%</u>	<u>51-75%</u>	<u>&gt;75%</u>
N	64,645	42,796	18,852	8,353
Economic Disadvantage (individual)	.34	.47	.57	.62
Poverty % (mean for schools)	29%	42%	55	65%

We found a similar trend across the state and in the Focus Sites.

**Table 10: Economic Isolation by School % Black for North Carolina 9<sup>th</sup> Graders (Focus Sites)**

	<u>Percent Black</u>			
	<u>&lt;25% (1)</u>	<u>25-50%</u>	<u>51-75%</u>	<u>&gt;75%</u>
N	1,531	818	2,000	879
Economic Disadvantage	0.35	0.47	0.47	0.73
Poverty % (Mean for schools)	31%	47%	44%	67%

**Figure 9: Economic Isolation and Economic Disadvantage by % Black of School for North Carolina 9<sup>th</sup> Graders (North Carolina and in Focus Sites)**



Data Source: NC DPI, 2006-2007; Graphic CGISC

## THE EFFECTS OF RACIALLY AND ECONOMICALLY ISOLATED SCHOOLS ON STUDENT PERFORMANCE

Our analysis of the effect of Poverty in Schools on student performance is net of the effect of an individual student economic disadvantage (FRPL eligibility) and other variables (See Appendix A Tables 5 and 6). Ordinary Least Square and Multi-Level Modeling analysis found independent effects for Percent Poverty in Schools as well as for Economic Disadvantage of the individual student, both highly significant (.001). The largest effect was an average decrease of 3.41 points on English 1 exam scores for each 10% increase in School Poverty or economic isolation. This finding is discussed in more detail below.

### ***Finding 7: Economic Isolation Negatively Affects School Performance.***

Economic isolation (as measured by the % Poverty in a school) has a negative effect on the academic performance of all students in the school, after controlling for other variables including economic disadvantage of the individual student(s):

**Table 11: Performance and Economic Isolation by Percent Black of School N.C. 9<sup>th</sup> Graders**

	<b>Percent Black</b>			
	<u>&lt;25%</u>	<u>25-50%</u>	<u>51-75%</u>	<u>&gt;75%</u>
Algebra I (Mean Score)	154.8	151.9	149.0	146.6
English (Mean Score)	152.7	150.5	148.6	146.5
Poverty % (Mean for Schools)	29%	42%	55%	65%

**Table 12: Performance and Economic Isolation by School % Black for N.C. 9<sup>th</sup> Graders (Focus Sites)**

<b><u>Variable</u></b>	<b>Percent Black</b>			
	<u>&lt;25%</u>	<u>25-50%</u>	<u>51-75%</u>	<u>&gt;75%</u>
Algebra I (Mean Score)	151.6	154.6	150.5	145.1
English (Mean Score)	151.9	150.1	150.0	144.6
Poverty % (Schools)	31%	47%	44%	67%

These adverse effects are shown by the descriptive statistics above and confirmed by both the OLS and MLM models. The OLS model indicates greater poverty is associated with lower performance, all else equal (a reduction of 2.13 points for Algebra I and 4.2 for English, at a significance level of .001). In the MLM analysis, the effect is slightly smaller but still shows significantly lower scores (a reduction of 1.81 in Algebra I and 3.41 in English, significant at the .05 and .001 levels, respectively). See Appendix A Tables 5 and 6.

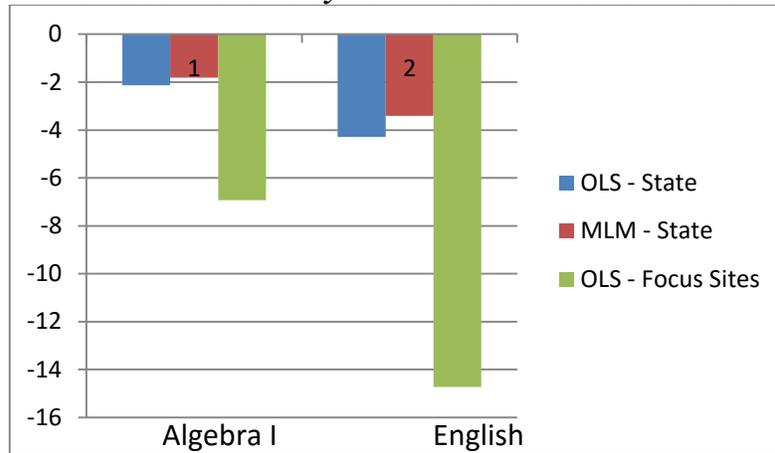
**Table 13: Decrease in Scores by 10% Increase in School Percent Poverty**

<b><u>Model</u></b>	<b><u>Algebra I I</u></b>	<b><u>English I</u></b>
OLS - State	-2.13	-4.28
MLM - State	-1.81	-3.41
OLS - Focus Sites	-6.93	-14.72
MLM - Focus Sites	N/A*	N/A

\* = not statistically significant

## THE EFFECTS OF RACIALLY AND ECONOMICALLY ISOLATED SCHOOLS ON STUDENT PERFORMANCE

**Figure 10: Decrease in Scores by 10% Increase in School Percent Poverty**



Data Source: NC DPI, 2006-2007; Graphic CGISC

While the results of the methods vary (this is discussed in more detail below), the trend is clear, and the depressive effect of economic isolation on performance at the Focus Sites is stark. OLS analysis showed a 10% increase in Percent Poverty in schools associated with a decrease of 6.93 points (significance .05) on the Algebra I End of Course Exam and 14.72 points (significance .001) on the English 1 End of Course exam.

These findings confirm those of the US Department of Education, which found:

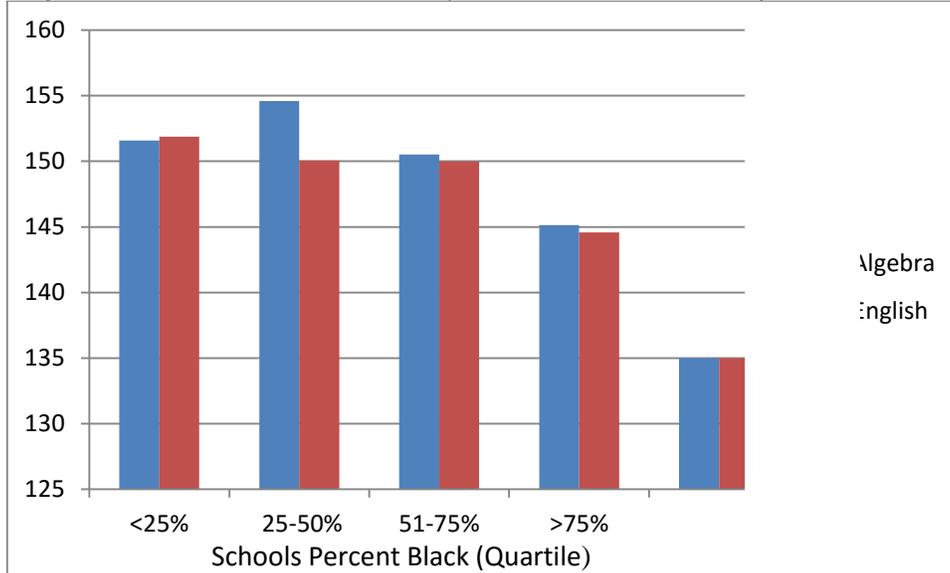
*...the level of poverty schoolwide also has an effect on an individual student's achievement--whether or not that student is in poverty. Research shows that test scores of all students, both poor and non-poor, decline as they are in schools with increasing numbers of fellow students in poverty. The U.S. Department of Education's Prospects report (Puma, Jones, Rock & Fernandez, 1993) finds that even though non-poor students perform consistently better than their low-income classmates, the performance of non-poor students nevertheless declines as the proportion of their classmates below the poverty line increases.... Overall, the report finds that "students in low-poverty schools score from 50 to 75 percent higher in reading and math than students in high-poverty schools" (Puma et al., 1993). Further, the report finds a "tipping point" of sorts, where school poverty begins to seriously effect student performance. "School poverty depresses scores of all students in schools where at least half the children are eligible for subsidized lunch and seriously depresses the scores when more than 75 percent of students live in low income households" (Puma et al., 1993). [Emphasis added] (Stone et al. 1999)*

### ***Finding 8: In Focus Sites, Students in Racially Balanced Schools Perform Better.***

In the Focus Sites, students in racially balanced schools performed significantly better on Algebra I exams than students in racially isolated schools.

**THE EFFECTS OF RACIALLY AND ECONOMICALLY ISOLATED SCHOOLS ON STUDENT PERFORMANCE**

**Figure 11: Mean Exam Scores by School Percent Black for Focus Sites**



Data Source: NC DPI, 2006-2007; Graphic CGISC

**Finding 9: Predominantly-Black Schools Have a Lower Percentage of Qualified Teachers.**

Teacher qualifications are known to have a major effect on student success, and racially isolated and economically isolated schools tend to have teachers who have less experience and lower levels of credentials or training, especially in the area of licensure. A 2005 study (Ladd et al.) which also reviewed North Carolina Department of Public Instruction data determined that

*“in any grade, a black student in North Carolina is more likely than a white student to be taught by a novice teacher. For example, a typical black 7<sup>th</sup> grader is 54% more likely to have a novice teacher in math than a white 7<sup>th</sup> grader, and is 38% more likely to have a novice teacher in English than a white student.”*

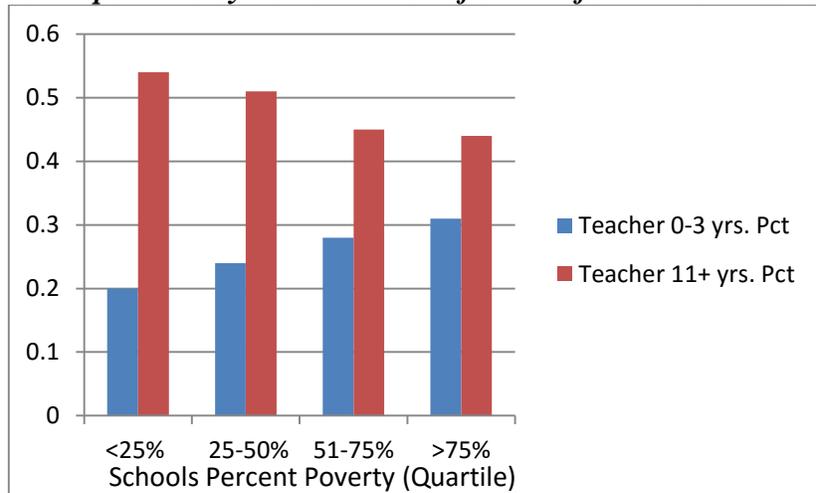
Our findings show a disparity remained in 2007-08. Across the state, Black 9<sup>th</sup> graders are more likely to attend a school with inexperienced teachers than White students. Similarly, Black students are less likely to attend a school with experienced teachers than White students. The disparity is more severe at the most segregated schools. As illustrated in Table 14 and Figure 11, NC 9<sup>th</sup> graders who attend schools which are more than 75% Black are less likely to be taught by experienced teachers, and fifty percent more likely to be taught by the most inexperienced teachers than the predominantly-White schools. The trend is similar in Focus Sites schools.

**Table 14. Mean Teacher Experience, Education and Licensure by Percent Black of School**

<u>Variable</u>	<u>Percent Black</u>			
	<u>&lt;25%</u>	<u>25-50%</u>	<u>51-75%</u>	<u>&gt;75%</u>
Teacher 0-3 Yrs. %, NC	20%	24%	28%	31%
Teacher 0-3 Yrs, %, Focus Sites	21%	16%	27%	31%
Teacher 11+ Yrs. %, NC	54%	51%	45%	44%
Teacher 11+ Yrs %, Focus Sites	55%	62%	47%	48%

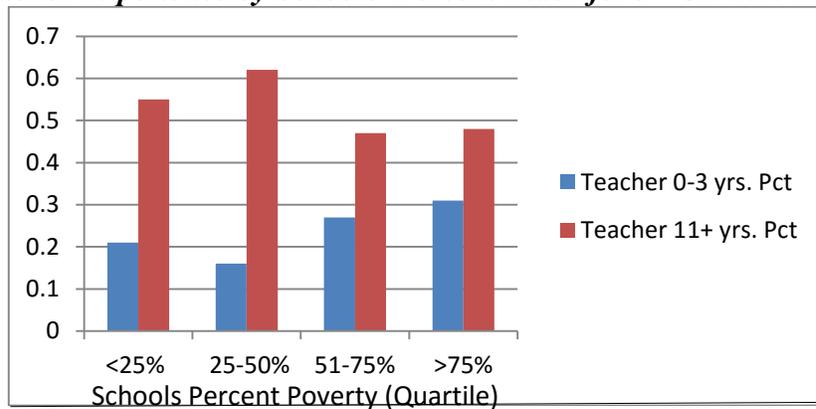
## THE EFFECTS OF RACIALLY AND ECONOMICALLY ISOLATED SCHOOLS ON STUDENT PERFORMANCE

**Figure 12. Teacher Experience by Percent Black of School for All North Carolina 9<sup>th</sup> Graders**



Data Source: NC DPI, 2006-2007; Graphic CGISC

**Figure 13: Teacher Experience by Schools' Percent Black for 9<sup>th</sup> Graders in Focus Sites**



Data Source: NC DPI, 2006-2007; Graphic CGISC

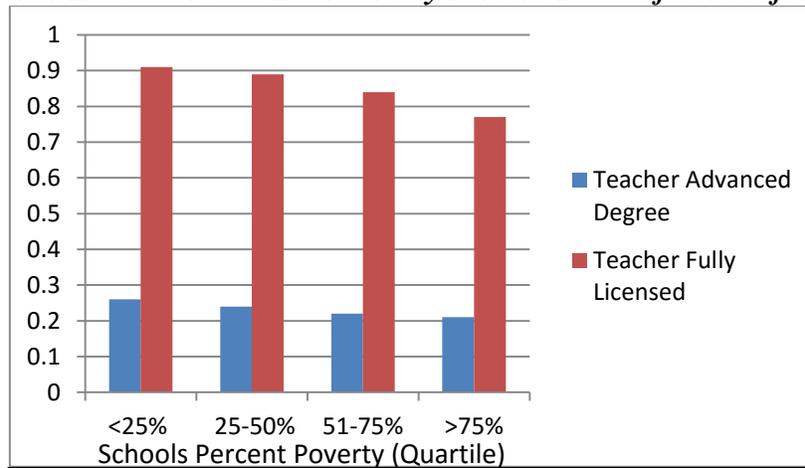
In North Carolina, teachers may teach while they are working toward certification. As such, they may be lateral entry temporarily licensed, or provisionally licensed. We analyzed the effect of a schools' percentage of fully-licensed teachers on academic performance, as compared to the percentage of teachers who are not fully-licensed. We also looked at the percentage of teachers holding advanced degrees as a school-level variable. We found that predominantly-Black schools are significantly less likely to have teachers who are fully-licensed, and significantly less likely to have teachers with advanced degrees. Students in schools that are predominantly-White are almost 20% more likely to have a teacher in any single class who is fully licensed than students in predominantly-Black schools. Students in schools that are predominantly-White are almost 24% more likely to have a teacher who has an advanced degree (in any single class) than students in predominantly-Black schools. And the trend is consistent for each quartile in the analysis.

**THE EFFECTS OF RACIALLY AND ECONOMICALLY ISOLATED SCHOOLS ON STUDENT PERFORMANCE**

**Table 15: Teacher Licensure and Education (Mean) by Percent Black of School for NC 9<sup>th</sup> Graders**

<b>Variable</b>	<b>Percent Black</b>			
	<b>&lt;25% (1)</b>	<b>25-50%</b>	<b>51-75%</b>	<b>&gt;75%</b>
% Teacher Fully Licensed NC	91%	89%	84%	77%
Focus Sites	93%	95%	90%	73%
% Teacher Advanced Degree	26%	24%	22%	21%
Focus Sites	18%	23%	25%	17%

**Figure 14. Teacher Education and Licensure by Percent Black of School for NC 9<sup>th</sup> Graders**



Data Source: NC DPI, 2006-2007; Graphic CGISC

These results show that racially isolated schools have fewer fully-licensed teachers and teachers with advanced degrees across the state and in the Focus Sites. More than ¼ of teachers in the most racially isolated schools (>75% Black) are not fully-licensed. In addition, only 17% of teachers in these schools have advanced degrees.

**Finding 10: Schools with High Levels of Teachers with Full Licensure or Advanced Degrees Have a Positive Effect on Student Performance**

MLM analysis shows fully-licensed teachers and teachers with advanced degrees can significantly improve student performance by as much as 5.07 points for Algebra I and 3.24 points for English (see Appendix A).

**Table 16. Effect on Performance of Teachers with Advanced Degrees**

	<b>Math</b>	<b>English</b>
OLS - NC	4.93***	5.64***
MLM -NC	2.50 +	4.36 ***
OLS – Focus Sites	28.21 ***	not significant
MLM – Focus Sites	45.32**	not significant
Significance levels:	+ .10	* .05    ** .01    *** .001

## THE EFFECTS OF RACIALLY AND ECONOMICALLY ISOLATED SCHOOLS ON STUDENT PERFORMANCE

This means that as the percentage of teachers with advanced degrees increases, scores increase. For example, a 10% increase in teachers with advanced degree at a school would increase the average 9<sup>th</sup> grader’s Math score by approximately half a point, with similar changes in the English score. Note that in this case, “Advanced Degree” does not necessarily indicate that the degree is in the subject taught. Research indicates that having a degree in the subject taught further increases scores. Results regarding the effect of fully-licensed teachers are similar for Algebra I and somewhat smaller for English I, but both are significant.

**Table 17. Effect on Performance of Fully-Licensed Teachers for N.C. 9<sup>th</sup> Graders**

	<b>Math</b>	<b>English</b>
OLS - NC	4.17***	1.17*
MLM - NC	5.07 *	3.24 ***

These findings corroborate the High School Resource Allocation Study (Henry et al., 2008), which found that teachers with temporary, provisional, or emergency licenses are associated with lower EOC scores.

***Finding 11: The Disparity in Teacher Licensure and Teachers with Advanced Degrees at Racially Isolated Schools has a Significantly Disparate Impact.***

Both across the state and in the Focus Sites, fewer than 10% of teachers in predominantly-White schools are not fully-licensed, contrasted with approximately ¼ of the teachers in the predominantly-Black. The disparity is even greater at the Focus Sites. Similarly, the most segregated schools have 20% fewer teachers with advanced degrees than the state’s predominantly-White schools. The effect of these inequitable resources on test scores is statistically significant (see Appendix A). ***As teacher training is one of the most effective ways to increase student performance, the lack of such resources in these schools has a significantly disparate impact.***

***Finding 12: Children in Predominantly-Black Schools are Less Likely to be Designated Gifted***

One method for raising achievement of students regardless of the school community is to identify those children who are academically-gifted and nurture them with additional instruction and enrichment. Yet according to the National Research Council (2002), “disproportionately-low numbers of African-Americans, Hispanics, and American Indians have been designated as gifted.”<sup>11</sup> Racial disparities in Gifted and talented education programs enrollment are

*“drastic and persistent. In 2000, Black students accounted for about seventeen-percent of the nation’s public school students, but were only eight-percent of the GATE population. Disparity in enrollment rates persists for racial groups even when controlling for socio-economic status.”<sup>12</sup>*

<sup>11</sup> National Academy of Sciences, “Minority Students in Special and Gifted Education,” Committee on Representation of Minority Children in Special Education and Gifted Programs, Division of Behavioral and Social Sciences and Education. 2002. National Academy Press.

<sup>12</sup> Loftis, Kenyatha. "Creating a Gifted Class: How Restructuring Parent-District Relationships Affects Access to Elite Educational Opportunities" Paper presented at the annual meeting of the National Conference of Black Political Scientists, Inc. 39th Annual Meeting, Allegro Hotel, Chicago, Illinois, Mar 19, 2008.

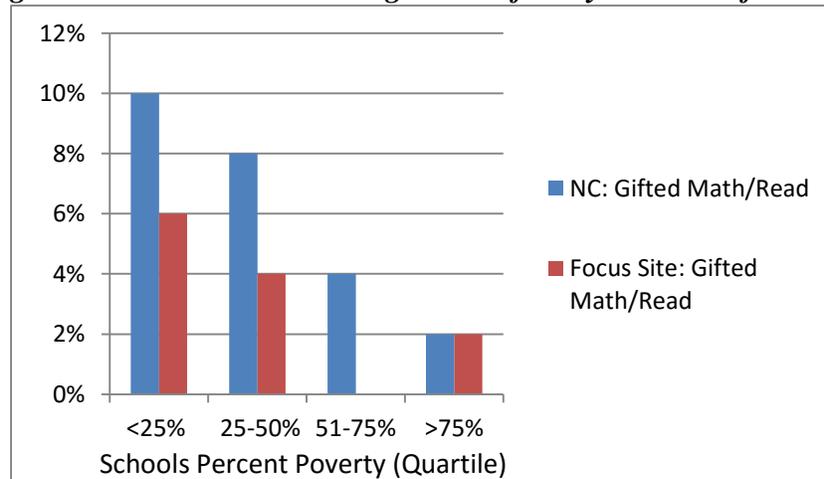
## THE EFFECTS OF RACIALLY AND ECONOMICALLY ISOLATED SCHOOLS ON STUDENT PERFORMANCE

While this national study showed Black students were under-represented by about 50%, the disparity is even greater in North Carolina’s predominantly-Black schools and in the Focus Sites. Across the state, schools which are >75% Black have only ¼ as many students designated as gifted as racially balanced schools. In the Focus Sites, schools which are >75% Black have 1/3 the percentage of students designated as gifted as predominantly-White schools.

**Table 18. Mean Percent Designated Gifted by Percent Black of School**

<u>Variable</u>	<u>Percent Black</u>			
	<u>&lt;25%</u>	<u>25-50%</u>	<u>51-75%</u>	<u>&gt;75%</u>
% Gifted Math/Reading: NC	10	08	04	02
% Gifted Math/Reading: Focus Sites	06	04	00	02

**Figure 15. Mean Percent Designated Gifted by % Black of School**



Data Source: NC DPI, 2006-2007; Graphic CGISC

As the National Research Council (2002) notes, “These [high-poverty, predominantly-minority] schools are less likely to offer advanced courses for their students, providing less support for high academic achievement.” The Council asked, “Does special education and gifted education provide a benefit to students, and is that benefit different for different racial/ ethnic groups?” But it lacked the data to answer the question. Teachers tend to designate as “gifted” students who are already successful in school, and the Council found that high-poverty students were more likely to need interventions prior to reaching high school. The Council concluded, “What evidence there is suggests that parent advocacy and teacher instruction and experience, both of which would be expected to correlate with higher-quality interventions, are less likely to happen in higher-poverty school districts where minority children are concentrated.”

## THE EFFECTS OF RACIALLY AND ECONOMICALLY ISOLATED SCHOOLS ON STUDENT PERFORMANCE

### ***Finding 13: Alternative Schools are Much More Likely to be Racially Isolated Schools***

Since the 1975 Individuals with Disabilities Education Act required all schools meet the learning needs of disabled students,

*...disproportionately large numbers of children in some racial and ethnic groups have been identified with disability labels and placed in special ed programs. The labels are intended to identify those who need extra educational support, but identification also may bring lowered expectations from teachers and others...the nature of classroom instruction and a school's environment also plays a prominent role in influencing learning and behavior.*

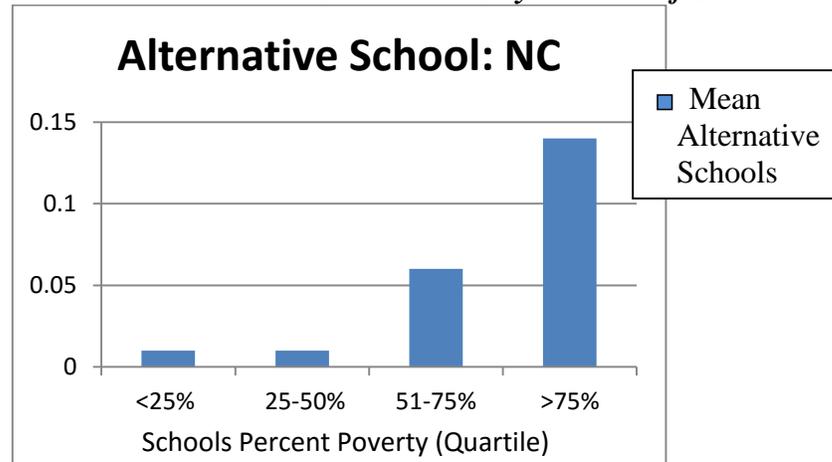
- National Research Council, 2002

According to the North Carolina Department of Public Instruction (2000), Alternative Learning Programs (ALPs) “are defined as services for students at risk of truancy, academic failure, behavior problems, and/or dropping out of school.” In 2000, there were more than 190 alternative schools serving grades 9-12 and more than 220 serving grades 6-12. Local school boards have the ultimate authority for student assignment to these ALPs. This study found that these alternative schools in North Carolina are significantly more likely to be >75% Black.

***Table 19: Mean Alternative School by Percent Black of School***

<u>Variable</u>	<u>&lt;25%</u>	<u>25-50%</u>	<u>51-75%</u>	<u>&gt;75%</u>
Alternative School: NC	01	01	06	14

***Figure 16. Mean Alternative School in NC by % Black of School***



Data Source: NC DPI, 2006-2007; Graphic CGISC

There may be many explanations for this concentration of Blacks in Alternative Schools. For instance, the No Child Left Behind law puts great pressure on school districts to meet state test score standards for each racial/ethnic groups in a school. Because students in poverty and in minority groups are less likely to meet the state standard, schools and districts with a large concentration of poor and minority students are more likely to fail. As a result, there may be increasing pressure from superintendents, principals, and parents to keep poor and minority students

## THE EFFECTS OF RACIALLY AND ECONOMICALLY ISOLATED SCHOOLS ON STUDENT PERFORMANCE

out. Whatever the factors working to cause this phenomenon, this concentration of Black students in alternative schools means three things:

- 1) Blacks are disproportionately more likely to be sent to alternative schools;
- 2) Students at these schools suffer the detrimental effects accruing from attending a racially isolated school (discussed above); and
- 3) Students at these schools suffer the detrimental effects discussed below.

The success of any school or program, especially ones involving students at risk for academic or behavior problems, depends heavily on a qualified, caring faculty which is well trained. According to the Department of Public Instruction’s 2000 study, teachers in ALPs are more likely to be inexperienced in general, as well as inexperienced in the ALP setting. They are also more likely to be overworked: about 10% reported they work full-time in a regular school and part-time in the ALP in the evening. Some must teach with divided attention: 5% teach part-time in the ALP and part-time in a regular school.

Many ALP teachers teach subjects for which they are not licensed. About 40% of ALP teachers teach one or more subjects in which they are not licensed; 8% are licensed in less than 50% of subjects taught; 11% are not licensed in *any* subjects taught. Perhaps most importantly, many teachers of core subjects are not licensed in those subjects.

---

**Table 20. Specific Subjects Are Being Taught Without Licensure in Subject Taught**

---

<u>Subject</u>	<u>Frequency</u>	<u>Percent</u>
Math	81	21
Science	77	20
English/Language Arts	61	16
Social Studies	45	12
Reading	26	7
PE/Health	25	6
History	18	5
Computer	19	5
Geography	10	3
Art	7	2
Creative Writing	7	2
Family & Consumer Science	9	2
Drama	2	.5
Foreign Language	2	.5

---

ALP teachers frequently teach students of multiple grade levels within a single class period.

*“The number of different grade levels reported within one class ranged from 1 to 12. Ninety-four percent of ALP teachers reported having students from one to four different grade levels within a single class period. Of those, fifty-four percent had three or four different grade levels represented within a single class period. Thus, at least half the teachers have several grade levels at one time.”*

Additionally, 45% of ALP teachers teach different subjects – up to nine subjects – within a given class period.

**THE EFFECTS OF RACIALLY AND ECONOMICALLY ISOLATED SCHOOLS ON STUDENT PERFORMANCE**

*“Nearly twenty five percent reported teaching two subjects, and an additional ten percent reported teaching three subjects during a class period.... about ten percent of ALP teachers teach four or more subjects within a given class period.”*

MLM analysis indicates that attending an alternative school - *after* controlling for the effects of teachers who are not fully-licensed, teachers without advanced degrees, and schools that are high-poverty and predominantly-Black – significantly depresses Algebra I scores by 6.12 points and English I scores by 4.19 points (.001 confidence interval).

In spite of all these handicaps, only 66% of high school ALP teachers reported that the instructional level of most of their students was below grade level. This means that 34% reported that most of their students were performing at grade level or above. These facts raise the question: why are these students assigned to alternative schools?

If a large group of ALP students are assigned to these programs not because they are failing but because they are “at risk,” then ALP teachers require training to deal with issues involved with “at-risk” students. Surveyed concerning barriers to optimal effectiveness of program, 35% of responding ALP teachers listed students’ lack of motivation, disruptive behavior, and “poor attitude.” Yet – as noted in red in the table below - DPI’s 2000 report indicated that most teachers reported very little training in these or other relevant areas:

**Table 21. Extent to Which Teachers Have Not Had Helpful Training in Specific Topics**

<u>Areas of Helpful Training</u>	<u>Percent</u>
Discipline and behavior management	41
Instructional methods/strategies to accommodate diverse learning styles	44
Working with varying academic levels	47
Teaching through group discussion	50
Conflict resolution	50
Building teams and working collaboratively	50
Teaching social skills	52
Peer mediation	53
Strategies for working with students who are unmotivated and low achieving	59
Teaching basic literacy skills in reading, writing, math to older students	59
Working with students with disabilities	60
Instructional methods/strategies to accelerate learning	60
Service learning	62
Strategies to involve parents	63
Using technology to fullest extent	63
Strategies to help students who do not pass the competency requirement	65
Working with suspended and expelled youth	65
Experiential methods to educate students	66
Strategies to help students who score below Level 3 on state tests	67
Working with adjudicated youth	70
Working with students with unstable home environments	70
Working with community agencies to provide/improve services for ALP students	74
Working with neglected or abused children	75
Working with students who are abusing substances	76
Working with students returning from state institutions	79

## THE EFFECTS OF RACIALLY AND ECONOMICALLY ISOLATED SCHOOLS ON STUDENT PERFORMANCE

Because of the lack of qualified resources devoted to students and other problems associated with alternative schools, the National Research Council (2002) has recommended that

*“educators should be required to first provide them with high-quality instruction and social support in a regular setting before determining whether special services are needed [in order to] make sure that minority students who are poorly prepared for school are not assigned to special education for that reason.”*

When such schools are also segregated, students suffer the penalties associated with such isolation, as well as the stigma and very real penalties associated with alternative schools. The reauthorized Individuals with Disabilities Education Act requires that states ensure that personnel receive appropriate and adequate training to meet the learning needs of their special education students. In the North Carolina’s most segregated schools, there is a significant disparity in the state’s ability to meet this mandate.

### ***Finding 14: Racial and Economic Isolation Costs Money and Opportunity***

Henry et al. (2008) discuss the costs of solutions to address the problems of low-performing schools, including

*“extra funds to high schools that serve higher concentrations of students living in poverty.... Increasing expenditures for regular instruction – especially increasing compensation in order to recruit and retain more effective teachers – appears likely to produce performance improvements. An increase of expenditures for regular instruction of \$1,000 per student could improve average EOC scores in a high school by about 1 point – one fifth of the difference between average scores in the state’s lowest and highest-performing high schools.”*

It is possible to assign a dollar amount to the cost of racially and economically isolated schools. If we add the loss in academic performance associated with racially and economically isolated schools, and multiply by the cost of increasing average EOC scores by 1 point, we can approximate what it would cost to offset the penalty of attending these schools. As an example, Goldsboro High School is 99.4% Black in a School System that is 44% White-non-Hispanic,<sup>13</sup> for a difference of 55 percentage points. As we have seen above, Algebra I scores decrease .229 points for every 10% more racially isolated a school is (see Appendix A Table 5). Thus, the performance penalty for attending Goldsboro High School (as opposed to a Wayne County high school which was racially balanced) equals approximately  $5.5 \times .23$  or 1.26 points – all else equal – due solely to the fact that Goldsboro High is severely segregated.

This must then be added to the cost of attending a school that is also economically isolated, like Goldsboro High School. The total percentage of children in Wayne County enrolled in the FRPL program in 2007 was 65.8%,<sup>14</sup> while Goldsboro High School’s FRPL enrollment is 81%, for a

---

<sup>13</sup> This percentage would be higher if not for the County’s large Private School attendance, which is 87% White.

<sup>14</sup> Kids Count Data Center, Anna E. Casey Foundation, <http://datacenter.kidscount.org/data/bystate/Map.aspx?state=NC&ind=2239> accessed 1/11/10.

## THE EFFECTS OF RACIALLY AND ECONOMICALLY ISOLATED SCHOOLS ON STUDENT PERFORMANCE

difference of 15 percentage points. As shown above, Algebra I scores decrease .229 points for every 10% more racially isolated a school is, for a penalty of  $1.5 * .213$  or .32 points. Therefore, the per-pupil penalty associated with such attending Goldsboro High School is 1.26 points + .32 points, for deficit of 1.58 points on the End of Course Algebra I exam. Using a cost of \$1,000 per point (Henry et al. 2008) to increase average EOC scores by 1 point, we can assign a cost for racial and economic segregation of  $\$1,000 \times 1.58$  points, or \$1,580 per student. As Goldsboro High School has 616 students (2007-2008), this equals \$970,000. This is the approximate cost of the academic disadvantage of attending Goldsboro High School because of its racial and economic isolation. That cost would have to be multiplied many times over to cover the costs of the penalty paid by the thousands of students attending North Carolina's racially isolated schools.

While this example only illustrates the cost of racial and economic isolation at one school, our findings in the Focus Sites indicate that the pattern appears to hold for other isolated schools. As described above, OLS analysis of academic performance in the Focus Sites showed a 10% increase in Percent Poverty in schools associated with a decrease of .693 points (significance .05) on the Algebra I End of Course Exam and 1.47 points (significance .001) on the English 1 End of Course exam.

In addition, there are other costs of attending racially and economically isolated schools, such as the independent performance costs associated with attending a school which has lower rates of licensed teachers (see Appendix A Tables 5 and 6), as well as other costs not considered here (e.g. higher dropout rates, the cost of increased teacher turnover, and the well-documented social costs associated with lack of success in school, etc.).

In many instances, these are costs that school systems volunteer for, as their residential patterns do not require segregation. Moreover, these are costs that are being born by everyone – in part by some additional funds paid to low-performing schools and schools with higher numbers of low-income students,<sup>15</sup> and in part by the costs to society of not educating our children to succeed in a global economy. These costs are incurred daily, and are felt for generations as a narrowing of opportunity. Over the long-term, they include lost wages (Sclafani, 2005), a culture of school failure, and community instability. More immediate, short-term losses include:

- Less student academic success;
- Monies spent to increase student performance (Henry et al. 2008);
- Higher teacher turnover, the costs associated with training new teachers, and poorer performance from the necessity of using inexperienced teachers.

But primarily, these are costs paid by the student who attends a racially or economically isolated school – the moment that student steps across the school's threshold.

### ***Finding 15: Black Student by Percent Black in School Variable Interaction Unclear***

The combined effects of students' individual characteristics and the overall composition of a high school's student population are extremely powerful influences on the average level of academic performance in that school. We included an interaction effect for Black students and percentage Black in the schools. At the state level, this interaction has no significant effect on the

---

<sup>15</sup> "On average, Low Performing and Priority high schools are spending about \$105 per student on supplementary instruction and \$456 per student on student services. Our analysis indicates that these expenditures are not currently contributing to higher levels of academic performance." (Henry et al. 2008). Our research shows that - at this level of funding, little improvement can be expected.

## THE EFFECTS OF RACIALLY AND ECONOMICALLY ISOLATED SCHOOLS ON STUDENT PERFORMANCE

English scores and only modest effects on the Algebra I scores. At the Focus Site level, there were strong and significant negative effects on both exams. This may be an artifact of the homogeneity of this sample.

### ***Finding 16: Ordinary Least Squares and Multivariate Analysis Confirm Descriptive Quartile Findings.***

The patterns seen in Table 4 and Figure 5 clearly show that there is a relationship between racial isolation and 9<sup>th</sup> grade test scores in Algebra I and English. To extend and confirm this analysis we estimate a set of Ordinary Least Squares (OS) regression models and corresponding Multi-Level Models (MLM). The models are estimated for all 9<sup>th</sup> grade students and schools in the state that are in the dataset, and then just for the students and schools in the Focus Sites. The OLS results provide a baseline but do not account for unobserved characteristics (e.g. neighborhood effects, family values, parent education). MLM adjusts for these and for clustering of individuals within schools. OLS results are not accurate for the Focus Sites. Algebra I and English I End of Course exam scores are the dependent variables in all of the models.

We have shown that segregation and concentrations of poverty have a negative effect on exam scores. The next step is to evaluate other variables which may have an effect on this relationship. Therefore, we estimate a series of multivariate regression models at the state level and Focus Site-level beginning with Ordinary Least Squares (OLS) models. The OLS results confirm Black students maintain Algebra I scores almost five points lower, *ceteris paribus*, with similar outcomes estimated for the English exam (see Appendix A, Table 5).

The OLS model contains both individual-level (e.g. FRPL eligibility) and school-level variables (e.g. percent Black). While OLS is recognized as being very robust, the combination of individual and school data can be modeled using a mixed-level approach. The Mixed-Level Modeling (MLM) analysis complements the OLS model, allowing us to account for clustered data. As mentioned earlier, this can also be seen as a hierarchical ordering of data: Individual student-level data is Level One; school-level data is Level Two; and district-level data would be Level Three. MLM is an appropriate model to account for correlated errors because observations may not be independent.<sup>16</sup>

The OLS results for the state are shown in Appendix A, Table 5, and the OLS results for the Focus Sites are in Appendix A, Table 7. At the state level, Black students score 4.81 points lower than White students on the Algebra I End of Course exams and 4.16 points lower on the English I exams - all else equal. Both of these effects are statistically significant at the .001 level. Economically disadvantaged 9<sup>th</sup> grade students scored 2.28 points lower than other 9<sup>th</sup> grade students on the Algebra I test and 3.06 points lower on the English tests – all else equal. Again, these effects are statistically significant at the .001 level. Not surprisingly, students with limited English proficiency scored significantly lower on both tests, and academically-gifted students

---

<sup>16</sup> The approach used is very similar to this. However, due to technical issues relating to concavity, we have used district-level dummy variables in place of district id at Level Three to control for unobserved characteristics. Therefore, school id functions as the random effects or moderator variable at Level Two. In simple terms, this means school-level characteristics moderate the effects of racial characteristics at the individual-level to impact student performance on Algebra I and English exams. The results are very similar to those in the OLS showing that being Black and being in schools with a higher percentage Black both result in lower scores. See Appendix A Tables 5 and 6.

## THE EFFECTS OF RACIALLY AND ECONOMICALLY ISOLATED SCHOOLS ON STUDENT PERFORMANCE

scored higher. We also controlled for gender and for other racial/ethnic identities relative to White students.

School-level variables include teacher characteristics (e.g. percent with advanced degrees) and characteristics of the 9<sup>th</sup> grade students (e.g. percent in poverty). Teacher characteristics have strong and significant effects on test scores. A 10% increase in teachers with advanced degrees results in an increase of .49 points for the Algebra I test and .56 points on the English test. We also found statistically significant but smaller effects of the percentage of fully-licensed teachers.

Characteristics of the student bodies of the schools also significantly affect test scores. Increases in the percentage of students in poverty significantly decreases test scores. Increases in the percentage of students who are Black (racial isolation in schools) significantly decrease Algebra I scores. The effect on the English scores is ambiguous, as OLS found a small effect for the state but MLM results were not significant.

We also include an interaction effect for Black students and percentage Black in the schools. As noted above, this interaction has no significant effect on the English scores and has modest effects on the Algebra I scores.

The MLM results for the state (Appendix A, Table 6) are very similar to the OLS results, with Black students scoring significantly lower relative to White students and economically disadvantaged students also scoring significantly lower. The school-level effects are also similar with two notable differences. First, while an increase in the percentage of teachers with advanced degrees has a positive effect on Algebra I scores, it is only significant at the .10 level. Second, there is no significant effect of the effect of Black students on English scores in either the state or Focus Site samples.

Analysis of the effects of Focus Site schools should be interpreted with caution. There is wide variation in the effects, which may be due to the characteristics of the schools in these three counties (the student bodies are largely homogenous) or to the small sample size, which included only 19 schools (including alternative schools and one school that has only 9<sup>th</sup> grade). In general, the OLS for the Focus Site school systems (Appendix A Table 7) are similar to those for the state as a whole. The concentration of students who are Black and in poverty has negative effects on scores. At the individual level, Black students have significantly lower test scores than White students. Economically disadvantaged 9<sup>th</sup> grade students scored significantly lower on the tests, and academically gifted students scored significantly higher. OLS analysis found the effect of teachers with advanced degrees on Algebra I scores was very large and significant, but there was no significant effect on English scores. The percentage of fully licensed teachers has a negative effect on scores (significant at the .05 level). The interaction effects are similar to the state effects.

The MLM results for the Focus sites are shown in Appendix A Table 8. Like the OLS results, the MLM school-level effects vary considerably. There are very large estimated effects of the percentage of teacher effects on scores, but most are not statistically significant. There are no effects of the percentage of students who are black or the percentage in poverty. However, the interaction effect between being Black and the increasing percentage of Black in the schools has significant negative effects on both Algebra I and English scores. This could be interpreted as an effect of racial isolation, but may be an artifact of the homogeneity of the sample.

# THE EFFECTS OF RACIALLY AND ECONOMICALLY ISOLATED SCHOOLS ON STUDENT PERFORMANCE

## Conclusion

Like the rest of the nation, North Carolina is moving toward more-segregated and economically isolated schools. The Supreme Court has approved school boards' ability to seek a race-conscious objective of integration as long as assignment decisions do not turn on an individual student's race. Our analysis shows that the drawing of school attendance area boundaries can create racially and economically balanced schools that meet this criterion. However, we find that boundaries of school district and school attendance areas are often drawn in ways that create segregated schools where community residential patterns do not require segregated schools.

We find that attendance at racially and economically isolated schools is associated with lower performance on both Algebra I and English I End of Course exams, and these associations are quantifiable and statistically-significant. We also find that the achievement gap associated with racial and economic isolation of schools *is substantially more challenging and costly to address than to improve academic performance for students who attend schools which are racially and economically balanced*. We also find that, while teacher quality can improve performance, those resources are less likely to be found at segregated schools.

The Supreme Court indicated other individual student characteristics might be used to achieve other forms of diversity (which often have the secondary effect of improving racial diversity), including consideration of socioeconomic status and academic proficiency levels. Our analysis suggests three complementary key strategies for improving academic performance in North Carolina's high schools: (1) create school attendance areas which are racially and economically balanced; (2) require teachers who are fully-licensed; and (3) provide funding to hire teachers with advanced degrees.

## Authors

**Ann Moss Joyner**, President of Cedar Grove Institute for Sustainable Communities, Inc., studied the segregation of Wayne County high schools for the NC NAACP in 2006, funded by the Paul Green Foundation.

**Ashley Osment** was Senior Attorney at the Center for Civil Rights, UNC-CH. She co-authored an amicus brief for the defendants in the PICS case, which severely limited the ability of school boards to use race as a factor in student assignment policies to foster racial diversity in public schools.

**Andy Sharma**, PhD, MS, MA, recently completed the doctoral program at UNC Chapel Hill. He is also a former Carolina Population Center trainee. His areas of expertise relate to aging, education, health disparities, migration, and quantitative methodology.

**Jessica Pearlman** is a graduate student in the Departments of Sociology and Statistics at UNC Chapel Hill, focusing on demography, labor market inequality and quantitative methods.

**Tim Stallmann** is a freelance GIS technician in Durham, NC.

**Allan M. Parnell**, Ph.D., is a demographer with Cedar Grove Institute for Sustainable Communities, Inc. He was the Principal Investigator on an NIH grant to develop a measure of segregation by political exclusion.

# THE EFFECTS OF RACIALLY AND ECONOMICALLY ISOLATED SCHOOLS ON STUDENT PERFORMANCE

## References

Grant, Gary, *Hope and Despair in the American City: Why There Are No Bad Schools in Raleigh*, Harvard University Press, (2009).

Henry, Gary T. Charles L. Thompson, Kathleen Brown, Elizabeth Cunningham, Kirsten Kainz, Bianca Montrosse, Adrienne Sgammato, and Yi Pan, "The High School Resource Allocation Study," Carolina Institute for Public Policy, University of North Carolina at Chapel Hill, February (2008).

Joyner, Ann Moss. "Institutionalizing Discrimination in Education: Addressing Segregation in Wayne County, NC High Schools." Cedar Grove Institute for Sustainable Communities, Inc. (2007).

Ladd, H.F., Clotfelter, C. and Vigdor, J. "Who Teaches Whom? Race and the Distribution of Novice Teachers." *Economics of Education Review*. 2005; vol 24(n4).

Loftis, Kenyatha. "Creating a Gifted Class: How Restructuring Parent-District Relationships Affects Access to Elite Educational Opportunities" Paper presented at the annual meeting of the National Conference of Black Political Scientists, Inc. 39th Annual Meeting, Allegro Hotel, Chicago, Illinois, Mar 19, (2008).

National Research Council, "Minority Students in Special and Gifted Education," Committee on Representation of Minority Children in Special Education and Gifted Programs, Division of Behavioral and Social Sciences and Education. M. Suzanne Donovan and Christopher T. Cross, Editors. National Academy Press. (2002).

North Carolina Department of Public Instruction, "Administrator and Teacher Qualifications and Training Needs, Alternative Schools and Programs," Preliminary Report, March (2000).

North Carolina Department of Public Instruction, "Alternative Learning Programs and Schools Standards and Implementation Procedures," (2005).

Orfield, Gary. *Schools More Separate: Consequences of a Decade of Resegregation*, Civil Rights Project, Cambridge, Massachusetts. (2001)

Orfield, Gary and Lee, Chungmei. *Why Segregation Matters: Poverty and Educational Inequality*. Civil Rights Project, Cambridge, Massachusetts. January, (2005).

Reardon, S.F., J.T. Yun and T.M. Eitle 2000. "The changing structure of school segregation: Measurement and evidence of multiracial metropolitan-area school segregation, 1989-1995." *Demography* 37: 351-364.

Schofield, Janet Ward. Review of Research on School Desegregation's Impact on Elementary and Secondary School Students, in *Handbook of Research on Multicultural Education*. 597. James A. Banks & Cherry A. McGee Banks eds. (1995).

## **THE EFFECTS OF RACIALLY AND ECONOMICALLY ISOLATED SCHOOLS ON STUDENT PERFORMANCE**

Schofield, Janet Ward. Maximizing the Benefits of Student Diversity: Lessons from School Desegregation Research, in *Diversity Challenged: Evidence on the Impact of Affirmative Action*. 99 Gary Orfield with Michal Kurlaender, eds. (2001).

Sclafani, Susan. U.S. Department of Education, Office of Vocational and Adult Education. Presentation, April (2005).

Stone, Clarence, Marion Orr and Circe Stumbo. "Five Princes and a Pauper," Paper presented at the Annual Meeting of the Urban Affairs Association, Louisville, KY, April 15-17, (1999).

Theil, H. and A.J. Finizza 1971 "A note on the measurement of racial integration of schools by means of informational concepts." *Journal of Mathematical Sociology* 1: 187-193.

White, M.J. 1986 "Segregation and diversity measures in population distribution." *Population Index* 52: 198-221.

## Appendix A: Statistical Tables

**Table 1: Variables by Percent Black of School for All North Carolina 9<sup>th</sup> Graders**

<b>Variable</b>	<b>Percent Black/Quartile</b>			
	<b>&lt;25%</b>	<b>25-50%</b>	<b>51-75%</b>	<b>&gt;75%</b>
	<u>Mean</u>	<u>Mean</u>	<u>Mean</u>	<u>Mean</u>
Algebra I	154.81	151.91	148.95	146.64
English	152.67	150.49	148.61	146.46
Black	0.13	0.40	0.62	0.84
Economic disadvantage	0.34	0.47	0.57	0.62
Male	0.53	0.53	0.53	0.56
Gifted Math/Read	0.10	0.08	0.04	0.02
Teacher 0-3 Yrs. %	0.20	0.24	0.28	0.31
Teacher 11+ Yrs. %	0.54	0.51	0.45	0.44
Teacher Advanced Degree	0.26	0.24	0.22	0.21
Teacher Fully Licensed	0.91	0.89	0.84	0.77
Poverty %	0.29	0.42	0.55	0.65
Black %	0.12	0.38	0.60	0.86
Latino %	0.06	0.08	0.09	0.05
Alternative School	0.01	0.01	0.06	0.14
N	64,645	42,796	18,852	8,353

**Table 2: Variables by Percent Black of School for Focus Site 9<sup>th</sup> Graders**

<b>Variable</b>	<b>Percent Black/Quartile</b>			
	<b>&lt;25% (1)</b>	<b>25-50%</b>	<b>51-75%</b>	<b>&gt;75%</b>
	<u>Mean</u>	<u>Mean</u>	<u>Mean</u>	<u>Mean</u>
Algebra I	151.58	154.60	150.51	145.13
English	151.88	150.07	149.98	144.58
Black	0.23	0.49	0.63	0.92
Economic Disadvantage	0.35	0.47	0.47	0.73
Male	0.54	0.50	0.53	0.56
Gifted Math/Read	0.06	0.04	0.00	0.02
Teacher 0-3 Yrs.	0.21	0.16	0.27	0.31
Teacher 11+ Yrs.	0.55	0.62	0.47	0.48
Teacher Advanced Degree	0.18	0.23	0.25	0.17
Teacher Fully Licensed	0.93	0.95	0.90	0.73
Poverty (school)	0.31	0.47	0.44	0.67
Black (school)	0.21	0.45	0.56	0.93
Latino (school)	0.07	0.07	0.04	0.01
Alternative School	0.00	0.00	0.06	0.00
N	1,531	818	2,000	879

**THE EFFECTS OF RACIALLY AND ECONOMICALLY ISOLATED SCHOOLS ON  
STUDENT PERFORMANCE**

**Table 3: Descriptive Statistics by Race for All North Carolina 9<sup>th</sup> Graders**

	<b><u>Black Mean</u></b>	<b><u>White Mean</u></b>	<b><u>Total Mean</u></b>
<b>Individual Level</b>			
Algebra I	148.40	155.80	153.50
English	148.90	155.10	153.20
Black	1.00	0.00	0.31
Economic disadvantage	0.62	0.19	0.32
Male	0.46	0.50	0.49
Gifted Math/Read	0.04	0.17	0.13
<b>School Level</b>			
Teacher 0-3 Yrs.	0.25	0.21	0.22
Teacher 11+ Yrs.	0.49	0.53	0.52
Teacher Advanced Degree	0.23	0.25	0.25
Teacher Fully Licensed	0.87	0.91	0.90
Poverty	0.44	0.32	0.36
Black	0.46	0.20	0.28
Latino	0.07	0.06	0.07
Alternative School	0.01	0.01	0.01

**N = 103,859**

**Table 4: Descriptive Statistics by Race for Focus Site 9<sup>th</sup> Graders**

	<b><u>Black Mean</u></b>	<b><u>White Mean</u></b>	<b><u>Total Mean</u></b>
<b>Individual level</b>			
Algebra I	147.90	154.90	151.60
English	148.20	154.70	151.60
Black	1.00	0.00	0.48
Economic disadvantage	0.63	0.16	0.39
Male	0.45	0.48	0.47
Gifted Math/Read	0.01	0.08	0.05
<b>School Level</b>			
Teacher 0-3 Yrs. %	0.24	0.21	0.23
Teacher 11+ Yrs. %	0.51	0.54	0.53
Teacher Advanced Degree	0.21	0.20	0.21
Teacher Fully Licensed	0.89	0.93	0.91
Poverty %	0.46	0.38	0.42
Black %	0.55	0.36	0.45
Latino %	0.04	0.06	0.05
Alternative School	0.01	0.00	0.00

**N = 3,625**

**THE EFFECTS OF RACIALLY AND ECONOMICALLY ISOLATED SCHOOLS ON  
STUDENT PERFORMANCE**

**Table 5: OLS results for All North Carolina 9<sup>th</sup> Graders<sup>17</sup>**

	Algebra 1 Score	English 1 Score
	b/se	b/s
Black/African American student	-4.81*** (0.14)	-4.16*** (0.11)
Latino student	-0.60*** (0.14)	-1.05*** (0.11)
Asian/Asian American student	2.92*** (0.21)	0.83*** (0.17)
Native American student	-2.68*** (0.28)	-3.12*** (0.20)
Multi-Racial student	-1.03*** (0.19)	-0.74*** (0.15)
Limited English proficient student	-4.29*** (0.19)	-7.13*** (0.14)
Economically Disadvantaged: (FRPL student)	-2.28*** (0.07)	-3.06*** (0.05)
Male student	-0.10+ (0.06)	-2.22*** (0.05)
Academically Gifted in Math/Read student	9.78*** (0.09)	8.34*** (0.08)
Teaching Experience 0-3 Yrs. Percent	-7.99*** (0.59)	-4.81*** (0.46)
Teaching Experience 11+ Yrs. Percent	-5.04*** (0.46)	-4.91*** (0.36)
Teachers with Advanced Degrees Percent	4.93*** (0.41)	5.64*** (0.32)
Fully Licensed Teachers Percent	4.17*** (0.59)	1.17* (0.46)
Percent poverty	-2.13*** (0.22)	-4.28*** (0.17)
Percentage of Black Students in School	-2.29*** (0.23)	1.60*** (0.18)
Percentage of Latino Students in School	-0.76 (0.58)	1.13* (0.46)
Black x percent Black	1.55*** (0.32)	0.01 (0.25)
Alternative School	-5.37*** (0.29)	-3.09*** (0.20)
Dummy Variables for District	0.00*** (0.00)	0.00*** (0.00)
Constant	154.00*** (0.65)	156.06*** (0.51)
Observations	80,316	103,859
Adjusted R2	0.284	0.311
Significance levels:	+ .10   * .05   ** .01   *** .001	

<sup>17</sup> Exam score change for 100% change in Variable

**THE EFFECTS OF RACIALLY AND ECONOMICALLY ISOLATED SCHOOLS ON  
STUDENT PERFORMANCE**

**Table 6: MLM for North Carolina 9<sup>th</sup> Graders<sup>18</sup>**

	Algebra 1 Score	English 1 Score
	b/se	b/s
Black/African American student	-4.39*** (0.16)	-4.33*** (0.12)
Latino student	-0.54*** (0.13)	-1.14*** (0.11)
Asian/Asian American student	2.61*** (0.20)	0.43** (0.17)
Native American student	-2.93*** (0.30)	-3.24*** (0.23)
Multi-Racial student	-1.00*** (0.18)	-0.86*** (0.14)
Limited English proficient student	-4.28*** (0.18)	-7.00*** (0.14)
Economically Disadvantaged: (FPRL student)	-2.02*** (0.07)	-2.85*** (0.05)
Male student	-0.03 (0.06)	-2.16*** (0.04)
Academically Gifted in Math/Read student	9.75*** (0.09)	8.59*** (0.08)
Teaching Experience 0-3 Yrs. Percent	-1.90 (1.98)	-1.10 (1.34)
Teaching Experience 11+ Yrs. Percent	0.68 (1.66)	-3.08** (1.12)
Teachers with Advanced Degrees Percent	2.50+ (1.42)	4.36*** (0.96)
Fully Licensed Teachers Percent	5.07* (1.99)	3.24* (1.36)
Percent poverty	-1.81* (0.71)	-3.41*** (0.48)
Percentage of Black Students in School	-2.79*** (0.70)	0.42 (0.47)
Percentage of Latino Students in School	-1.26 (2.20)	0.11 (1.49)
Black x percent Black	0.76* (0.38)	0.36 (0.29)
Alternative School	-6.12*** (0.59)	-4.19*** (0.39)
Constant	150.13*** (2.18)	153.18*** (1.47)
Observations	80,316	103,859
Significance levels:	+ .10      * .05      ** .01      *** .001	

<sup>18</sup> Exam score change for 100% change in Variable

**THE EFFECTS OF RACIALLY AND ECONOMICALLY ISOLATED SCHOOLS ON  
STUDENT PERFORMANCE**

**Table 7: OLS for Focus Site 9<sup>th</sup> Graders<sup>19</sup>**

	Algebra 1 Score	English 1 Score
	b/se	b/s
Black/African American student	-3.92*** (1.02)	-4.20*** (0.77)
Latino student	-0.95 (0.86)	-1.08 (0.69)
Asian/Asian American student	6.55*** (1.51)	-0.11 (1.17)
Native American student	-5.02* (2.14)	-6.29*** (1.50)
Multi-Racial student	-0.51 (1.05)	-1.16 (0.82)
Limited English proficient student	-7.18*** (1.29)	-8.95*** (1.01)
Economically Disadvantaged: (FRPL student)	-1.85*** (0.38)	-3.21*** (0.29)
Male student	-0.28 (0.33)	-2.41*** (0.25)
Academically Gifted in Math/Read student	9.43*** (0.86)	10.07*** (0.72)
Teaching Experience 0-3 Yrs. Percent	-4.57 (7.71)	-10.82+ (5.86)
Teaching Experience 11+ Yrs. Percent	-0.17 (4.16)	-6.22* (2.97)
Teachers with Advanced Degrees Percent	28.21*** (5.99)	-2.47 (4.59)
Fully Licensed Teachers Percent	-12.08* (5.13)	-9.53* (3.87)
Percent poverty	-6.93* (3.19)	-14.72*** (2.44)
Percentage of Black Students in School	-5.30* (2.50)	9.44*** (1.95)
Percentage of Latino Students in School	-2.39 (5.17)	2.71 (3.93)
Black x percent Black	-3.30 (2.10)	-3.57* (1.59)
Alternative School	-7.10 (5.59)	-0.65 (2.43)
Dummy Variables for District	0.01*** (0.00)	0.01*** (0.00)
Constant	150.50*** (7.47)	167.58*** (5.51)
Observations	2,662	3,625
Adjusted R2	0.272	0.321
Significance levels:	+ .10   * .05   ** .01   *** .001	

<sup>19</sup> Exam score change for 100% change in Variable

**THE EFFECTS OF RACIALLY AND ECONOMICALLY ISOLATED SCHOOLS ON  
STUDENT PERFORMANCE**

**Table 8: MLM for Focus Site 9<sup>th</sup> Graders (Exam Score Change for 100% Variable Change**

	<b>Algebra 1 Score</b>	<b>English 1 Score</b>
	b/se	b/s
Black/African American student	-3.18** (1.05)	-3.98*** (0.70)
Latino student	-0.99 (0.85)	-1.12 (0.69)
Asian/Asian American student	6.76*** (1.50)	0.12 (1.17)
Native American student	-6.21** (2.15)	-6.69*** (1.52)
Multi-Racial student	-0.58 (1.04)	-1.07 (0.82)
Limited English proficient student	-7.17*** (1.28)	-8.75*** (1.00)
Economically Disadvantaged: (FRPL student)	-1.77*** (0.38)	-3.22*** (0.29)
Male student	-0.32 (0.32)	-2.41*** (0.25)
Academically Gifted in Math/Read student	9.83*** (0.87)	10.14*** (0.73)
Teaching Experience 0-3 Yrs. Percent	16.66 (24.32)	-1.30 (13.90)
Teaching Experience 11+ Yrs. Percent	10.08 (13.05)	-1.42 (7.42)
Teachers with Advanced Degrees Percent	45.32** (17.29)	8.90 (9.76)
Fully Licensed Teachers Percent	18.46+ (11.08)	2.39 (6.51)
Percent poverty	5.19 (8.37)	-7.17 (4.93)
Percentage of Black Students in School	2.09 (6.53)	5.87 (3.76)
Percentage of Latino Students in School	12.42 (13.27)	6.75 (7.80)
Black x percent Black	-5.04* (2.18)	-4.03* (1.64)
Alternative School	-10.14 (9.45)	-3.65 (4.76)
Dummy Variables for District	0.01*** (0.00)	0.01*** (0.00)
Constant	115.61*** (21.41)	152.67*** (12.28)
Observations	2,662	3,625

Significance levels: + .10      \* .05      \*\* .01      \*\*\* .001

# THE EFFECTS OF RACIALLY AND ECONOMICALLY ISOLATED SCHOOLS ON STUDENT PERFORMANCE

## Appendix B: Universe of Variables

Note: Data used is italicized.

### **Community Index Data**

This file has one record per Local Education Agency (LEA) with the percent of students (a) *scoring at or above level III on End of Grade/End of Course tests*, (b) living in single parent households, (c) *living below the poverty line*, and (d) who have at least one parent without a high school diploma. The file also contains an index of relative disadvantage as compared to the state average. Charter schools are not included in this dataset.

### **Discipline**

This file has one record per Local Education Agency in 2000 with information on corporal punishment, out of school suspensions, and expulsions, overall and by race-gender categories. This file does not include charter schools.

### **District Finance**

These LEA Finance files provide finance information for all local education agencies (including charter schools) that provide free public elementary and secondary education. There is one record per LEA with information about assets, debts, revenues (from local, state, and federal sources), and expenditures (for instruction, support services, administration, operations and maintenance, transportation and food services).

### **District Report Cards**

Each file has one record for each district with information about characteristics such as personnel demographics, student academic performance, and spending. Charter schools are not included in this dataset.

### **Dropout Rate**

Each file has one record per LEA with the number of dropouts and the dropout rate each year.

### **Exceptionality**

These data contain records for students receiving special education and related services. These files describe students' disabilities, demographics, service plan, services provided, and exit from exceptional services.

### **High School Graduates**

Each file has one record per LEA with counts of high school graduates that contain all high school diploma recipients each year, including summer school, mid-year, and 11th grade graduates. Records include demographic breakouts of the graduates, such as the number of White female high school graduates in a particular district. (Note: This is not a cohort rate.)

### **Juvenile Justice**

This file has one record per county with information including intake statistics, detention admissions, and youth development center commitments.

## **THE EFFECTS OF RACIALLY AND ECONOMICALLY ISOLATED SCHOOLS ON STUDENT PERFORMANCE**

### **Legally Reportable Incidents**

Each file has one record per district with counts of legally reportable incidents (such as robbery or possession of a controlled substance).

### **Local Education Agency Universe**

Each file has one record per school district with information about agency type, county, address, and boundary changes. This file includes district counts of staff, by type (e.g., teachers, guidance counselors, librarians, support staff, and administrators) and counts of diploma recipients and other high school completers by ethnicity and gender.

### **Per Pupil Expenditure**

Each file has one record per school district with per pupil and total expenditures by local, state, and federal sources. Charter schools are not included in this dataset.

### **Personnel**

Each file has one record per LEA with the number of teachers, principals, guidance counselors, and other school staff, by race and gender.

### **Salary Supplement**

Each file has one record per LEA with the number of teachers, principals, superintendents, and other school staff receiving local salary supplements and the average amount of this supplement. Charter schools are not included in this dataset.

### **School-level data**

These files have information on the more than 2,000 North Carolina public schools. All of these files include records for charter schools.

### **Attendance**

Each file has one record per school with average daily membership and average daily attendance. Charter schools are not included in these data.

### **Growth Scores**

*Each file has one record per school with the results from North Carolina's ABC accountability system. Data include the percent of students at the school performing at grade level and the school's overall rating from the state.*

### **Private School Survey**

Each file contains information about each private school in North Carolina that completed the Private School Survey (PSS) conducted by the National Center for Education Statistics. The PSS data contain information about school level, size, religious orientation, and program emphasis; length of school year and school day, number of high school graduates, whether a school is single-sexed or coeducational, racial composition of the school, enrollment by grade, number of teachers employed.

## **THE EFFECTS OF RACIALLY AND ECONOMICALLY ISOLATED SCHOOLS ON STUDENT PERFORMANCE**

### **Public School Universe**

Each file has one record per school with its address, type, and locale code. It includes the pupil-teacher ratio, the counts of free/reduced price lunch eligible students, and the count of students by race, ethnicity, and grade.

### **School Report Cards**

Each file has one record per school with information about characteristics such student academic performance, teacher quality, and school safety.

### **Classroom-level data [Phase II]**

The School Activity Reporting (SAR) System provides information on the approximately 350,000 class activities that take place daily in North Carolina's public schools. Activities include traditional academic classes as well as non-class events (e.g., study hall, lunch period). Schools report activities that are regularly scheduled throughout the year as well as those that meet for only part of the year. Charter schools are included in these files.

### **SAR - School Activity Directory/Student Count**

Each file has one record per school, activity and course section (e.g., Algebra 2, second period) with information about the course title, number of credits, number of semesters, state grade code, and academic levels (e.g., honors, remedial). The file includes state course codes with state course title, academic level, and grade level for each subject. *This file has summary data on the students: counts for race-gender categories (e.g., White female), and counts for different exceptionality categories (e.g., academically gifted, behaviorally/emotionally handicapped).*

### **SAR - Meeting Codes**

This file has one record for each district, school code, activity, and section with information about the number of times and the number of minutes the activity occurs in a scheduling cycle. One could use this information to determine, for example, how much of a teacher's day is spent in instruction.

### **SAR - Personnel**

Each file has one record per activity with information about the instructor(s) assigned to that activity. This information includes the instructors' race, sex, and level of experience. Personnel included are those employed by the public school system that have direct student contact in a public school activity for which a state course code or personnel assignment type exists.

### **Teacher-level data**

These files include information on the certified personnel (central office administrators, principals, assistant principals, teachers, and other instructional staff) in the public school system. Charter schools and alternative schools are not required to submit information for these files.

### **National Board Certification**

Each file has records for all education personnel who were teaching in a given year after becoming certified by the National Board, and includes certification area and year.

### **Personnel Absence [Phase 2]**

Each file includes records for all education personnel who were teaching in a given year, with one record per absence report per teacher.

# THE EFFECTS OF RACIALLY AND ECONOMICALLY ISOLATED SCHOOLS ON STUDENT PERFORMANCE

## ***Personnel Education***

*Each file has one record per instructor with educational attainment, including the name of the institution of higher education and graduation date.*

## ***Personnel License***

*Each file has one record per instructor with license information, including date of license/renewal and license area. Note that licensure is renewed every five years, and that the teacher may have become licensed elsewhere.*

## **Personnel Pay**

Each file has detailed information on every teacher's position and salary each year. Using these data, one can monitor the progress of a teacher's career.

## **Personnel Testing**

North Carolina teachers are required to pass standardized tests (the Praxis series) in both general educational principles and subject areas. This file includes all such test information and state cutoff scores.

## **Working Conditions Survey [Phase 2] vis-à-vis demographics**

This statewide survey of all licensed school personnel asked about perceptions of the work environment. Questions focused on time management, facilities and resources, school leadership, personal empowerment, and opportunities for professional development. (Note: This survey was conducted in 2002.)

## **Student-level data**

These files include information on students in public schools. Most files include records for those in 3rd grade or older.

## **Career-Technical Enrollments [college bound]**

This file contains individual student records for all students in grades 6 through 12 who have declared a vocational pathway (i.e. agriculture, business). Charter schools are included.

## **Course Membership**

This file consists of information on students' courses, such as course title and the number of students in the course. Records are at the course level, so there are multiple records per student. Beginning in 2007, this provides a link between students within classrooms and between students and teachers.

## **Dropouts**

Each file has one record per student identified as a dropout according to the Federal definition of dropout. For each dropout, data include race and gender as well as the student's school, age, and grade at the time of the dropout, and the reason for dropping out. Often, these records cannot be linked to academic data.

## ***End of Course Tests***

*Students take subject-specific tests when they complete the following courses: Algebra 1, Algebra 2, Geometry, Biology, Chemistry, Physics, Physical Science, English 1, English 2, Economic-Legal-*

## **THE EFFECTS OF RACIALLY AND ECONOMICALLY ISOLATED SCHOOLS ON STUDENT PERFORMANCE**

*Political Systems, and U.S. History. In some years, they were required to take a high school comprehensive exam in 10th grade. The data include records for all students eligible to take the test and note whether they were absent or exempt and whether they had any modifications to the test. The data also contain the student's test records, participation in extracurricular activities, and time spent on homework for the class as well as the student's birth date, race, sex, learning disabled status, and exceptionality status.*

### **End of Grade Tests**

Each student in grades 3 through 8 is tested in reading and math each year. The Data Center has a separate file for each grade, with one record for each student who was a member of that grade at the time of the test. Data include records for students who were absent or exempt from the test for various reasons. If a student took a retest, such information is included as well in a separate student record within the file.

The data include the individual student's test records and information about the test process, such as whether any testing modifications were used. The data also incorporate information about the student's class work, such as using calculators in math class or having written assignments in reading class. The data contain the student's birth date, race, sex, free/reduced price lunch eligibility, learning disabled status, and exceptionality status.

### **Geocoded Addresses**

These files are from the bus route data from the Institute for Transportation Research and Education at North Carolina State University. The Data Center geocoded those addresses and linked that information to the student test files. Measures include socio-economic data at the block-group level from the United States Census and an approximate latitude/longitude (rounded to the nearest kilometer). Charter schools and some districts are not included in these files.

### **Growth**

This dataset contains information on students' growth and proficiency in each subject as calculated by NCDPI.

### **Masterbuild**

*Each masterbuild file contains one record per student in 3rd grade or older with a date and score for each test (End of Grade and End of Course), race, sex, and limited English proficiency status. Whenever possible, students in these data are linked to the longitudinal student database maintained by the North Carolina Education Research Data Center (NCERDC).*

### **Offense-Consequence**

Each file contains records for each time a legally-reportable offense, an out-of-school suspension (short or long term), a referral to an alternative school or program, or an expulsion occurs during the school year.

### **Promotion-Retention [phase 2 demographics of school]**

The promotion-retention dataset contains promotion and retention information for students in grades 3, 5, and 8. Note that promotion and retention data in 2005-06 were based solely on reading performance due to the delay of math results at the end of the school year.

## **THE EFFECTS OF RACIALLY AND ECONOMICALLY ISOLATED SCHOOLS ON STUDENT PERFORMANCE**

### **School Exit**

This file contains students' transfer, dropout, and graduation status. The dataset also includes indicators used in the calculation of the new NC cohort graduation rate.

### **Youth Risk Behavior Survey [Phase 2]**

Produced by the Centers for Disease Control and Prevention, the Youth Risk Behavior Survey is intended to assess health risk behaviors of children and adolescents. Surveys are of a sample of middle and high school students.

### **Encrypted Identifiers Created by the NCERDC**

Using encrypted identifiers, researchers can track students across tests, grades, and schools. For example, researchers can:

- \* Link students' test scores within a year.
- \* Create cohorts of students and follow their progress through school.
- \* Analyze students' transitions to middle or high school.
- \* Identify students who move into different school systems (either charter schools or different LEAs).
- \* Identify students who have been retained.

Researchers can also track teachers by combining the teacher pay, education, and test data to conduct the following kinds of studies:

- \* Evaluate the qualifications of teachers employed in different schools or districts.
- \* Analyze teacher retention by following teachers who change schools or districts within the North Carolina public school system and identifying those who exit the system.
- \* Identify cohorts of new teachers and study their career paths.