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Poor-performing schools are consistently seen as a barrier to attracting middle and upper income families to center city neighborhoods. Although some strategies have used magnet schools to attract families to these locations, few have considered the effects of school performance on their project. School performance is highly tied to socioeconomic status, making it difficult to create a high-performing school in a low-income neighborhood. However, there is little research on magnet school performance and how it relates to student socioeconomic status. This thesis establishes what ties magnet schools have to neighborhood socioeconomic status and creates a model to predict magnet school performance and student body average family income. Geo-coded student address data from the Guilford County, NC school system is combined with income and racial data and school characteristic variables to create a profile of each magnet school in the district. The results of this study are good news for neighborhood revitalization projects. This research proves that magnet school performance is independent of neighborhood socioeconomic status and that many of these schools perform well because they serve students from middle and upper income households. As these schools are often competitive and accept a limited number of students, a high performing magnet school with an attendance zone that gives seating priority to children in a targeted neighborhood may attract middle and upper income families to purchase homes there, raising property values, increasing the tax base and slowing the affects of sprawl.

CAN MAGNET SCHOOL PERFORMANCE AND STUDENT BODY FAMILY INCOME BE PREDICTED FOR NEIGHBORHOOD REVITALIZATION PURPOSES?

by

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APPROVAL PAGE

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CHAPTER I

INTRODUCTION

"Disreputable schools will impede the recentralization of the middle class even where good housing opportunities are offered." (Belmont, 2002, p. 360)

One of the most common reasons middle class families leave central cities is the poor quality of the schools (HUD 1998, p. 9). Although there has been a recent resurgence of downtown residential development in many cities, few families with children live in these areas (Birch, 2005). For this reason, it is well known that urban "pioneer" gentrifiers are generally childless couples or single households (Berry, 1985; Birch, 2005). Childlessness is important to living in central cities because these couples are generally unaffected by poor-performing schools.

Poor schools are not the only barrier to the attraction of middle class families to center cities, but they are part of the problem. Some groups have attempted to use schools to attract families to city neighborhoods (Weiss, 2004). However, because school performance is highly tied to socioeconomic status (Toutkoushian and Curtis, 2005), it is difficult to create a high performing school in a low-income neighborhood. One project that attempted to bypass this barrier created two magnet schools in downtown Chattanooga, Tennessee. These schools were built to accommodate nearly twice as many students than lived downtown, and allowed the children of downtown workers to attend (Kreyling, 2002). No formal studies have been conducted on the affect of these schools on the downtown area, but the idea appears to be a sound one in that

middle and upper income students were attending a school in a low-income neighborhood.

Because of strong ties between socioeconomic status and school performance (Sutton and Soderstrom, 1999; Sirin, 2005), it is my assertion that many magnet schools, much like the two in Chattanooga, serve a different clientele than their neighborhood might indicate. By their unique way of mixing students from different geographic areas and socioeconomic backgrounds, magnet programs may create schools in lower socioeconomic neighborhood settings that outperform neighborhood schools in similar areas. High performing magnet schools, when attached to a partial attendance zone that gives enrollment priority to students in the surrounding neighborhoods, may add economic value to these neighborhoods. Much like Smith's rent gap theory (1979), where some neighborhoods had rent prices below the housing value, this situation may lead to gentrification of these neighborhoods, attracting middle class homeowners and helping to slow trends of suburbanization.

However, there are few strategies that use school *performance* in neighborhood revitalization plans. This thesis will attempt to create a model that does just that. By examining magnet school performance and how it relates to student socioeconomic status (SES) and school characteristics, it may be possible to predict the performance of magnet schools. Consequently, it may also be possible to predict the average family income of a magnet school student body for the purposes neighborhood revitalization. To predict magnet school performance, I will use student address data from the Guilford County, NC school district, coupled with socioeconomic data from the U.S. Census and

descriptive data for each school, including attendance zone size and the number of students, to create a profile for each school in the study area. If my analysis finds that

1. magnet schools outperform neighborhood schools, despite locations in lower socio-economic environments, and
2. high performing magnet schools have student bodies with higher average family incomes than these schools' neighborhood locations,

then attractive magnet schools combined with investment strategies, such as the introduction of a historic preservation district, can truly stimulate neighborhood revitalization efforts. In the case of a new magnet school, neighborhood groups or city planning agencies could even work with a school district to target certain areas of a city for such a strategy.

CHAPTER II

LITERATURE REVIEW

The idea of using magnet schools to spur neighborhood revitalization is anchored in several areas of study. It is necessary to understand previous research on gentrification, school location, school choice, socioeconomic effects on school performance and neighborhood school effects on housing prices. This section will explore all of these subjects in order to build a base of knowledge with which to explore this idea.

Gentrification

Gentrification is defined as "the conversion of socially marginal and working-class areas of the central city to middle-class residential use" (Zukin, 1987; p. 129), and it involves significant changes in the social composition of a neighborhood and its housing stock (Hamnett, 1991, p. 176). Berry (1985, pp. 78-79), outlined three stages of neighborhood revitalization, or gentrification:

1) A small number of households, usually singles or childless couples, purchase homes in a neglected neighborhood that they will renovate and live in. Neighborhood vacancy rates are usually high and there is little displacement of existing neighborhood residents.
2) After knowledge of the neighborhood revitalization spreads, more of the same types of households are attracted to the neighborhood, along with the professional class and small-scale developers, who begin renovations for speculation.

Displacement begins to appear among low-income renters and the initial population begins to resent the influx of newcomers.

3) Prices escalate, commercial redevelopment spreads and the area is "green lined" by financial institutions, making home improvement capital more readily available for investment. The newcomers make demands for public resources, protection and land use restrictions; social service institutions, public housing and low-income housing programs are opposed.

Much of the literature on gentrification revolves around its effects, particularly the displacement of low-income neighborhood residents (Vigdor, 2002), but recent research, influenced by neoliberal policies promoting a "social mix" in central city neighborhoods, has focused on the causes of this process while displacement is increasingly overlooked as a defining feature (Slater, 2006). Indeed, the negative consequences of gentrification, namely the displacement of the existing residents of a neighborhood, are often pointed out in scholarly definitions. Gentrification is described as "working class upheaval" (Slater, 2006, p. 744), "a process by which wealthier, more privileged residents and new land uses (those that attract and are supported by the new residents) replace poorer, less privileged residents and older land uses" (Niedt, 2006, p. 100) and "the production of urban space for progressively more affluent users" (Hackworth, 2002, p. 815). However, not all urban revitalization need be gentrification. Redevelopment of formerly vacant or non-residential land-uses, such as has been seen in downtowns, harbors and waterfronts, does not constitute gentrification as it is traditionally defined (Bourne, 1993, p. 186).

Several strategies have been attempted to limit gentrification's negative effects (Kennedy and Leonard, 2001):

- Atlanta and Cleveland allow tax deferral for longtime homeowners to postpone gentrification-driven tax increases until they sell their house.
- Boston and San Francisco require developers to set aside some affordable housing units in gentrifying markets.
- San Francisco and Washington, D.C. control the conversion of rental units to condominiums, while San Francisco and Berkeley use rent stabilization to maintain housing affordability.
- Other cities attempt to protect tenants living in rental housing by requiring relocation payments when landlords take units off the rental market.

The motivations of gentrifiers have been depicted as using housing as a status symbol to define identity (Redfern, 2003), but the process is more typically framed as driven by economic processes (Lees, 2000, p. 398). Smith's "rent gap" hypothesis (1979) explained gentrification as a process where the economic depreciation of older inner-city neighborhoods coupled with a rise in potential rent levels produces the prospect of profitable redevelopment.

Gentrifiers need not necessarily be individuals. Corporate leaders at The Bank of America, which is headquartered in downtown Charlotte, NC, promoted the gentrification of the city's downtown in the 1970s, through the loaning of funds to the city for infrastructure improvement and the creation of a non-profit community development corporation, in order to enhance their corporate identity (Smith and Graves,

2005). Local political actors and community development organizations have recently been encouraging neighborhood reinvestment as the result of neoliberal policy trends that emphasize poverty deconcentration, mixed-income neighborhoods, homeownership and reliance on the private market (Newman and Ashton, 2004). Indeed, this emphasis on private sector redevelopment has enabled collaboration between government, developers and even homeowners, garnering popular support for gentrification (Niedt, 2006).

Gentrification "pioneers," young professional couples with children that renovate old houses in historic neighborhoods, are changing the process of gentrification, as they are less mobile than traditional gentrifiers without children, and look to their own neighborhood for shopping, school, restaurants and social contacts, making family issues a higher priority in urban policies (Karsten, 2003). Indeed, gentrifiers have been observed starting their own neighborhood charter schools[1] when local public schools did not live up to their expectations (Hankins, 2007). Middle-class parents are more likely to consider education circuits for their school-age children, and highly value neighborhoods that give them access to *both* excellent primary and secondary schools (Ball et al., 1995). Neighborhoods that can serve both these needs simultaneously are more highly valued by gentrifiers (Butler and Robson, 2003).

School Location

Although schools have a large impact on the shape of cities, there is an outright disconnect between public education and urban planning (Vincent, 2006; Norton, 2007). School districts have a long history of independence from municipal government (Henry

[1] Charter schools are publicly funded, privately managed schools (Hankins, 2007, p. 114).

and Kerwin, 1938), and are considered separate governments than the municipality in which they reside, with school boards elected by district residents. A school board does not answer to the elected body of its municipality.

A systematic study of local school board decision-making in Michigan found that, overall, school boards appear to be most influenced by a sense of competition with neighboring school districts and changing demographics (Norton, 2007). This process leads to a pattern of "school sprawl," where schools increasingly relocate to suburban areas. The majority of superintendents indicated that neither the state's financing system, nor its building codes influenced the decision of whether to renovate existing school buildings or relocate schools to new sites, although a quarter of the superintendents believed the state's building and renovation codes favored construction over renovation. When picking a location for a new school, the availability of land appeared to be the overriding concern of school boards, with the most influential factors being the availability of land for new sites and the easy availability of land if the site chosen was already owned by the school district. Other influential factors included concerns about the availability of roads and infrastructure, parking needs, plan policies regarding new school development, anticipated shifts in student populations, athletic facility needs, local plan policies regarding growth and development and consultant recommendations. Less influential factors were differences in land prices across potential school sites, local officials' comments, Council of Educational Facility Planners International acreage standards, and the easy availability of land if the site chosen was donated or offered to the school district at a good price. Without an oversight role for local government, this last

factor may be key to influencing the pattern of school location by municipal governments.

The state of Florida requires the coordination of school and development planning (Donnelly, 2003), but in North Carolina, school boards, municipalities and county commissions operate autonomously with few institutional mechanisms or incentives to coordinate with each other (Salvesen, Sachs and Engelbrecht, 2006; p. 4). There are many benefits to such collaboration; through simple coordination between municipalities and school boards, it is possible to link school capacity to new residential development, link schools with their adjacent neighborhoods, co-locate schools with complimentary facilities like libraries, and to better plan future urban growth. Co-located schools are an idea that has gained traction as crowded schools and strained budgets have left school administrators looking for creative solutions to these problems (Romeo, 2004).

The City of Learning (COL) strategy, an outgrowth of the New American School Design Project at the MIT School of Architecture and Planning, is an attempt to slow school sprawl and use schools to help revitalize communities (Strickland, 2002). It encourages the coordination of school projects with housing, economic development and job training initiatives, through inter-agency coordination, mixed use development, adaptive reuse of buildings and private investment. The COL approach has been used in a number of post-industrial cities in New Jersey. One such plan, linking the design of community schools in Trenton with housing and community development, was helped by a smart-growth grant for the municipal government and school system.

The renovation and continued use of older school buildings also has many advantages for communities that new suburban schools do not. Older schools often serve as town centers and neighborhood anchors, busing expenses are lower when schools are in the neighborhood they serve and more students are able to walk to school (Beaumont, 2000). High acreage standards for new schools, deferred maintenance of older schools, state funding biases and the influence of housing developers are all impetuses for the abandonment of historic schools and the construction of new suburban schools. The growth in popularity of school choice and magnet schools, however, is leading to investment in schools in some of the poorest city neighborhoods.

Magnet Schools & School Choice

Magnet schools, largely nonselective schools where students apply based on their interest and motivation to attend, have a long history beginning with Boston Latin, founded in 1635 to serve a small intellectual elite. In the early 1900s, magnet schools often took the form of a technical trade high school. During the 1960s, magnet schools, then known as alternative schools, served students perceived as potential dropouts or students with financial and family problems. Another type of magnet school followed the concept of the "Super High School," where students blend academic work with career education (Estes, 1990).

Today's magnet school systems contain facets of these past incarnations of this school form, but mainly serve as a tool for voluntary school desegregation. Federal regulations define a magnet school as a "school, or program within a school, that has four characteristics:

1. A special curricular theme or method of instruction;
2. A role in voluntary desegregation within a district;
3. Choice of school by student and parent; and
4. Access to students beyond a regular attendance zone" (Fleming et al., as quoted in Blank, 1990; 78).

Magnet schools arose as an alternative to mandatory busing as a school district desegregation strategy (Varady and Raffel, 1995). Busing of minority students to majority white schools and vice-versa was a widespread, but unpopular practice throughout the country in the 1960s and 1970s (Carlson, 1974). Today, busing is rarely used and probably will not be used much in the future, as only two mandatory busing plans have been ordered by the courts since 1981 (Varady and Raffel, 1995, p. 214).

The number of magnet schools nationwide is growing. For the 2005-06 school year (the most recent reported), there were 2,736 magnet schools serving approximately 2.1 million students nationwide with 144 magnet schools serving more than 106,000 students in North Carolina (National Center for Education Statistics, 2007). Many magnet schools receive funds from beyond their local school district, including state, and federal funds from the Magnet Schools Assistance Program and Title I, Voluntary Public School Choice, Advanced Placement, and Smaller Learning Community grants (Magnet Schools of America, 2007).

Because of the voluntary nature of magnet schools, it is helpful to know what types of students choose to attend. The profile of a parent that chooses a magnet school is generally of upper socioeconomic status, chooses for academic reasons and is likely to

live far from the child's school (Goldring and Hausman, 1999). On the other hand, parents who choose non-magnet schools are more likely to select their school for convenience reasons while also giving their community school a better grade. The results of a survey and multivariate analysis of parents with students in the St. Louis City Public School District indicated that 71% weighed alternatives to their neighborhood schools through the choice system, but 18% of parents sought magnet information and still enrolled their children in non-magnet schools. The large majority of parents that chose magnet schools were upper class whites and minorities, while those that considered magnet schools but still chose neighborhood schools were mainly low and middle income minority and white parents.

Parents who were most dissatisfied with the schools in their communities were most likely to choose magnet schools, while the higher the income of a respondent, the higher the level of dissatisfaction with public schools in their community. Whites expressed more dissatisfaction with the community's schools than minorities. Parents who chose non-magnet schools were more satisfied with their community schools than were magnet choosers. No relationship existed between satisfaction and race or income in this group. Parents with concerns about transportation and the distance of magnet schools from their home were less likely to send their children to magnet schools, just as parents who were not concerned about transportation were more likely to send their children to magnet schools. In addition to dissatisfaction, parents chose magnet schools for academic reasons, values and discipline.

This same conclusion can be seen in a study of school selection in the gentrifying neighborhood of Greenpoint, Brooklyn, in New York City (DeSena, 2006). Within the working-class and low-income mothers interviewed, none considered sending their children outside the neighborhood for schooling; they instead chose between their neighborhood school and neighborhood Catholic schools. Gentry mothers, on the other hand, were critical of the neighborhood schools, even though some of the elementary schools were highly rated or average, based on city and state test scores. This dissatisfied group of parents enrolled their children in talented and gifted (TAG) programs and other alternative (magnet) public schools, primarily in the borough of Manhattan. One group of gentry mothers is attempting to resolve this dilemma by opening the neighborhood's own alternative school.

Not all magnet schools attract students from outside their neighborhood. By measuring the success of magnet school integration and enrollment, it is possible to explore what aspects of magnet schools make them attractive. A review of magnet school research (Rossell, 1985) outlined what features have been proven to make magnet schools more attractive. The most important magnet school characteristic was overwhelmingly found to be its location; long busing distance hurt enrollment for magnet schools. After location, other school characteristics differ in importance based on the location of the magnet school and the parent's social class. The research suggests that to attract a sufficient number of white students to integrate a racially isolated school, magnet schools need to offer a more academically stimulating program. This leads me to believe that highly rated magnet schools will attract the greatest number of possible students.

Magnet schools themselves may help desegregate majority white school districts, but in areas where whites are the minority, this strategy can result in greater segregation in neighborhood schools (Saporito, 2003). A study of Philadelphia's magnet school program found that because of the magnet application patterns of whites and non-whites, along with white family preference for majority-white schools, conventional neighborhood schools have greater concentrations of poor and minority students than if there were no magnet program in place. Low minority participation in voucher and magnet programs make it unlikely that this dilemma will be remedied as long as a large choice program is in place.

Socioeconomic Status and School Performance

Research on student achievement has long tied it to socioeconomic status (SES). Family SES determines where a student lives, which determines where he or she can go to school. Perhaps more importantly, family SES influences a student's academic performance by providing resources at home (Sirin, 2005, p. 438), but by also providing the social capital needed to succeed in school (Coleman, 1988).

The Equality of Educational Opportunity Survey (Coleman et al, 1966), a classic study popularly called The Coleman Report, was commissioned by the U.S. Office of Education in response to the Civil Rights Act of 1964. The Coleman Report was a groundbreaking sociological investigation into the reasons behind the disparities between white and minority student achievement. The researchers administered a series of academic tests and questionnaires to more than 600,000 students in 4,000 elementary and secondary schools. Student achievement was predicted less by the quality of a student's

school and more by factors such as family background for achievement, social composition of the student body, the student's sense of control of his or her environment and future. "Taking all these results together, one implication stands out above all: That schools bring little influence to bear on a child's achievement that is independent of his background and general social context…" (p. 325). The report led to mandatory bussing policies by school districts to better racially integrate schools. Coleman at first supported these actions, but later regretted this when he saw resultant white flight from cities, causing further segregation (Kiviat, 2000).

Researchers have been finding strong ties between student achievement and SES both before and after the Coleman Report, right up to present times. Although many researchers have found strong relationships, many weak correlations have been reported as well (White, 1982). A meta-analysis of about 200 studies between the years of 1918 and 1975 that considered the relationships between SES and academic achievement found that the strength of these relationships differed by the size of the unit of analysis. SES was found to be weakly correlated (r=.22) with academic achievement at the individual level, but aggregated units of analysis, such as entire schools, had much higher correlations (r=.73). A replica of White's (1982) meta-analysis, using data from journal articles published between 1990 and 2000, found only a slight decrease in the average correlation (Sirin, 2005). While average SES is a good predictor of academic achievement for large groups of students, SES is not destiny. Individual student achievement is a complicated calculation affected by numerous and complex human relationships, that appear to average out in large groups.

SES can affect student outcomes at the district level, as higher tax revenue can better fund public schools. Students in well funded schools have many advantages over students in schools with smaller budgets that lead to smaller achievement gaps between lower SES students and higher SES students (Wenglinsky, 1998). Schools with more financial resources have smaller class sizes, can attract better teachers through higher pay and teach a greater variety of classes, including college-preparatory courses. Students with low SES are also more likely to suffer from poor achievement in poorly funded schools, as resources are often spent on programs like gifted and talented curriculums that raise average school achievement, but don't often serve the needs of low income students.

Individual student SES accounts for a large portion of the variation in overall school performance (Toutkoushian and Curtis, 2005). A study of schools in New Hampshire demonstrated how the SES of the district helps explain variations in student test scores and college enrollment rates. A study of Illinois schools found that a school's performance score is more a function of its demographic status and SES than its effectiveness (Sutton and Soderstrom, 1999). Results found that of the 11 school demographic variables studied, low income, percentage white, high school graduation rate, and dropout rate had strong and significant correlations with achievement scores. Moderate relationships were recorded for attendance, mobility and the high school student-teacher ratio. There were weak relationships for average class size, elementary school student-teacher ratio, teacher salary, teacher experience and expenditure per student.

Math, science, reading and writing achievement gaps between socioeconomic groups *within* schools are similar to those *between* schools (Ma, 2000). Multivariate, multilevel analyses of nearly 7,000 students from 148 schools found that within-school achievement gaps were not greatly influenced by student background characteristics (gender, Native status, number of parents, and number of siblings) and characteristics of school context and climate (school size, school mean SES, disciplinary climate, academic expectation and parental involvement). Interestingly, socioeconomic gaps in math and science were larger in schools with higher levels of parental involvement, possibly as a result of high SES parents being more involved in their children's education than parents in low SES families.

SES predictably plays a role in the demand for higher education (Kodde and Ritzen, 1988). Family income, student ability and expectations on earnings and employment directly affected demand for higher education, more than parental education level in a study in the Netherlands. Parental education level exerted indirect effects on demand for higher education, but is of course a good predictor of family income itself. In fact, rising tuition prices have a negative effect on the number of low-income college applicants, and thus low-income students (Savoca, 1990). Perhaps family income decreases educational attainment because low-income students feel they can't afford higher education and do not apply themselves to their studies as much as they can.

The SES of a student's peers affects individual academic achievement nearly as much as an individual's own family social status (Caldas and Bankston III, 1997). Peer groups influence behavior and attitudes, with influences over academic achievement

being no exception. Because of this peer effect, the authors of this study concluded that students from a disadvantaged socioeconomic background would benefit from a diverse school environment while it may be a disadvantage for students from a relatively privileged background.

School Performance and Home Prices

There is a wealth of literature exploring how school performance affects home prices – a strong indicator of a neighborhood's socioeconomic status. Most of the research on this subject is based on Tiebout's (1956) idea that citizens will "vote with their feet" as they choose from an array of communities to live in, each offering differing types and levels of public services such as schools, police protection and parks. His theory asserts that a community's taxes combined with the services it offers, act as a competitive marketplace with "consumer-voters" moving and buying homes where this mix is optimal for their needs.

A decade later, Lancaster (1966) theorized that the price of a good is not necessarily tied to the good itself, but to its multiple attributes. By breaking down the characteristics of a good, it is possible to assign a value to each of its characteristics. One of the major characteristics of real estate, of course, is its location. The theories of Tiebout (1956) and Lancaster (1966) have led to a great deal of research on how school performance affects housing value.

Kain and Quigley (1970) found that neighborhood schools affect housing values just as other characteristics of a dwelling unit do. They analyzed the market prices of owner- and renter-occupied dwelling units in St. Louis, examining qualitative and

quantitative aspects of the "housing bundle." By regressing the characteristics of each dwelling unit, they found that the quality of a unit's bundle of residential services, such as its schools, has nearly the same effect on housing prices as characteristics like the number of bedrooms or bathrooms.

Not all school characteristics are indicators of quality when it comes to purchasing a home according to a hedonic model of property values examining the influence of school quality on housing prices in Dallas, Texas (Hayes and Taylor, 1996). In areas of the city where bussing did not take students out of neighborhood attendance zones, homebuyers were willing to pay a premium for a school's effect on student performance, such as higher achievement on standardized tests. However, homebuyers were not willing to pay for changes in school expenditures or student body characteristics. At the time of the study, bussing students away from neighborhood schools was more common in southern Dallas than in northern Dallas, leaving homebuyers in southern Dallas unwilling to pay a premium for neighborhood schools. Nevertheless, of the characteristics observed, only the size and age of the property and its distance from downtown Dallas had more influence than school effects on home prices in northern Dallas.

A model in which housing characteristics were controlled for in an examination of the effect of schools on property values found how much homebuyers were willing to pay for better schools (Black, 1999). The model disentangled school effects on home prices by examining houses located on attendance zone boundaries and removing variation in neighborhoods, taxes and school spending. This approach allowed the study of houses

that were close to each other and varied only by the elementary school the child attends. Parents in the study were willing to spend 2.5 percent more for a five percent increase in test scores.

While school performance has a direct effect on the value of a house, it also has a spillover effect, influencing investment in the property in higher quality school attendance zones. Kane, Staiger and Riegg (2004) used Black's (1999) approach when they found a unique opportunity to study the effects of school assignment on property values during a court-imposed desegregation order in Mecklenburg County, North Carolina. Between 1994 and 2001 the school district redrew attendance boundaries to integrate its schools. This study looked at the values of properties near these boundaries and found that a one student-level standard deviation difference in a school's mean test score increased house values by ten percent. The authors also found that mean test score was highly correlated with both median income in the elementary school zone ($r = .77$) and percent of the population that was African American ($r = -.77$). However, property values changed slowly, over the course of years, when school assignments were changed. This lead the authors to believe that these long lags were a sign that property values increased not because of the school assignment per se, but because of the residential sorting that took place and the high socioeconomic households that moved into the neighborhoods.

By disentangling the effect of school quality from other neighborhood variables, the authors found that where school quality increased at attendance boundaries, the general quality of the homes also increased in many cases. The authors infer that school

quality affects house prices by improving the quality of the housing itself. They reason that families who are willing to pay more to live in a school attendance area with higher test scores may also invest more in their homes.

With the implementation of the No Child Left Behind Act, which rates schools on a pass/fail standard, and a growing trend in making student test scores public, there is more information than ever available about the quality of individual schools and school districts. Many states classify schools, giving them letter grades or evaluating them on a different scale, such as North Carolina's, that ranges from "Honor School of Excellence" to "Low Performing" (North Carolina State Board of Education, 2007, p. 2).

The act of simply making school performance information publicly available in the form of school report cards can influence housing prices (Figlio and Lucas, 2000). The authors examined repeat sales data before and after the assignment of school letter grades in the Gainesville, Florida school district. This study area had many advantages. The school district included both the city and county area and the area had a very high frequency of home sales. During the study, no school was given a grade of "F," which would have made its students eligible for vouchers, disturbing the geography of the study area. The authors found that upon implementing this school report card system, the housing market responded significantly. In the month after implementation the effect of an "A" versus a "B" was estimated to be $21,229. However, this price was observed to fall by $2,397 per month after the implementation, and the housing market may return to the pre-report-card condition in time.

Unconventional school formats, such as private schools, school vouchers and magnet schools, change the relationship between property values and school quality. In these models, schools are not strictly tied to neighborhoods with traditional school attendance zones. The open nature of school enrollment gives parents greater choice in where to send their children to school. The desire to send their children to a top school does not necessarily tie families to expensive neighborhoods.

Where schools and other public services do not meet the needs of homeowners, housing value differentials reflect the value of these services (Thorsnes and Reifel, 2005). A study of a high-quality housing subdivision, split in half by a central city/suburban boundary, found that homeowners on the city side paid less for their homes than on the suburban side in response to the poor quality of the city schools and other city services. Each side of the subdivision was demographically similar, but the city residents supplemented poor city services with private schools and a neighborhood association.

School voucher programs, which allow students in low performing schools to attend schools outside their neighborhood, may even decrease property values in neighborhoods with better quality public schools (Brunner and Sonstelie, 2003). Examination of a survey of potential voters on California's 2000 voucher initiative found evidence that homeowners voted to protect their property values. For homeowners without school-age children, 39% voted for the voucher program if they lived in a neighborhood with superior public schools while 56% approved if they lived in a neighborhood with inferior schools.

While some research suggests that magnet schools balance the capitalization of school quality over a school district, some suggests that choice programs rearrange the value of certain neighborhoods in much the same way voucher programs do. The successful implementation of magnet schools in Wake County, North Carolina, appeared to reduce the capitalized value of school quality on home prices there to zero (Walden, 1990). A hedonic price model of housing in the Wake County/Raleigh School District found no effect by school quality on housing prices within the district; though there could be an inter-district effect if surrounding school districts are of lower perceived quality. However, research on a school choice program in Minnesota found that residential property values appreciated significantly in school districts where students were able to transfer to superior schools, but home values declined in districts that accepted transfer students (Reback, 2005).

Summary and Analysis

The idea of using magnet schools as centers of neighborhood revitalization is based on research from many subjects. Urban studies research on school location has pointed out that, although schools greatly impact cities, there is little coordination between school boards and municipal planning departments (Vincent, 2006). However, school location decisions do appear to be influenced by land and building donations (Norton, 2007). The idea of using schools for neighborhood renewal seeks to fill a need that is examined in the gentrification literature by finding a way for middle class families with children to move into city neighborhoods. Research on school choice tells us that many of these families that we wish to move to these neighborhoods – mainly the middle

and upper class – prefer to use the services that magnet schools provide (Goldring and Hausman, 1999; DeSena, 2006). Because of the strong ties between school performance and SES (Sirin, 2005), it is easy to recognize that a high performing magnet school will consist of a student body with a high average family income. Just as districts that send students to superior schools have higher home values (Reback, 2005), the attendance zones of high performing magnet schools should also show increased home values, in turn, raising tax roles for the municipality in which they reside.

CHAPTER III

RESEARCH QUESTIONS, STUDY AREA, DATA AND METHODOLOGY

Research Questions

Although there is a great deal of research on the *components* for the idea of using magnet schools for neighborhood revitalization, there are large gaps in the urban studies literature describing the relationships between performance of magnet schools and their surroundings socioeconomic and students' demographic characteristics. Studies on magnet schools revolve around the varied successes of schools for the goal of integration (Goldring and Hausman, 1999), not necessarily of creating a high performing school.

The purpose of this thesis is twofold. The first objective will be to predict magnet school performance from student socioeconomic status and other school characteristics (e.g., attendance zone size, number of students). The second purpose will be to predict average family income of magnet school students based on school characteristics in order to predict whether some magnet schools can attract middle and upper class families. Since student SES and school performance are so greatly entwined, it is not unrealistic to believe that high income families will be attracted to neighborhoods that are given enrollment priority by high performing magnet schools.

The following questions will be answered in this thesis:

1. Do neighborhood socioeconomic characteristics of magnet school locations influence their performance?

2. If neighborhood socioeconomic characteristics of magnet school locations do not influence their performance, then what factors do? Is magnet school performance predictable from these factors?
3. Can average family income of magnet school students be predicted?

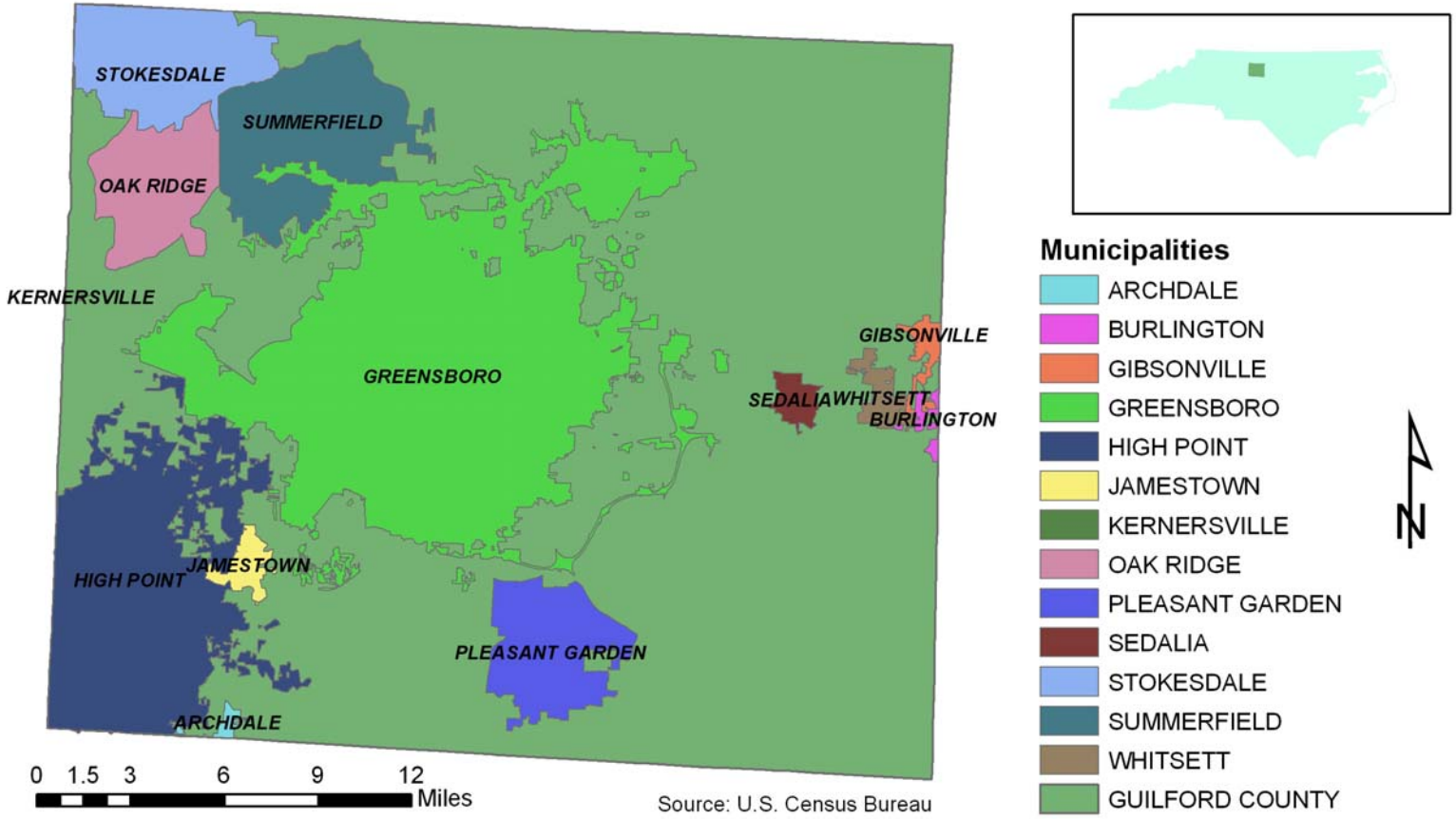
If the first question is answered in the negative, then it will be possible to find a high performing magnet school in a low-income neighborhood. We have already established that it is rare to find a high performing conventional school in such an area. Finding the answers to the next two questions will allow us to create a model with which to target certain neighborhoods for redevelopment through the attraction of middle class families.

Study Area

This study is a snapshot of the Guilford County, NC, school district in the 2005-2006 school year. Guilford County is unique because it is one of the leading counties in the south for newly incorporated municipalities, with five forming between 1990 and 2005 (Smith and Debbage, 2007). Although the county's principle city of Greensboro (2006 pop. 230,026) can still annex some surrounding territory, it is being surrounded by these smaller municipalities (Figure 1) and may find itself fighting for much needed property tax revenue, like many boxed in cities in the Northeast and Midwest (Rusk, 2003). Neighborhood revitalization efforts, like adding a high performing magnet school to a neighborhood, could help raise the city's property tax roles and slow the growth of municipalities surrounding Greensboro.

The Guilford County school district had 111 schools, serving approximately 70,000 students during the 2005-2006 school year, with 34 of those being magnet schools

Figure 1 – Guilford County Municipalities



(Guilford County Schools, 2008). About $7,800 was spent on average per student during the school year; student ethnic composition was approximately 42% White, 41% African American, 7% Hispanic and 5% Asian (Guilford County Schools, 2008). The city of Greensboro is located in the center of the county. High Point (2006 pop. 92,275) is the county's second largest urban area and is located in the southwest portion of the county.

Greensboro and High Point both have relatively large low-income, mostly African American areas on the cities' east and southeast sides. Median family income falls as low as $6,169 in 1999 dollars in these block groups with the percent of the population being African American measuring as high as 99% in some neighborhoods (Census, 2000). The wealthiest neighborhoods are in the city of Greensboro, but the northwest portion of the county is growing rapidly in population and income (Census 1990, Census 2000). Many of the best performing schools in the county are located outside either Greensboro's or High Point's city limits.

Data

Student Addresses

This research takes advantage of the unique opportunity to investigate school performance by using student address data collected from the Guilford County School System, classified by each school in the district. Although it is common to examine school performance issues using attendance zone boundaries, magnet schools are a special and difficult case because students from all over the district have a chance to attend. For all of the Guilford County school system, excluding special needs schools, 17,186 magnet student addresses were geo-coded using ArcGIS version 9.3. To make

comparisons, the remaining 42,322 student addresses from the district's conventional schools were also geo-coded.

Student addresses allow us to look at the variable that is unique to magnet schools: the proportion of students enrolled from outside the school's attendance zone. Although some magnet schools choose students on a lottery system and others require applications based on student achievement, some magnet schools give seating priority to students that live within partial attendance zones. Some schools allow more students from outside their attendance zone than others, and this may influence school performance. By combining student address points with attendance zone boundaries, it is possible to determine the percentage of students attending a school from outside the attendance zone. Each school's percentage of out-of-zone students was calculated using this method. Schools without attendance zones are considered to serve 100% of their students from out of their attendance zone. Although some magnet schools only have partial magnet programs where students take a different curriculum than the rest of the student body, the school's performance score still shows the influence of these outside students (North Carolina State Board of Education, 2007).

Besides the current school assignment for each student, an attendance zone will predict what school(s) a student may be assigned in the future. Elementary school attendance zones are encompassed by their middle school attendance zones as well as high school attendance zones. I will also investigate the effects that the performance of higher level schools may have on other schools within the same attendance zone.

School Socioeconomic Status

The SES of each school was approximated using the measures of Median Family Income (MFI) and Percent African American. Aggregated MFI is a strong predictor of school performance (Sutton and Soderstrom, 1999; Toutkoushian and Curtis, 2005) and the percent of African American students in a magnet school can predict how many white students choose to attend (Saporito, 2003). Neither variable was provided by the school district, but I was able to make a proxy aggregate measure of each variable for all Guilford County magnet schools based on their student addresses and 2000 U.S. Census data..

"Student Mean Family Income" (SMFI) was calculated for each school by combining student address points with a Census block group layer, averaging the value at each point for all schools. For example, School X has 10 students. By geo-coding each student's address over a map of Census block group data of median family income, we estimate each student's family income based on the block group they live in. In our example, three students live in a block group where the MFI is $20,000, five students live in a block group where the MFI is $35,000 and the remaining two students live in a block group with a MFI of $40,000. We multiply the number of students in each block group by its corresponding MFI, add up these values and divide by the total number of students. The Student Mean Family Income for School X would be $31,500. This value was calculated for each school as an approximation for its student body SES. Median family income, measured for household units with two or more related persons, is a broad measure of SES, but it boils down other factors associated with SES, such as poverty or

the number of children receiving school-provided meals that were used to measure SES in other school performance research. Both poverty rates and the number of school-provided meals will decrease as student family income rises.

Each school's proportion of African American students was approximated using a method similar to the one used for "Student Mean Family Income." "Percent African American Students" was calculated by combining student address points with Census block group data for each neighborhood's percentage of African American residents. Neighborhoods with a 50% or greater proportion of African Americans were labeled "majority African American neighborhoods." Student addresses located in these neighborhoods were considered African American, while addresses from neighborhoods with less than 50% African American population were not considered African American. For example, if three quarters of a school's students come from neighborhoods that are 30% African American and the remaining students come from neighborhoods that are 90% African American, the student body will be considered 25% African American. The variable "Percent African American Students" is the percentage of each school's students from majority African American neighborhoods and is used as an approximation of each school's demographics.

School SES was also evaluated at the school location. The MFI and percent African American of the Census block group for each school location is given as a basis for comparison between each school's student body and the neighborhood where the school is located. This comparison is very important, because it will establish if a magnet school is serving students from similar backgrounds to those in its neighborhood. If a

magnet school serves a population with a higher income than those in its attendance zone, it may attract higher income families to live in that neighborhood.

School Performance

Each school was evaluated using the performance composite calculated by the North Carolina Department of Education's ABCs of Public Education Program. The performance measures used are from the 2005-06 school year, which is the same school year as the student address data. Schools are also evaluated on academic growth, rewarding schools that improve their test scores year over year, and through federal No Child Left Behind legislation. No Child Left Behind measures whether each school is making "Adequate Yearly Progress" (AYP), and grades on a pass/fail basis. All of these elements are taken into account for school labels that range from "Low Performing" to "Honor School of Excellence," although the performance score is the most pertinent to the label each school receives, and to this study. The performance composite is a useful way to evaluate schools since schools that score above 90% can receive the state's highest honors and schools that score below 60% would be considered failing, much the same way students are graded in school (Table 1). Elementary and middle school scores are measured exclusively through student testing, while high schools measure dropout rates and the percentage of students completing college preparatory classes (Appendix A).

The performance composite will be the only variable used to measure each school's achievement in this study. Although year-over-year growth is important for a school as well as meeting the No Child Left Behind requirements, these measures add too

much uncertainty to an ordinal scale of school performance. For example, a school scoring 99% one year and 98.9% the next will get no recognition because it failed to meet its growth target; however, a school that scores 90% (still no small feat) will be labeled a "School of Excellence" or "Honor School of Excellence if it beat its previous year's score and also passed its federal No Child Left Behind requirements.

Table 1 – NC State Board of Education School Performance Evaluation[2]

<table>
<tr><th rowspan="2">Performance Level</th><th colspan="3">Academic Growth</th></tr>
<tr><th colspan="2">Schools Making Expected Growth or High Growth</th><th>Schools Making Less than Expected Growth</th></tr>
<tr><td rowspan="2">90% to 100%</td><td>Met AYP</td><td>Honor School of Excellence</td><td rowspan="4">No Recognition</td></tr>
<tr><td>AYP Not Met</td><td>School of Excellence</td></tr>
<tr><td>80% to 89%</td><td colspan="2">School of Distinction</td></tr>
<tr><td>60% to 79%</td><td colspan="2">School of Progress</td></tr>
<tr><td>50% to 59%</td><td colspan="3">Priority School</td></tr>
<tr><td>Less than 50%</td><td colspan="2">Priority School</td><td>Low Performing</td></tr>
</table>

Magnet School Types

Magnet schools have specialized programs geared toward student needs and wants and differ in the type of student they aim to attract. In Guilford County, magnet schools aim to attract students with different academic interests and abilities. Elementary magnets are divided by theme, with schools concentrating on arts-based curriculums, global studies, Montessori, foreign language immersion and even a school with a "traditional" curriculum. Elementary schools seat students outside their attendance zone on a lottery basis. For elementary magnet themes for which there are

[2] North Carolina State Board of Education, Department of Public Instruction, "ABCs 2007 Accountability Report Background Packet," p. 2.

two schools, such as Montessori and arts-based, parent residence determines which school the student is enrolled between Greensboro and High Point choices (Guilford County Schools, 2007a). Students with a sibling currently enrolled in a magnet school are given seating priority. Secondary magnet schools in Guilford County have themed curriculums, but students must apply to these schools and be accepted with an academic achievement component in their application. A lottery system is used if there are more qualified students than seats.

The school district has a system of "middle college" high schools, which are programs that concentrate on "underserved" students, teaching them on college campuses (Middle College National Consortium, 2008). Middle colleges will receive a dummy variable for statistical analyses to control for their narrow focus on "underserved" students, who are perceived as underachieving. The district also hosts several "early college" high schools where students are taught by college professors and can earn college credit in 11th and 12th grade. The Early College at Guilford, which has the district's highest performance composite (99.5%), has a 19-page application for prospective students (The Early College at Guilford, 2007). None of the middle college schools or the early colleges have attendance zones. The number of students in a school and the level of each school (elementary, middle, high) are also considered.

Methodology

Geo-coded student addresses, magnet school locations and school attendance zones will be mapped along with income and race data to investigate spatial patterns in these variables. By exploring the spatial relationships between these variables it will be

possible to create a model with which to use magnet schools in future neighborhood revitalization projects.

Regression methods are widely used in the social sciences to describe the relationship between a dependant variable and a set of independent variables. I am interested in predicting, through multiple regression analysis, the performance of magnet schools, based on the information available in this study. Furthermore, I am also interested in predicting the average family income of magnet school students to predict whether middle and upper class families are attracted to such schools.

The multiple regression equation generally takes the form

$$Y_{exp} = b_1X_1 + b_2X_2 + b_3X_3 + a,$$

where Y_{exp} is the expected value of the dependent variable, b_1, b_2 and b_3 are the weights for predictors X_1, X_2 and X_3, and a is the intercept (Howell, 2004, p. 237). The resulting R^2 value estimates the variance of the prediction. All variables in the spatial distribution and regression analyses are listed in Table 2:

It is understood that other factors besides the socioeconomic status of students influence school performance. Differences in school funding, teacher turnover rates, parental involvement, class size and the quality of leadership are just a few of the factors that can make one school perform better than another. Furthermore, the role of magnet schools has grown in recent years from one that integrates white and African American students, to one that integrates students based on parental income and may also take into account an area's Asian population. However, none of these issues greatly weaken the purpose of this research, which is to establish the relationships between income and

performance in magnet schools. Several researchers have concluded that socioeconomic status is a much larger predictor of school performance than school context (Sutton and Soderstrom, 1999; Ma, 2000). A larger number of schools to study would strengthen this research, but privacy policies in many school districts make the use of student address data difficult to acquire. Nevertheless, the student address data used in this study make it easy to draw conclusive answers to these research questions.

Table 2 – All Variables

Variable Name	Definition and Description
School Data	
Performance	NC Dept of Education (0 - 100)
Percent Out of Zone	Percentage of Magnet Students that attend school from outside attendance zone
Underserved (dummy)	Schools that teach exclusively underserved or underachieving students, 0 = exclusively underachieving students, 1 = not exclusive
Number Students	Number of students attending a school
School Level	Elementary/Middle = 0, High School = 1
Encompassing HS Performance	Performance score of high school for which an elementary or middle magnet school is in its attendance zone
Socioeconomic Data	
Neighborhood MFI	Census Block Group Level data at School Location
Neighborhood % African American	Census Block Group Level data at School Location
Student MFI	Average MFI value of student address points for each school
Students Percent African American	Percent of students from majority African American neighborhoods

CHAPTER IV

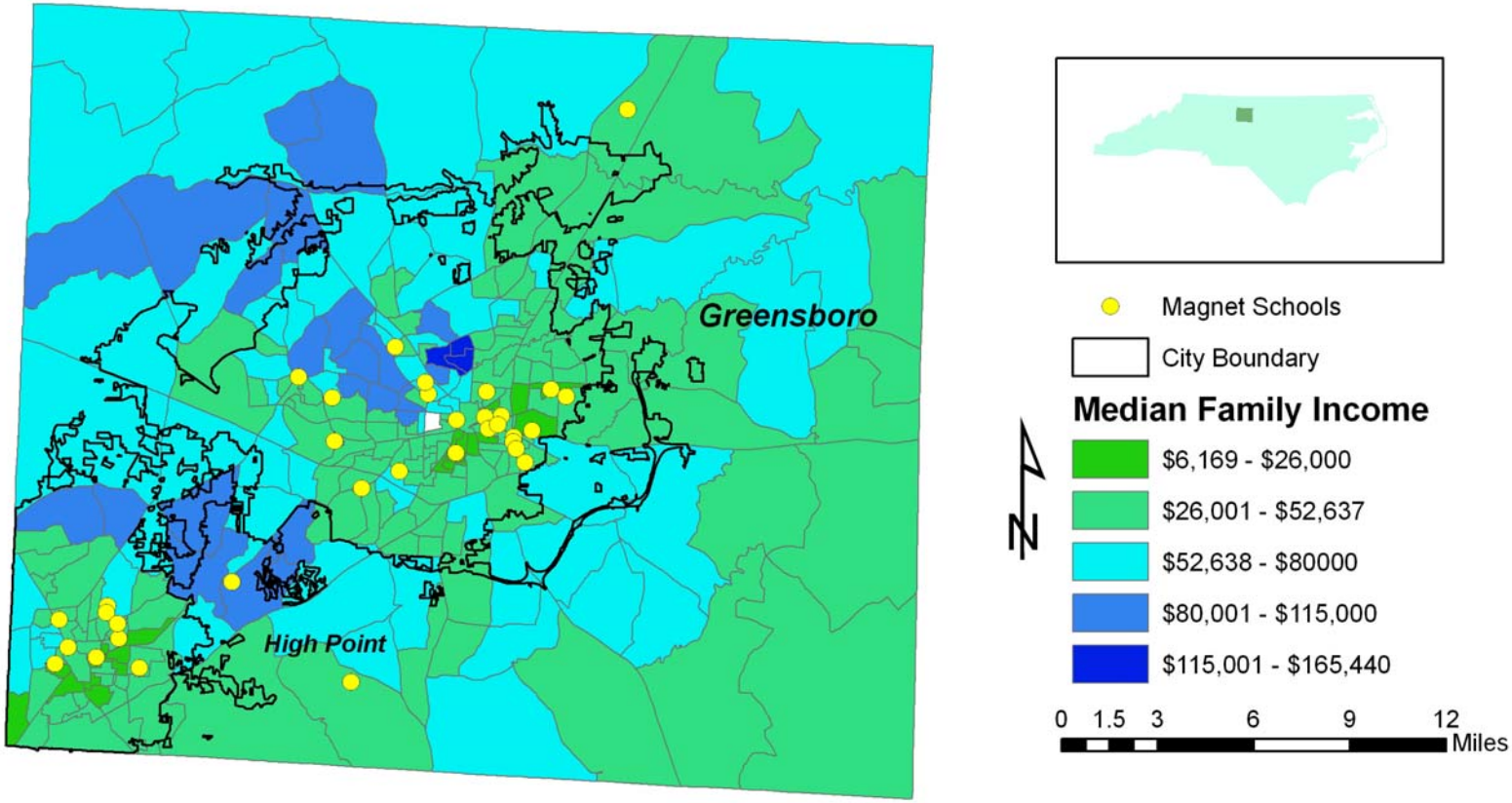
FINDINGS

Do Neighborhood Socioeconomic Characteristics of Magnet School Locations Influence Their Performance?

In Guilford County, magnet schools are overwhelmingly located in low-income neighborhoods (Figure 2). The average neighborhood MFI where magnet schools were located was $40,631, while the average was $57,157 for conventional public schools (Appendix D). This discrepancy is not surprising, considering magnet schools' role in voluntary integration, attracting white middle class students to poor minority neighborhoods. The MFI for Guilford County as a whole was $52,638, Greensboro's was $50,192 and High Point's was $48,057 (US Census, 2000).

A simple analysis of magnet school location finds their performance only loosely tied to neighborhood SES. Pearson's Correlation Coefficient was used to study the relationships between the variables as all the data are normally distributed and interval level. The neighborhood median family income surrounding conventional schools has a moderate to strong connection to conventional school performance (r = .674) (Table 4). The same is not true for magnet schools whose correlation is both low and insignificant (Table 3). This extreme difference between magnet and conventional schools makes them worthy of further study. Because we've established that neighborhood socioeconomic characteristics of magnet school locations *do not influence performance,*

Figure 2 – Guilford County Magnet Schools and Neighborhood Median Family Income



Sources: U.S. Census Bureau, NC Dept of Education, Guilford County Schools

Table 3 - Magnet School Correlations

	Performance	*Nbhd MFI*	*Student MFI*	*Neighborhood % African American*	*Students % African American*	*Number Students*	*% Out of Zone*
Performance	1	0.216	**.670****	**-.496****	**-.486****	-.049	.201
Nbhd MFI	.216	1	**.379***	**-.673****	**-.396***	-.053	.089
Student MFI	**.670****	**.379***	1	**-.627****	**-.860****	-.086	**.420***
Nbhd % Af Am	**-.496****	**-.673****	**-.627****	1	**.729****	-.143	.064
Stdnts % Af Am	**-.486****	**-.396***	**-.860****	**.729****	1	.034	-.264
Nmbr Students	-.049	-.053	-.086	-.143	.034	1	**-.772****
% Out of Zone	.201	.089	.420*	.064	-.264	**-.772****	1

Note: **= .01 sig, *= .05 sig – 2-tailed

Table 4 - Conventional School Correlations

	Performance	*Neighborhood MFI*	*Student MFI*	*Neighborhood % African American*	*Number Students*
Performance	1	**.674****	**.899****	**-.589****	-.231
Nbhd MFI	**.674****	1	**.740****	**-.562****	**.308***
Student MFI	**.899****	**.740****	1	**-.626****	**.350****
Nbhd % Af Am	**-.589****	**-.562****	**-.626****	1	-.218
Nmbr Students	-.231	**.308***	**.350***	-.218	1

Note: **= .01 sig, *= .05 sig – 2-tailed

we need to explore what factors do.

Magnet schools are most often used to racially integrate students, so the percentage of African Americans in each school and neighborhood is explored. Conventional school performance has a moderate negative correlation to the percent African American of the neighborhood surrounding the school (r = -.589) (Table 4), as does magnet school performance (r = -.496) (Table 3). We get a better picture of the SES

of each school's student body by using our approximations from the student address data combined with MFI and racial data at the Census block group level.

Magnet schools are serving lower income students on average with an average median family income of $47,065. Conventional school students have a median family income of $57,722, which is very close to the school neighborhood income average (Appendix D). School performance scores, highly correlated to student median family income for conventional schools (r = .899) and moderately so for magnet schools (r = .670), are reflected in each school's average student median family income (Tables 3 & 4). Weighted by the number of students attending each school, the average performance of conventional schools was 71.62% (Appendix C) while magnet schools averaged 62.66% (Appendix B).

Student average MFI of a school is tied to a number of variables. For conventional schools it is strongly tied to neighborhood MFI (r = .740) (Table 5) and has a negative relationship with neighborhood percent African American (r = -.562). The number of students in a school is weakly, but significantly tied to student MFI (r = .350). On the other hand, magnet school student MFI has a weaker relationship with neighborhood MFI (r = .379) (Table 4), but still has a moderate tie to neighborhood percent African American (r = -.627). The number of students in a magnet school is not related to its performance, but the number of students that attend a magnet school from outside its attendance zone does have a moderate correlation with its performance (r = .420) (Table 5), which is consistent with Rossell's (1985) research. Next, we will

examine the spatial distribution of these variables which will form the basis of the regression models that will answer our remaining research questions.

If Neighborhood Socioeconomic Characteristics of Magnet School Locations Do Not Influence Their Performance, Then What Factors Do?

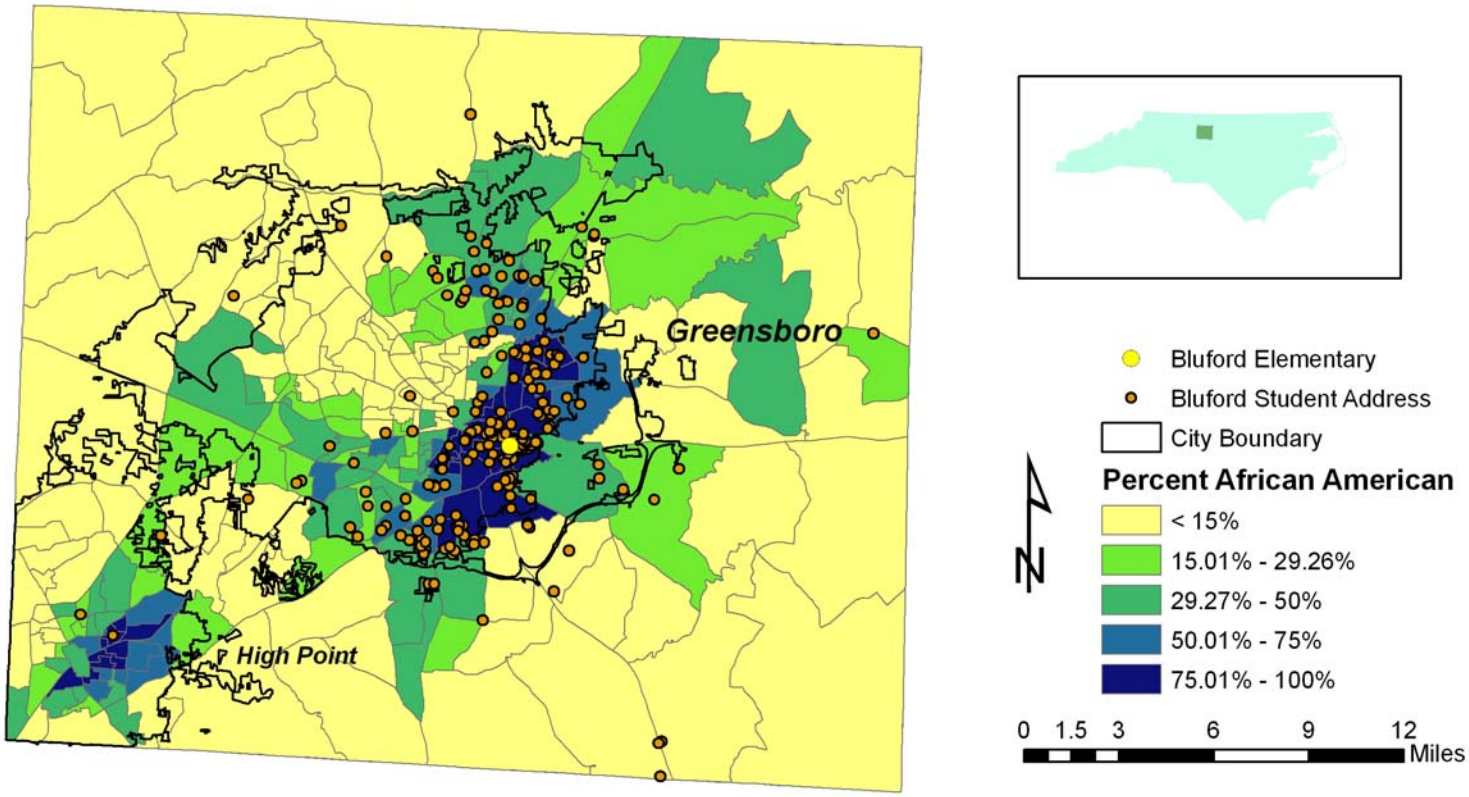
Spatial Distributions of Magnet School Students

The spatial distribution of student addresses over the school district varies greatly between magnet schools. Some schools attract students from all over the county, others from across their respective city, while some magnet schools only attract students from areas similar to the school's own neighborhood. By examining the spatial distributions of magnet school students along with income and racial data, it is possible to draw conclusions about the studied magnet schools. The following answers have been found to the question above:

Race Plays a Role in School Choice

As we've seen in prior research (Rossell, 1985), schools with large proportions of minority students do not attract large numbers of middle class white students. Many of the magnet schools in neighborhoods with high percentages of African Americans attract students principally from majority African American neighborhoods. Magnet schools located in mostly white neighborhoods are more likely to attract students from majority white neighborhoods, but they attract more African American students than majority African American schools attract white students. Examinations of student address distributions of schools in majority African American neighborhoods – Bluford, Falkener

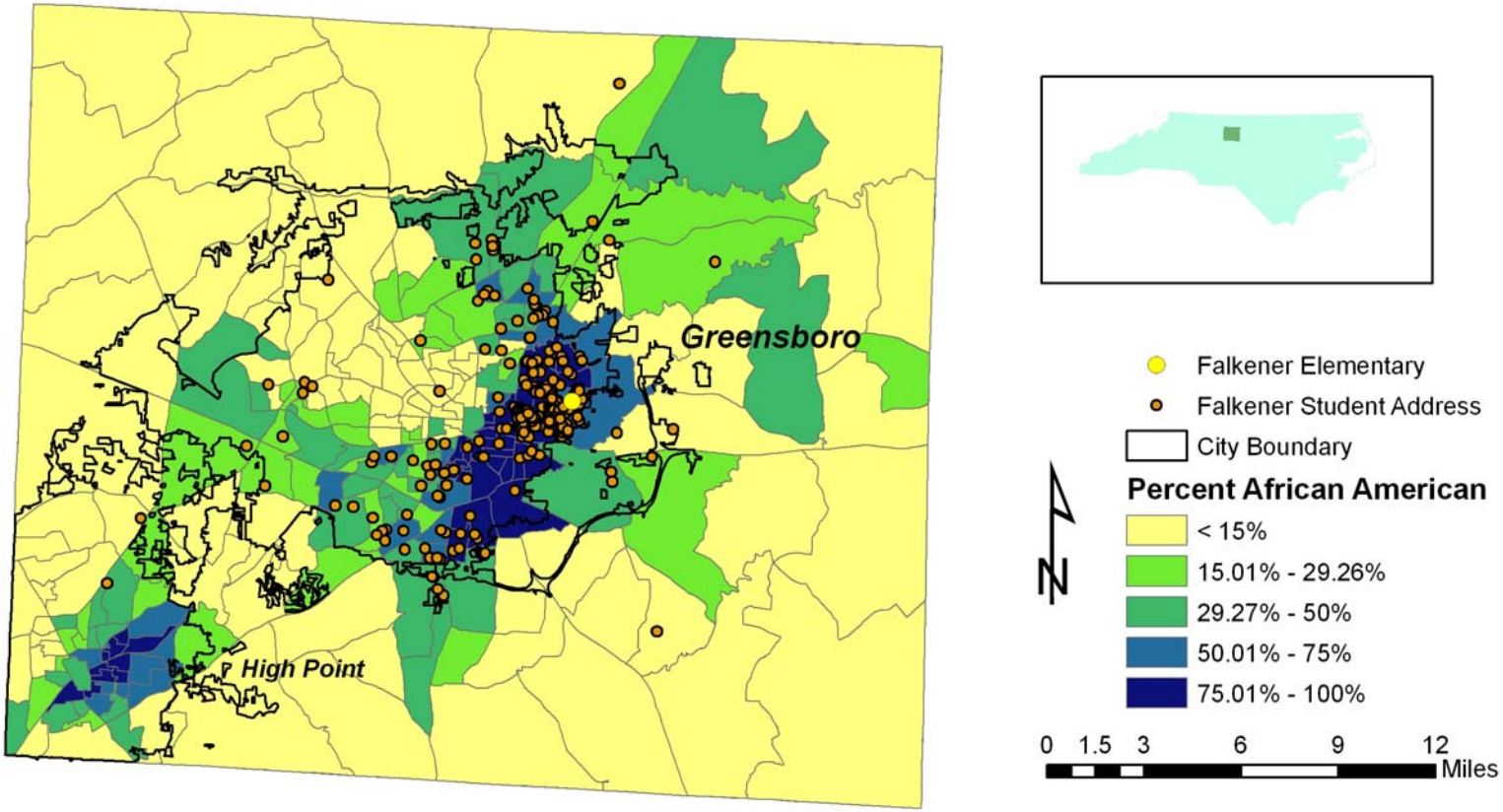
Figure 3 – Bluford Elementary School: Student Addresses and Neighborhood Percent African American



Sources: U.S. Census Bureau, NC Dept of Education, Guilford County Schools

ID	School Name	Performance	School Level	Nmbr Stdts	Nbhd MFI	Student MFI
2	Bluford Elementary	70.10%	Elem	296	$32,043	$40,249
Nbhd % Af Am	**Students % Af Am**	**% Out of Zone**	**AZ Area (km2)**	**Underserved**	**Encompassing HS**	**Encompassing HS Perf**
96.92%	67.90%	74.66%	0.96	No	Dudley	51.70%

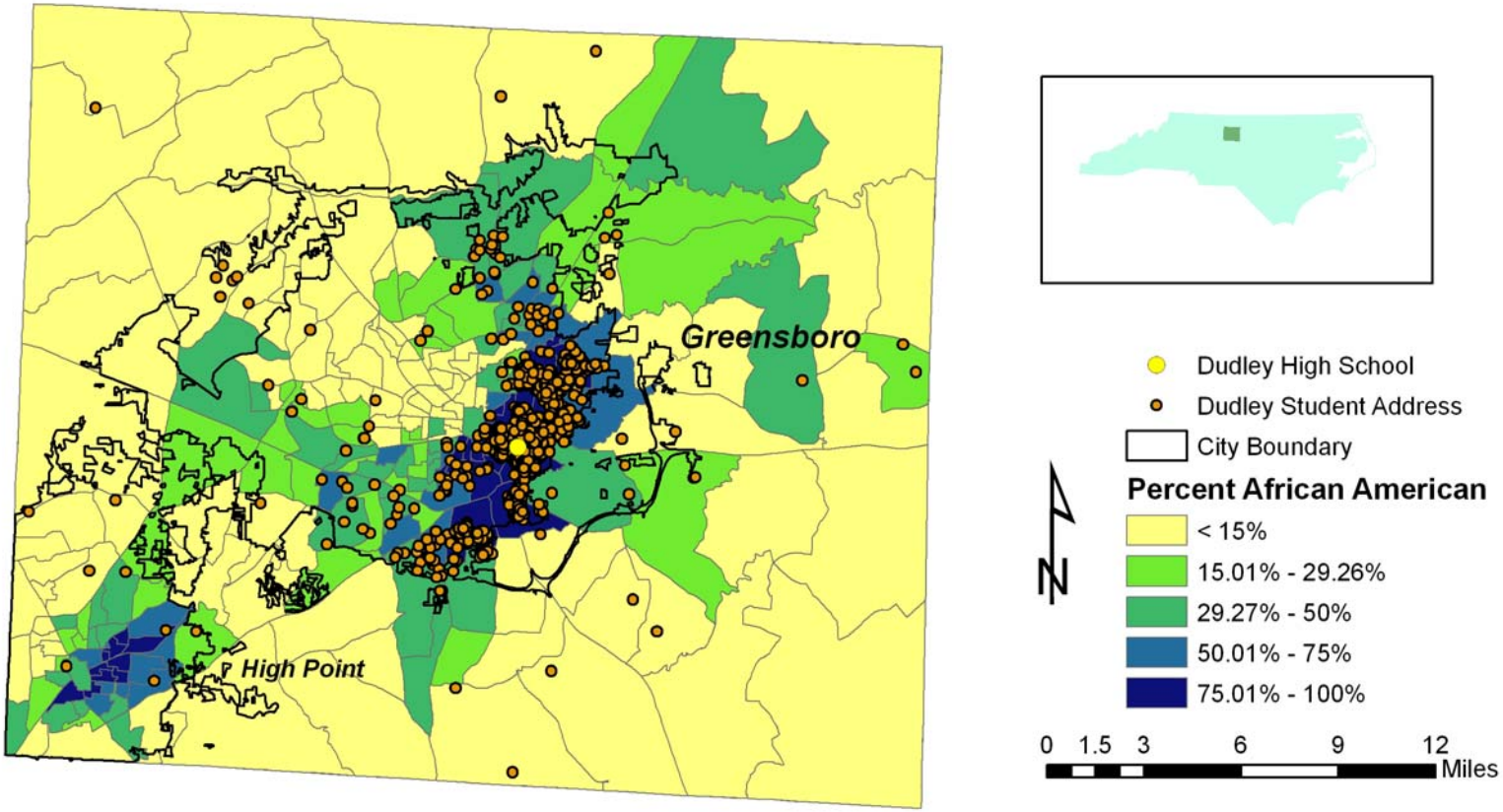
Figure 4 – Falkener Elementary School: Student Addresses and Neighborhood Percent African American



Sources: U.S. Census Bureau, NC Dept of Education, Guilford County Schools

ID	School Name	Performance	School Level	Nmbr Stdts	Nbhd MFI	Student MFI
32	Falkener Elementary	66.5%	Elem	367	$38,220	$34,596
Nbhd % Af Am	**Students % Af Am**	**% Out of Zone**	**AZ Area (km2)**	**Underserved**	**Encompassing HS**	**Encompassing HS Perf**
96.55%	81.47%	52.04%	5.27	No	Dudley	51.70%

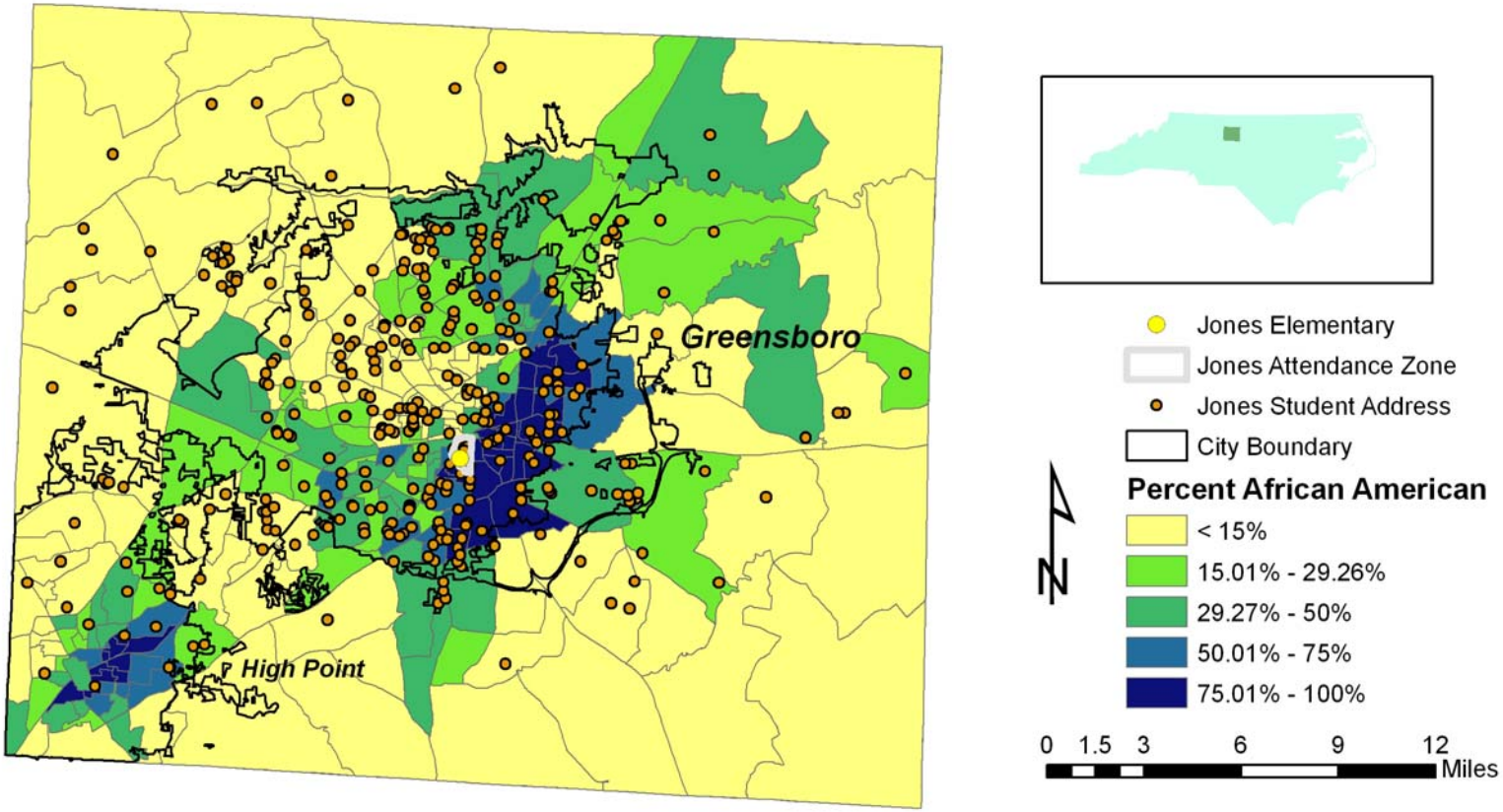
Figure 5 – Dudley High School: Student Addresses and Neighborhood Percent African American



Sources: U.S. Census Bureau, NC Dept of Education, Guilford County Schools

ID	School Name	Performance	School Level	Nmbr Stdts	Nbhd MFI	Student MFI
6	Dudley High School	51.7%	High	1463	$32,043	$37,242
Nbhd % Af Am	**Students % Af Am**	**% Out of Zone**	**AZ Area (km2)**	**Underserved**	**Encompassing HS**	**Encompassing HS Perf**
96.92%	86.26%	16.40%	32.83	No	N/A	N/A

Figure 6 – Jones Elementary School: Student Addresses, Attendance Zone and Neighborhood Percent African American



Sources: U.S. Census Bureau, NC Dept of Education, Guilford County Schools

ID	School Name	Performance	School Level	Nmbr Stdts	Nbhd MFI	Student MFI
5	Jones Elementary	77.7%	Elem	503	$17,583	$46,774
Nbhd % Af Am	**Students % Af Am**	**% Out of Zone**	**AZ Area (km2)**	**Underserved**	**Encompassing HS**	**Encompassing HS Perf**
89.11%	41.35%	74.55%	1.45	No	Grimsley	76.4%

and Dudley – show this pattern clearly (Figures 3-5). In fact, there is a strong correlation between the percent African American of the neighborhood surrounding a magnet school and the percent of the student body that is African American (r = .729) (Table 4). However, there are exceptions to this observation.

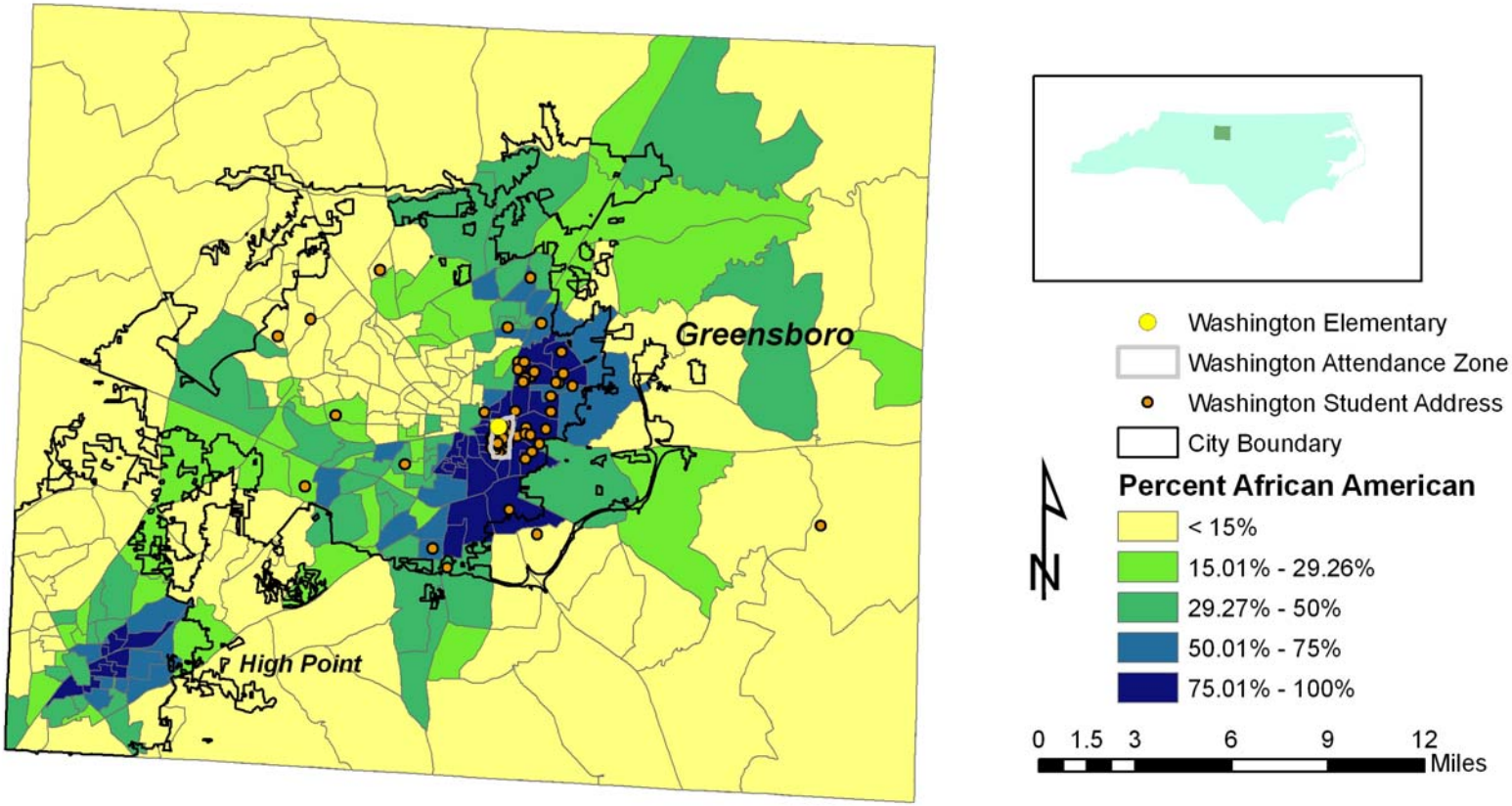
Some magnet schools located in mostly African American neighborhoods attract students from other areas of the school district (Figure 6). Jones Elementary has a more diverse student population than the neighborhood where it is located. Jones Elementary's neighborhood is 89.11% African American, but the school's population is only 41.35% African American. One might conclude that the program at this school is more attractive to parents, or that it performs better than other magnet school choices. Both of these assumptions may be true, but there is also another variable in play.

Attendance Zone Size Influences School Performance

While many of the magnet schools in Guilford County mainly serve the neighborhoods in which they are located, some magnet schools serve greater proportions of students from outside their neighborhood. Some magnet schools have no attendance zone at all and serve students exclusively from outside their neighborhood. Many of these schools perform extremely well, and they all perform differently than conventional public schools in similar neighborhoods.

Our example of Jones Elementary has a small attendance zone measuring about 1.5 km^2 (Figure 6). The size of a magnet school's attendance zone, however, is not as important as the percentage of its student body that comes from outside this boundary. Washington Elementary has a similar neighborhood racial makeup as Jones and also has

Figure 7 – Washington Elementary School: Student Addresses, Attendance Zone and Neighborhood Percent African American



Sources: U.S. Census Bureau, NC Dept of Education, Guilford County Schools

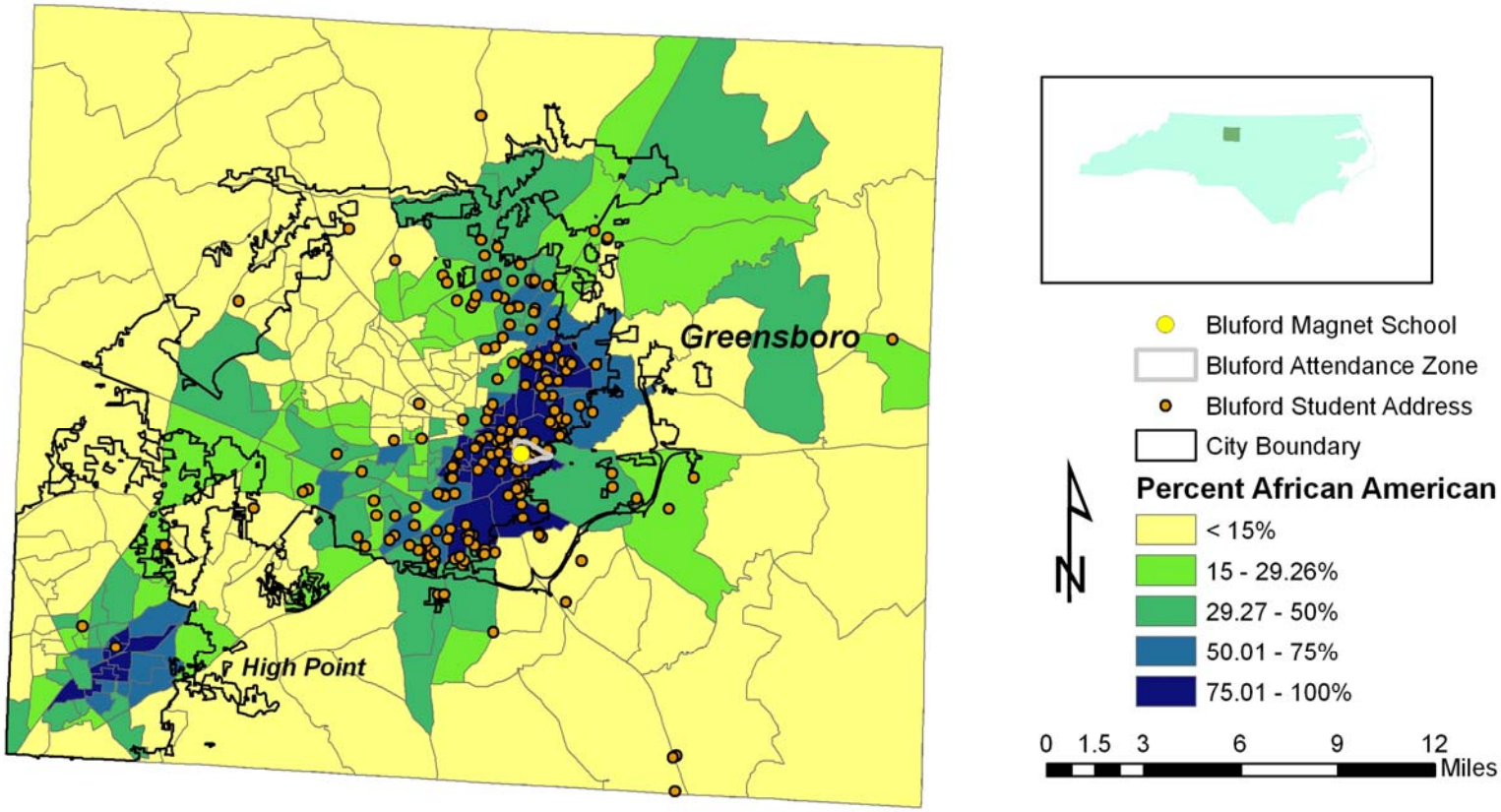
ID	School Name	Performance	School Level	Nmbr Stdts	Nbhd MFI	Student MFI
33	Washington Elementary	43.6%	Elem	202	$28,281	$26,126
Nbhd % Af Am	**Students % Af Am**	**% Out of Zone**	**AZ Area (km2)**	**Underserved**	**Encompassing HS**	**Encompassing HS Perf**
96.55%	94.06%	23.27%	1.95	No	Dudley	51.70%

a small attendance zone of less than two km^2 (Figure 7). However, Washington Elementary's student body is mainly from its own neighborhood, with only 23% of its students from outside its attendance zone and 94% of its student body coming from majority African American neighborhoods. Jones is a mirror image of Washington Elementary, with 75% of its student population coming from *outside* its attendance zone. Washington Elementary's performance of 43.6% was much lower than Jones' 77.7%. Conventional public schools in neighborhoods with similar proportions of African Americans and similarly low surrounding neighborhood incomes, Gillespie Park Elementary and Hairston Middle, had scores of 56.9% and 56.5%.

Within schools that attract students from mainly African American neighborhoods, attendance zone size appears to affect the performance here as well. Bluford Elementary (70.1% performance), which takes about 75% of its students from outside its attendance zone, scores much better than Falkener, which only takes 52% of its students from out of its attendance zone (Figures 8-9). Bluford's student body is about 68% from majority African American neighborhoods while Falkener's is about 81%. By allowing a greater percentage of students to attend from outside a magnet school's neighborhood, the school district often raises the aggregated SES of the school. As we've seen in the research on this subject (Coleman, et al, 1966; White, 1982; Sirin, 2005), student SES is closely related to school performance.

As attendance zones shrink, the spatial distribution of student addresses increases. Schools like Jones Elementary attract students from all over the county. This becomes more difficult to achieve as school size increases. If the district had to provide

Figure 8 – Bluford Elementary School: Student Addresses, Attendance Zone and Neighborhood Percent African American



Sources: U.S. Census Bureau, NC Dept of Education, Guilford County Schools

ID	School Name	Performance	School Level	Nmbr Stdts	Nbhd MFI	Student MFI
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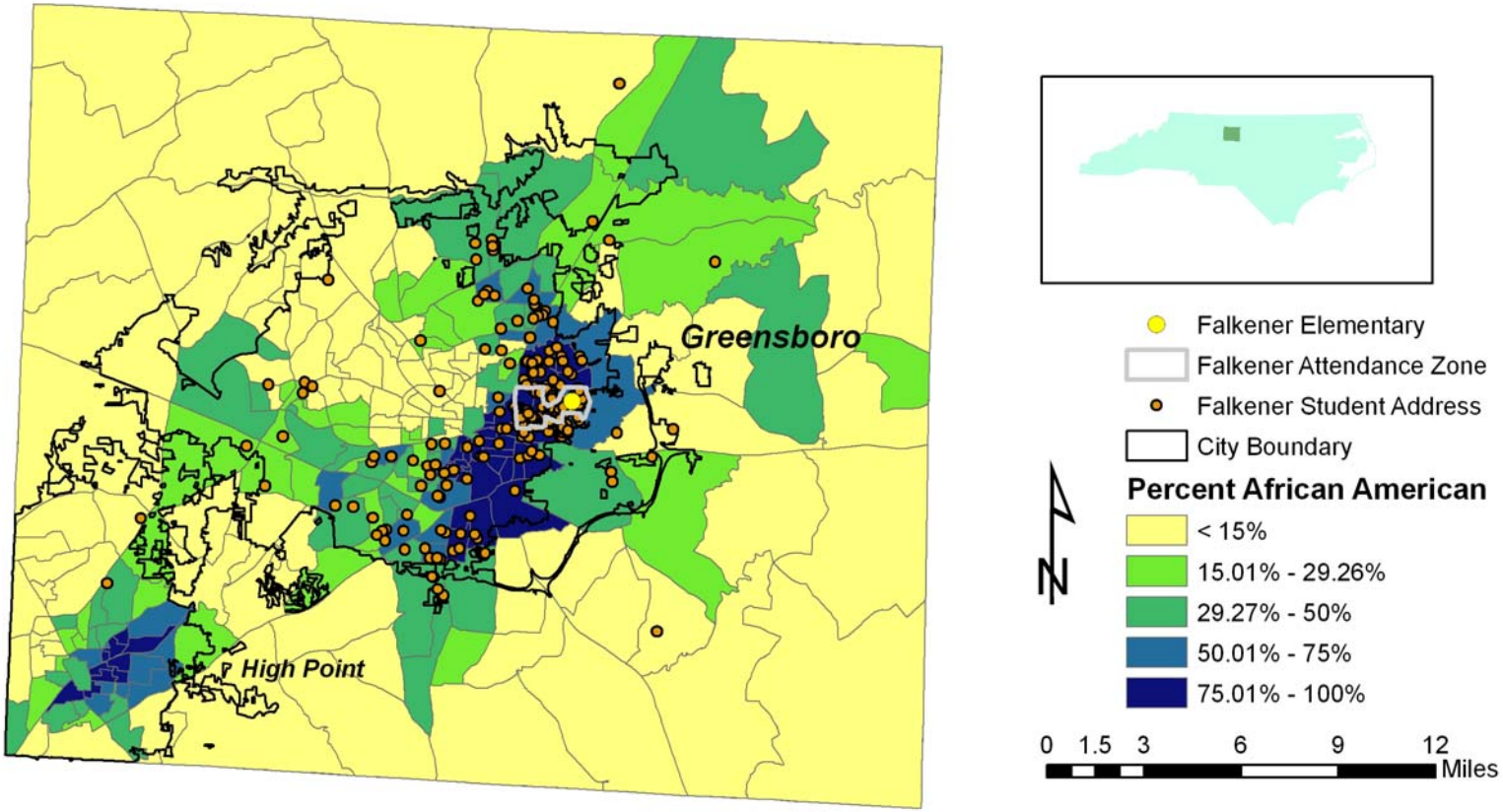
Nbhd % Af Am	**Students % Af Am**	**% Out of Zone**	**AZ Area (km2)**	**Underserved**	**Encompassing HS**	**Encompassing HS Perf**
96.92%	67.90%	74.66%	0.96	No	Dudley	51.70%

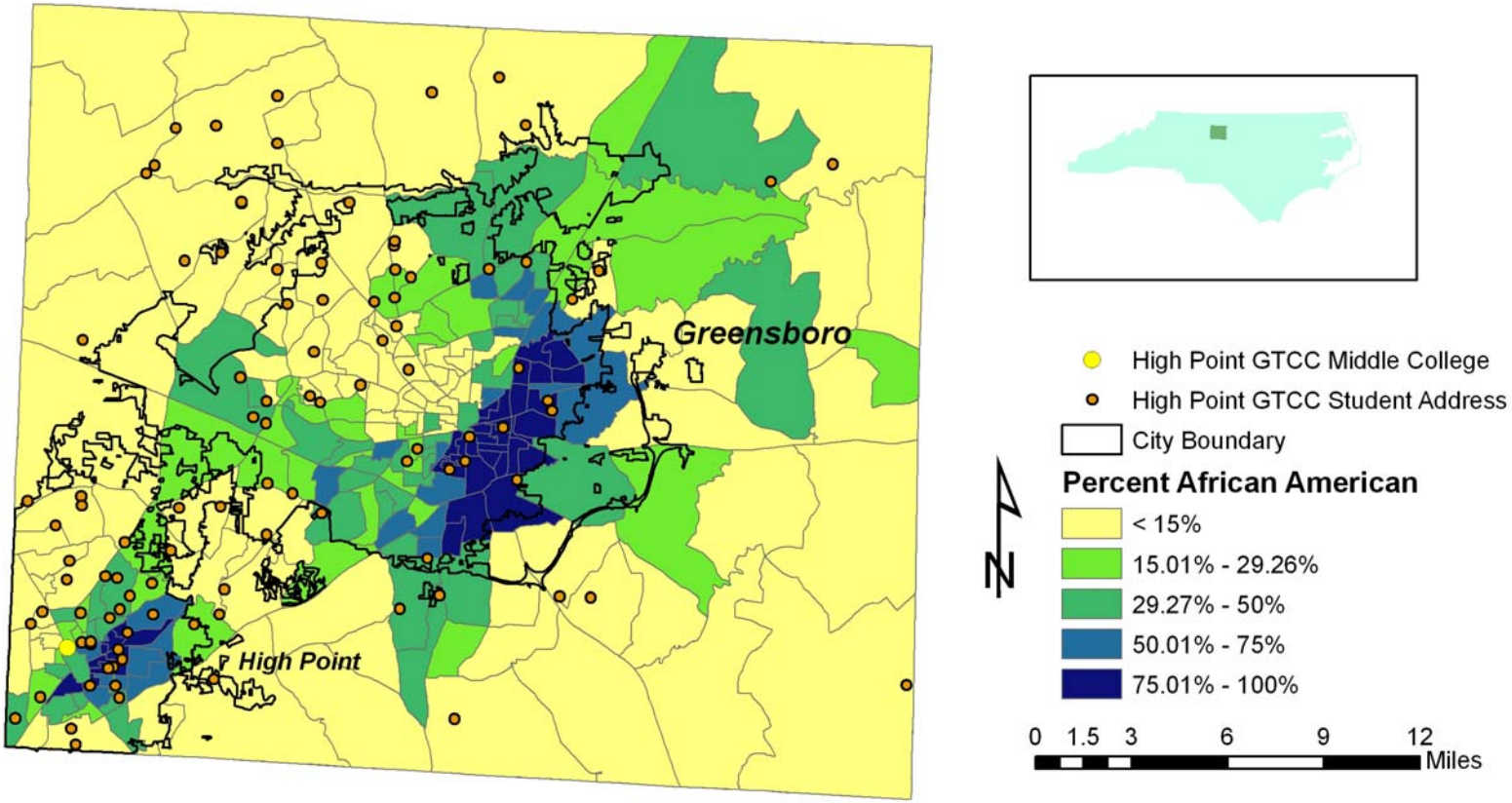
Figure 9 – Falkener Elementary School: Student Addresses, Attendance Zone and Neighborhood Percent African American



Sources: U.S. Census Bureau, NC Dept of Education, Guilford County Schools

ID	School Name	Performance	School Level	Nmbr Stdts	Nbhd MFI	Student MFI
32	Falkener Elementary	66.5%	Elem	367	$38,220	$34,596
Nbhd % Af Am	**Students % Af Am**	**% Out of Zone**	**AZ Area (km2)**	**Underserved**	**Encompassing HS**	**Encompassing HS Perf**
96.55%	81.47%	52.04%	5.27	No	Dudley	51.70%

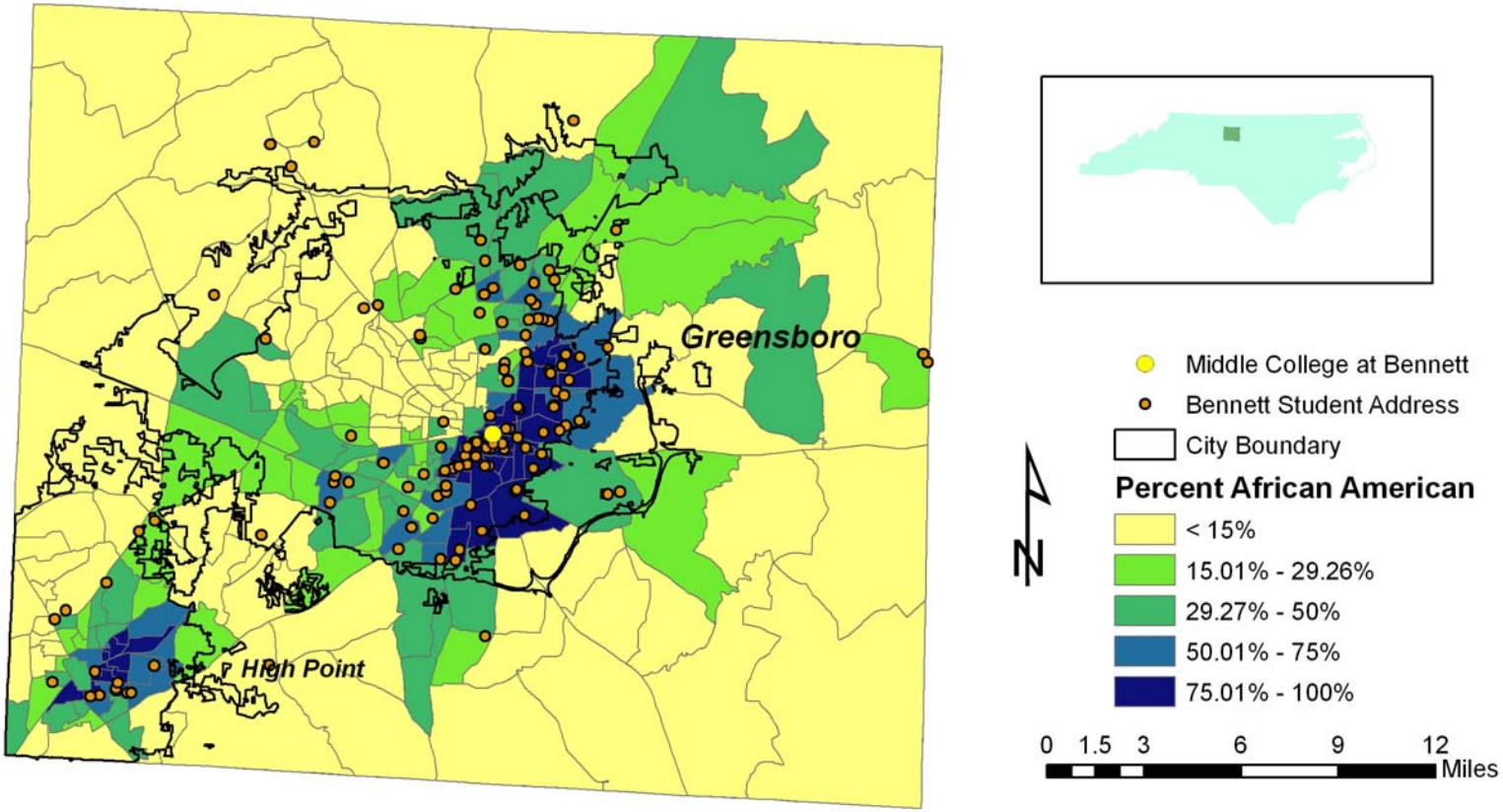
Figure 10 – High Point GTCC Middle College: Student Addresses and Neighborhood Percent African American



Sources: U.S. Census Bureau, NC Dept of Education, Guilford County Schools

ID	School Name	Performance	School Level	Nmbr Stdts	Nbhd MFI	Student MFI
13	High Point Mid College	55.7%	High	141	$13,750	$56,383
Nbhd % Af Am	**Students % Af Am**	**% Out of Zone**	**AZ Area (km2)**	**Underserved**	**Encompassing HS**	**Encompassing HS Perf**
73.80%	15.60%	100%	0	Yes	N/A	N/A

Figure 11– Middle College at Bennett: Student Addresses and Neighborhood Percent African American



Sources: U.S. Census Bureau, NC Dept of Education, Guilford County Schools

ID	School Name	Performance	School Level	Nmbr Stdts	Nbhd MFI	Student MFI
18	Mid College at Bennett	18.7%	High	150	$31,111	$39,063
Nbhd % Af Am	**Students % Af Am**	**% Out of Zone**	**AZ Area (km2)**	**Underserved**	**Encompassing HS**	**Encompassing HS Perf**
97.42%	54.00%	100%	0	Yes	N/A	N/A

transportation at the scale of a high school, where the population is often over 1000 students, fuel costs for buses might cost more than the district could afford. Generally speaking, large high schools cannot accommodate a large percentage of out-of-zone students, therefore SES plays a greater role in the performance of secondary schools.

Guilford County Schools, however, have a series of smaller, specialized high schools without attendance zones. The district's middle college high schools serve students that teachers feel are not living up to their potential while the early college high schools are for more advanced students that want to get college credit in high school. There is a marked performance gap between these types of schools, but student mean family income is reflected more in the early college scores than the middle college scores, which are low for their student SES. Student addresses are distributed much the same way as student addresses for other magnet schools without attendance zones (Figure 10). The Middle College High Schools at North Carolina A&T State University and Bennett College (Figure 11), both historically black institutions, attract more students from mainly African American neighborhoods.

High School Performance May Influence Magnet Elementary Performance

An elementary school is not only located within its own attendance zone, it is also located inside a middle school zone and a high school zone. Each middle school is typically larger than an elementary school and serves the students from at least two elementary schools, just as a high school typically serves students from at least two middle schools. It should not be surprising then that the performance scores for each of these schools in overlapping districts are correlated. Past research has found that middle

class parents pay attention to circuits of schooling and locate accordingly (Ball et al., 1995). Guilford County conventional elementary school performance scores have a moderate to high correlation with encompassing middle school performance (r = .684) and a moderate correlation with encompassing high school performance (r = .613) (Table 5). Middle school performance has an even stronger relationship than elementary schools with encompassing high school performance (r = .755).

Table 5 – Conventional School Correlations With Encompassing Schools
(= .01 sig, *= .05 sig – 2-tailed)**

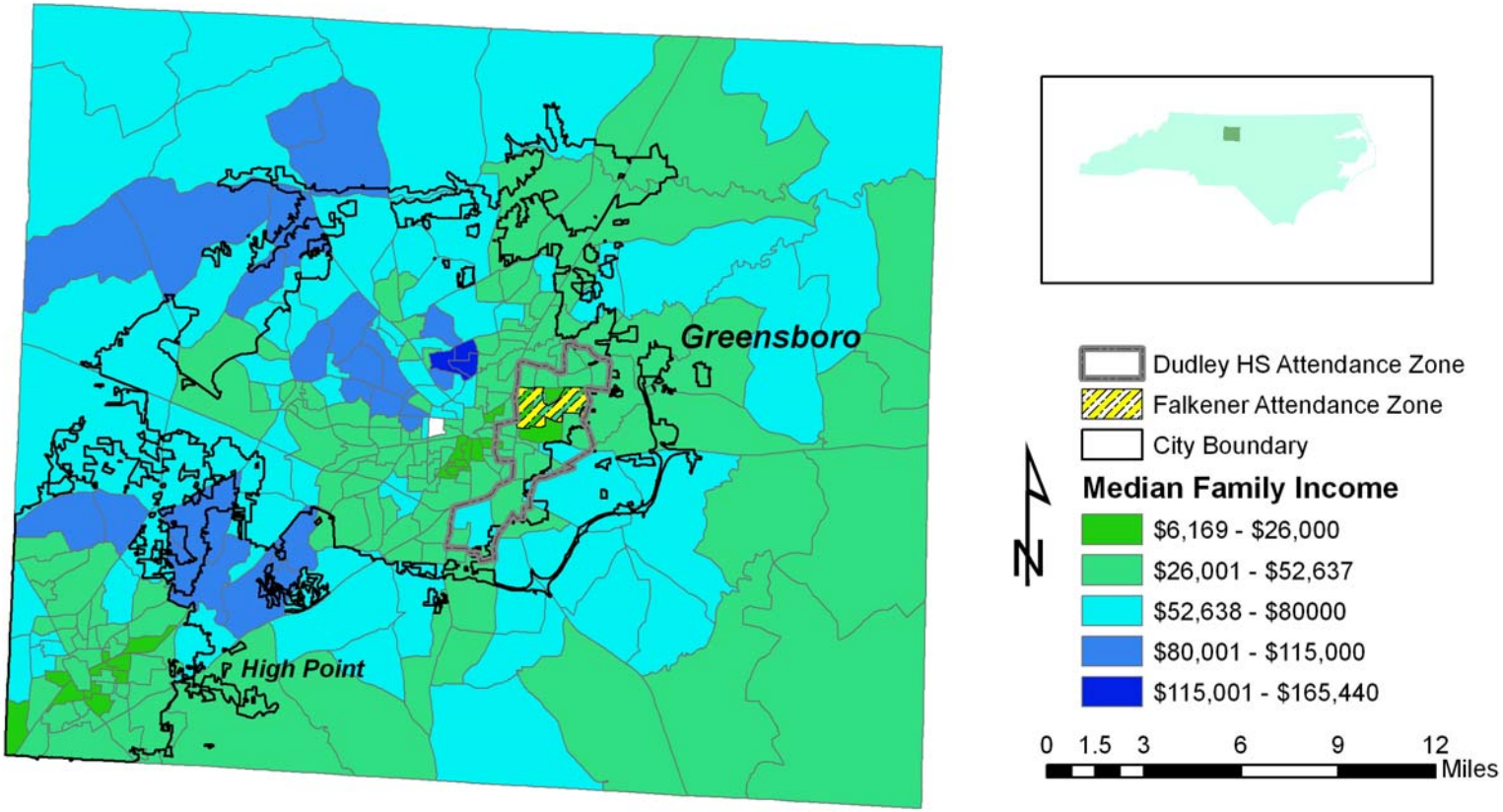
	Perf	***MS Perf***	***HS Perf***
Performance	1	**.684****	**.613****
MS Perf	**.684****	1	**.755****
HS Perf	**.613****	**.755****	1

Table 6 - Magnet School Correlations With Encompassing High Schools

	Perf	***HS Perf***
Performance	1	**.699****
HS Perf	**.699****	1

Even though magnet school students can attend their school from outside its attendance zone, the encompassing high school is still a strong predictor of magnet elementary and middle school performance (r = .699) (Table 6) (Figures 12-13).

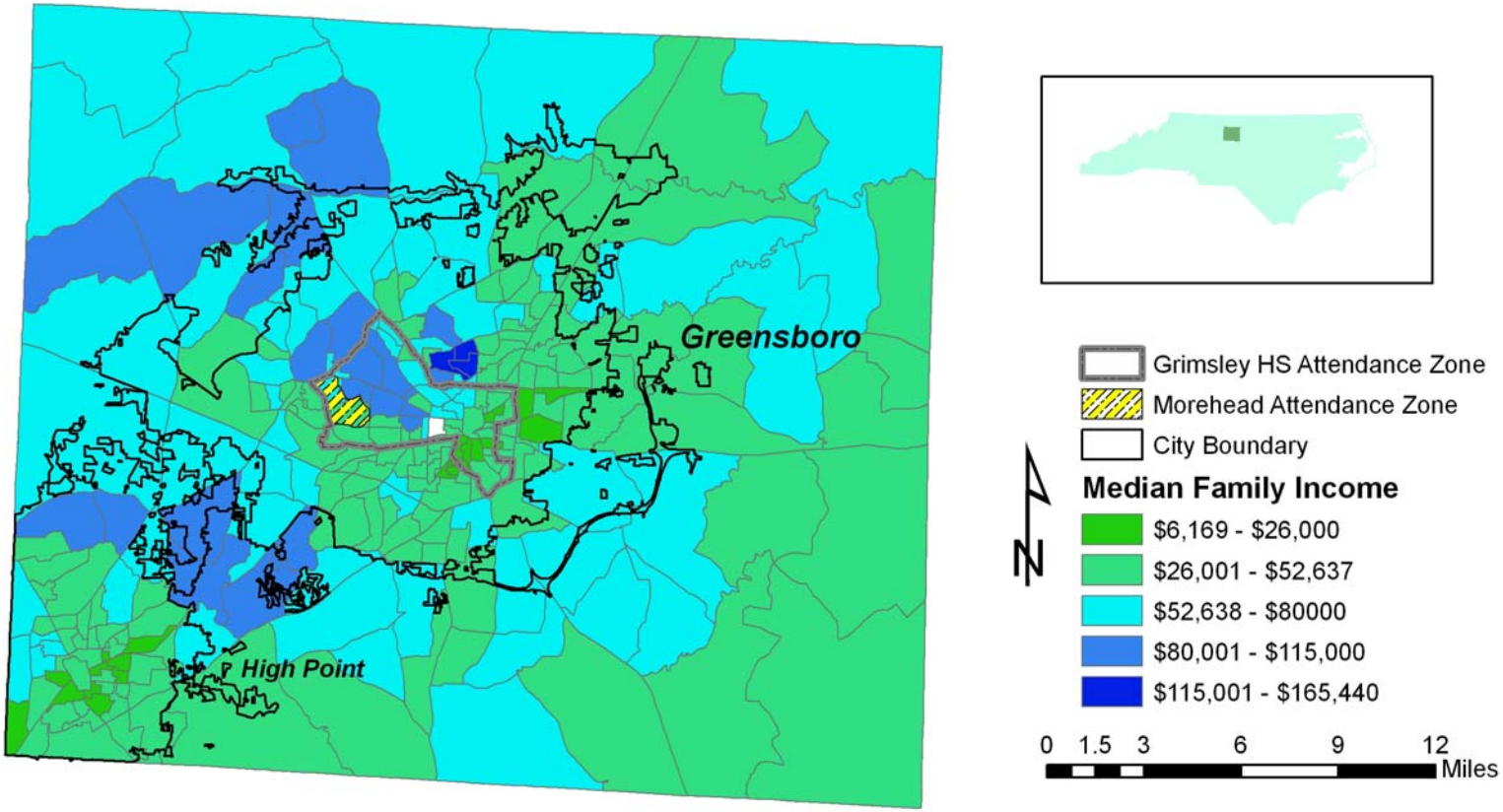
Figure 12 – Falkener Elementary School: Encompassing High School Attendance Zone and Neighborhood Median Family Income



Sources: U.S. Census Bureau, NC Dept of Education, Guilford County Schools

ID	School Name	Performance	School Level	Nmbr Stdts	Nbhd MFI	Student MFI
32	Falkener Elementary	66.5%	Elem	367	$38,220	$34,596
Nbhd % Af Am	**Students % Af Am**	**% Out of Zone**	**AZ Area (km2)**	**Underserved**	**Encompassing HS**	**Encompassing HS Perf**
96.55%	81.47%	52.04%	5.27	No	Dudley	51.70%

Figure 13 – Morehead Elementary School: Encompassing High School Attendance Zone and Neighborhood Median Family Income



Sources: U.S. Census Bureau, NC Dept of Education, Guilford County Schools

ID	School Name	Performance	School Level	Nmbr Stdts	Nbhd MFI	Student MFI
21	Morehead Elementary	84.1%	Elem	324	$71,118	$54,601
Nbhd % Af Am	**Students % Af Am**	**% Out of Zone**	**AZ Area (km2)**	**Underserved**	**Encompassing HS**	**Encompassing HS Perf**
3.25%	6.48%	54.01%	3.96	No	Grimsley	76.40%

However, encompassing middle school performance has no significant correlation with magnet elementary school performance. The relationship between magnet elementary and encompassing high school performance could be the result of many factors. This relationship could simply be a reflection of the low SES of the larger "neighborhood" of elementary schools that eventually supply a high school's students. However, previous research has found that middle and upper class white parents prefer not to send their children to majority black schools. Because school performance is tied so closely to income and race, the low performance scores of some encompassing high schools could reflect the limited drawing power of elementary magnets with high proportions of minorities. High schools with high proportions of minorities have lower performance scores than high schools with ethnicity profiles that more closely match the county. White middle class parents may be willing to send their children to magnet elementary schools in majority black neighborhoods as long as the racial makeup of the school is not majority African American, and later send their children to a secondary school closer to home.

Because encompassing high school performance is such a strong predictor of magnet elementary success, it could be important when creating a model to locate magnet schools for neighborhood revitalization purposes. Whereas SMFI is a more scientific predictor of magnet school performance and can predict the performance of magnet high schools, it has no fixed spatial characteristics. High performing high school attendance zones could be used to predict where magnet elementary schools could benefit the tax

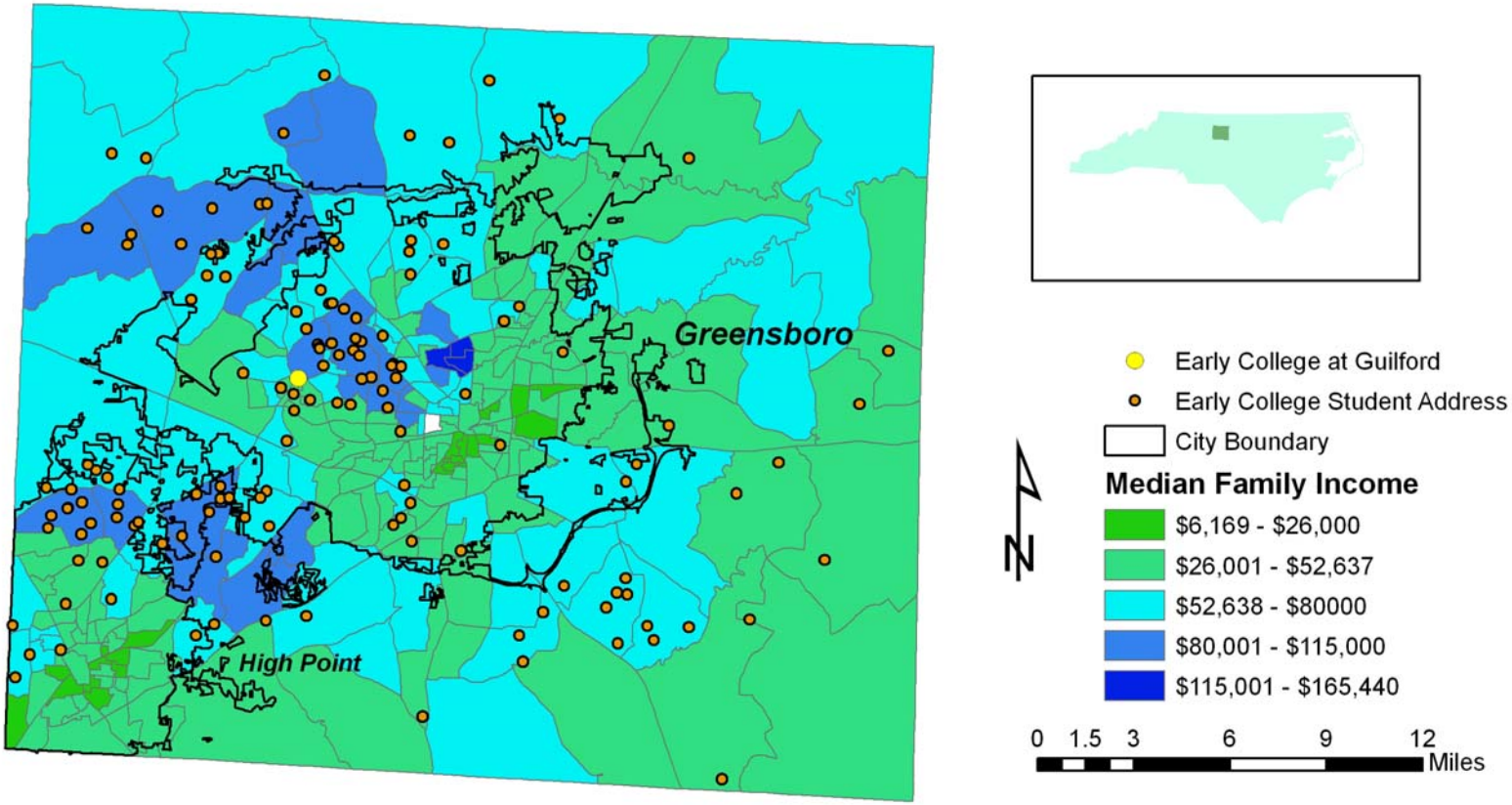
base by attracting middle class families. However, this study does not have a sufficient number of cases of encompassing attendance zones to make a solid prediction.

Extreme Performance Scores Limited by Income Mixing

Not surprisingly, the mix of student family incomes at magnet schools is greater than most of the district's conventional schools. Schools that do not have students from a variety of backgrounds have performance scores at the extremes of the scale. The Early College at Guilford (Figure 14) has the highest performance in the district (97.7%), but it also has the highest SMFI ($69,190) and the fewest students from majority African American neighborhoods (2.96%). The lowest performing schools do not correspond perfectly with the lowest SES measures, but generally speaking, they serve some of the district's lowest income student bodies.

A delicate balance must be struck between the variables of school location and the percent of students allowed from outside the attendance zone. Elementary magnet schools, because of their open attendance policies and potential for high percentages of out-of-zone students, can best demonstrate how these variables affect their student income mix and thus overall school performance. Brooks Global is the best performing elementary magnet (90.1% performance) and it also has no attendance zone, accepting students on a lottery basis (Figure 15). The school also has the advantage of being located in a higher income ($54,083), mostly white (7.61% African American) neighborhood. The school's high SES location probably makes more high-income white parents comfortable with sending their children there. The school attracts students from

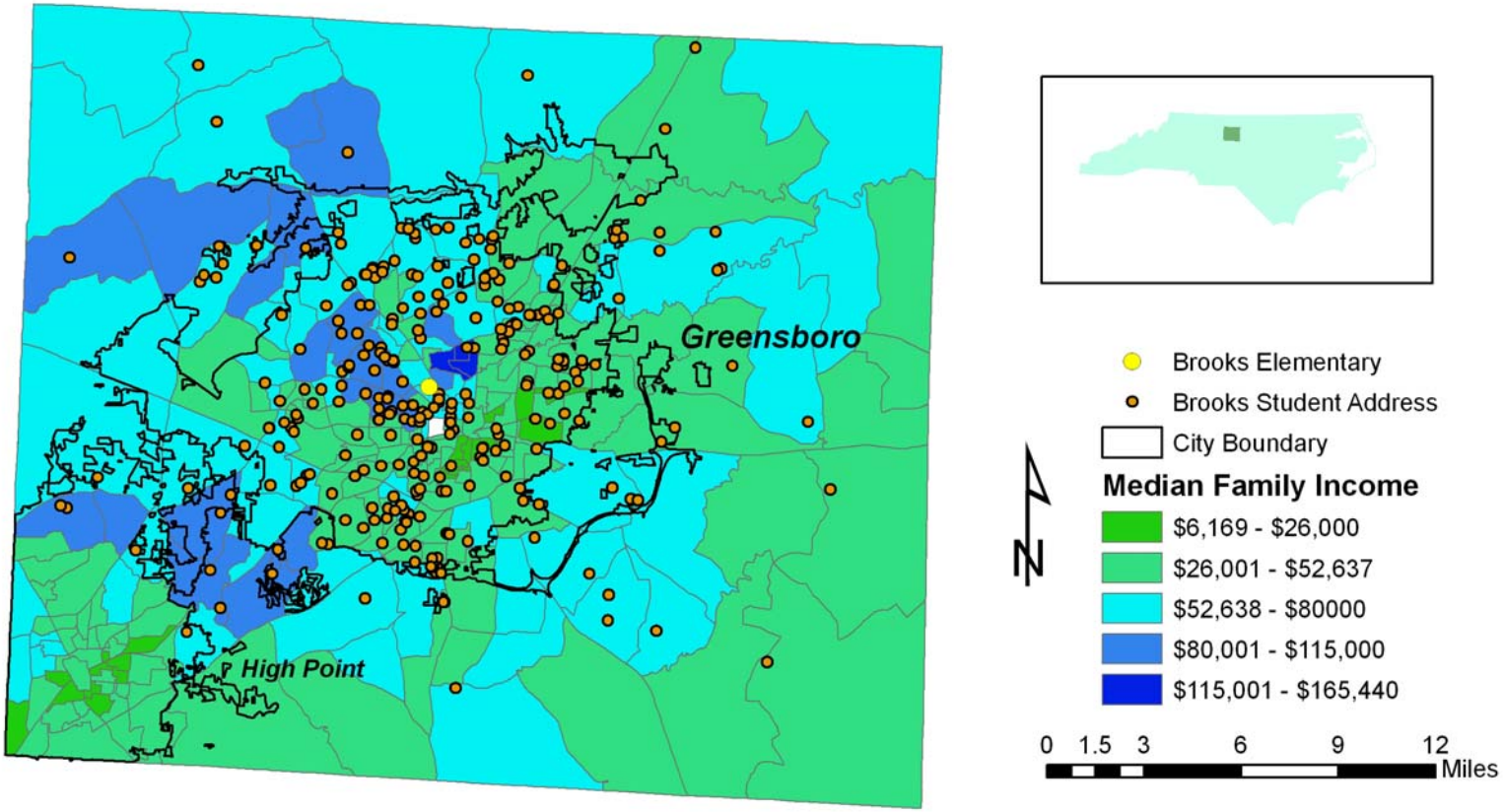
Figure 14 – Early College at Guilford: Student Addresses and Neighborhood Median Family Income



Sources: U.S. Census Bureau, NC Dept of Education, Guilford County Schools

ID	School Name	Performance	School Level	Nmbr Stdts	Nbhd MFI	Student MFI
7	Early Coll at Guilford	97.7%	High	169	$63,250	$69,190
Nbhd % Af Am	**Students % Af Am**	**% Out of Zone**	**AZ Area (km2)**	**Underserved**	**Encompassing HS**	**Encompassing HS Perf**
3.96%	2.96%	100%	0	No	N/A	N/A

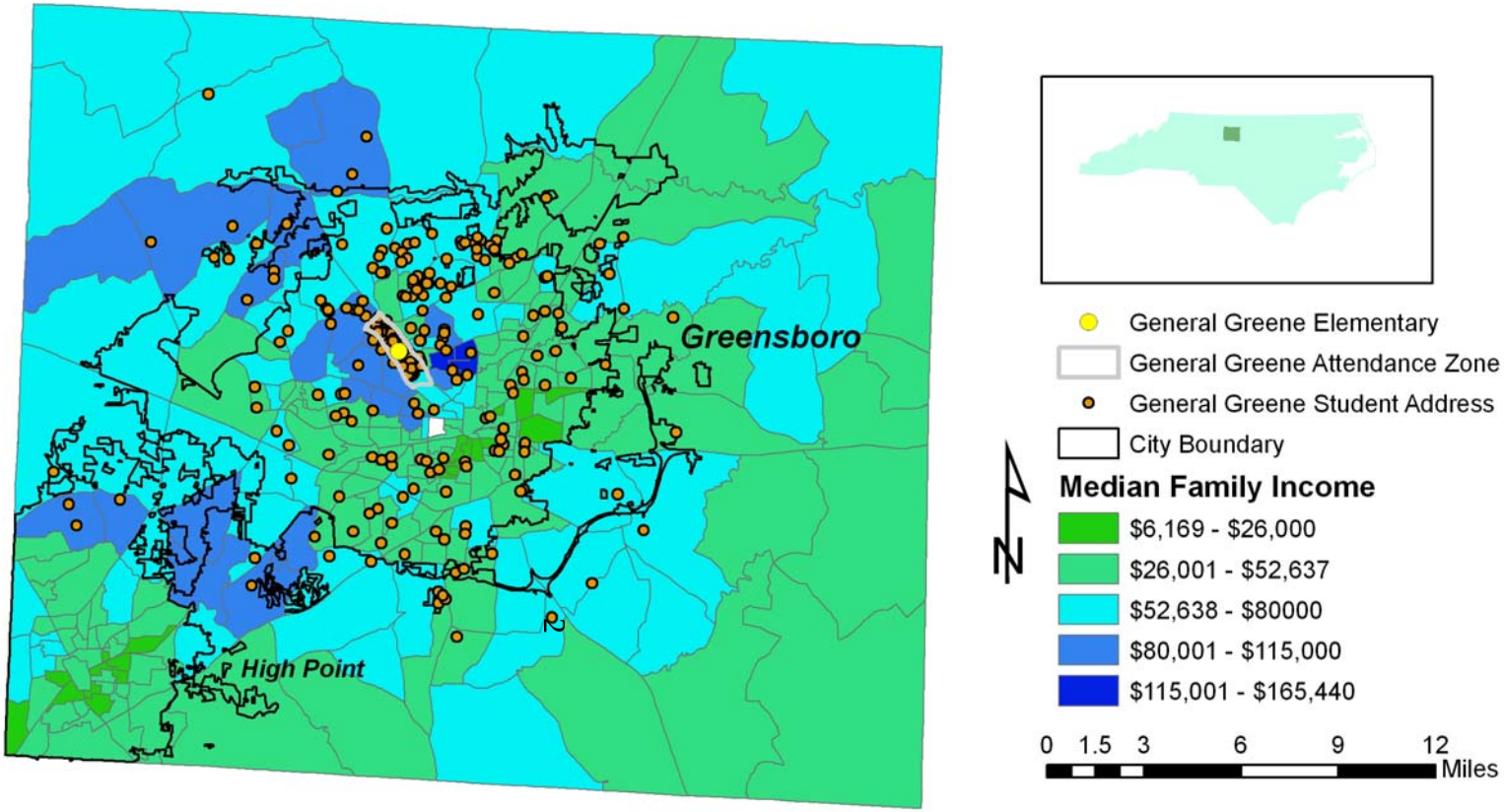
Figure 15 – Brooks Elementary School: Student Addresses and Neighborhood Median Family Income



Sources: U.S. Census Bureau, NC Dept of Education, Guilford County Schools

ID	School Name	Performance	School Level	Nmbr Stdts	Nbhd MFI	Student MFI
3	Brooks Elementary	90.1%	Elem	341	$54,083	$57,762
Nbhd % Af Am	**Students % Af Am**	**% Out of Zone**	**AZ Area (km2)**	**Underserved**	**Encompassing HS**	**Encompassing HS Perf**
7.61%	19.65%	100%	0	No	Grimsley	76.4%

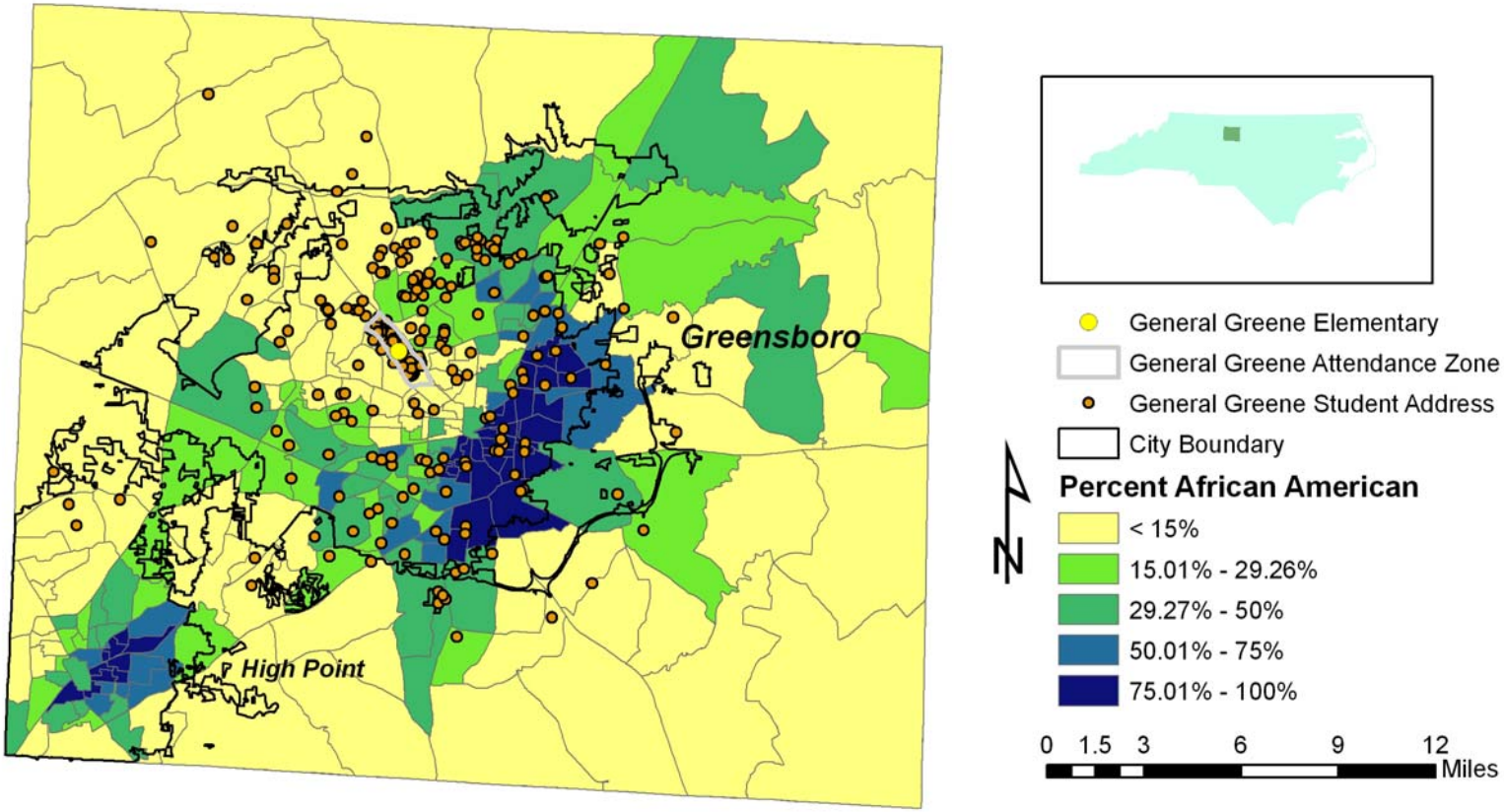
Figure 16 – General Greene Elementary School: Student Addresses, Attendance Zone and Neighborhood Median Family Income



Sources: U.S. Census Bureau, NC Dept of Education, Guilford County Schools

ID	School Name	Performance	School Level	Nmbr Stdts	Nbhd MFI	Student MFI
9	Gen Greene Elem	80.7%	Elem	334	$56,486	$54,267
Nbhd % Af Am	**Students % Af Am**	**% Out of Zone**	**AZ Area (km2)**	**Underserved**	**Encompassing HS**	**Encompassing HS Perf**
5.56%	12.57%	65.27%	4.06	No	Grimsley	76.4%

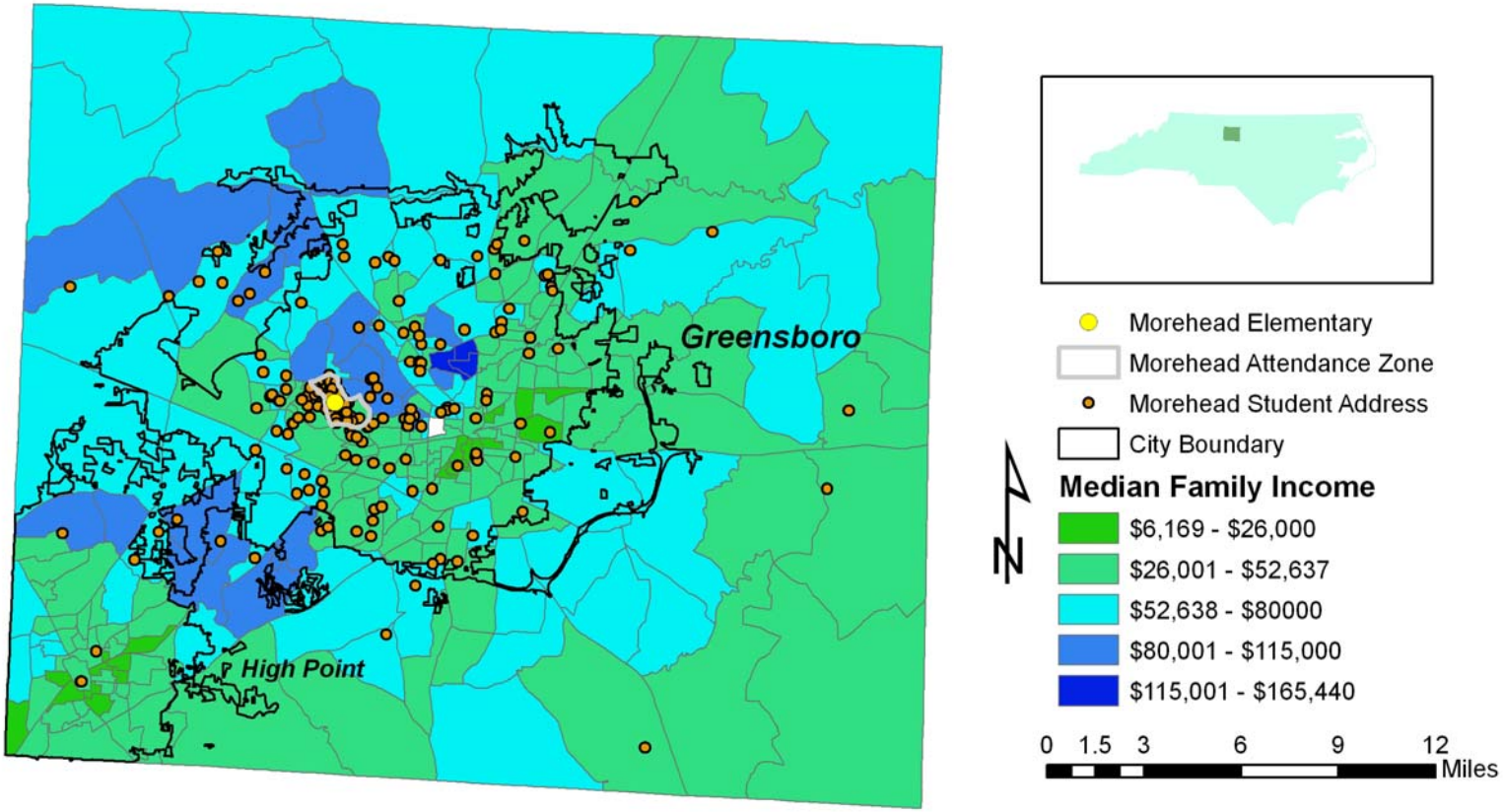
Figure 17 – General Greene Elementary School: Student Addresses, Attendance Zone and Neighborhood Percent African American



Sources: U.S. Census Bureau, NC Dept of Education, Guilford County Schools

ID	School Name	Performance	School Level	Nmbr Stdts	Nbhd MFI	Student MFI
9	Gen Greene Elem	80.7%	Elem	334	$56,486	$54,267
Nbhd % Af Am	**Students % Af Am**	**% Out of Zone**	**AZ Area (km2)**	**Underserved**	**Encompassing HS**	**Encompassing HS Perf**
5.56%	12.57%	65.27%	4.06	No	Grimsley	76.4%

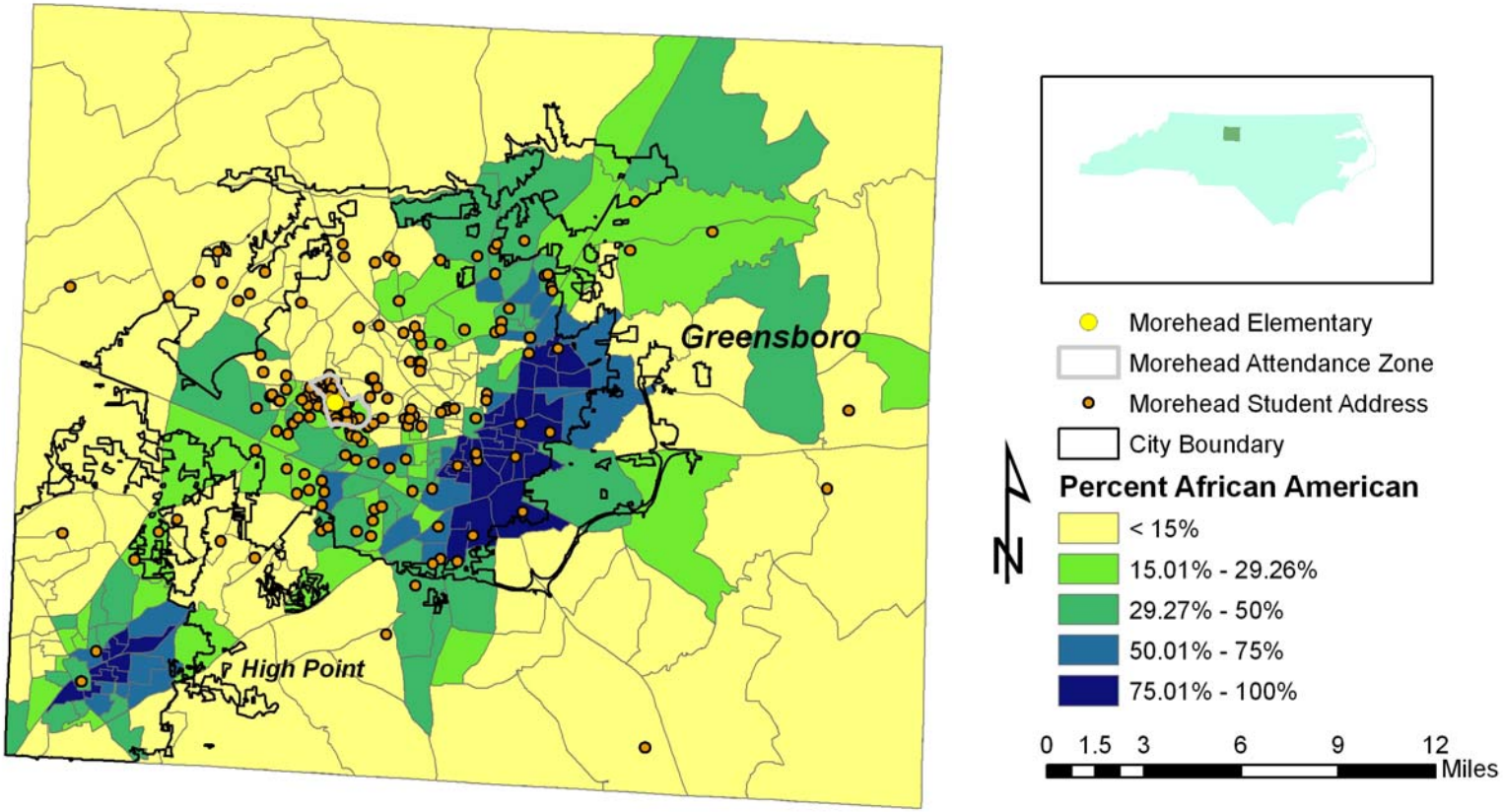
Figure 18 – Morehead Elementary School: Student Addresses, Attendance Zone and Neighborhood Median Family Income



Sources: U.S. Census Bureau, NC Dept of Education, Guilford County Schools

ID	School Name	Performance	School Level	Nmbr Stdts	Nbhd MFI	Student MFI
21	Morehead Elementary	84.1%	Elem	324	$71,118	$54,601
Nbhd % Af Am	**Students % Af Am**	**% Out of Zone**	**AZ Area (km2)**	**Underserved**	**Encompassing HS**	**Encompassing HS Perf**
3.25%	6.48%	54.01%	3.96	No	Grimsley	76.40%

Figure 19 – Morehead Elementary School: Student Addresses, Attendance Zone and Neighborhood Percent African American



Sources: U.S. Census Bureau, NC Dept of Education, Guilford County Schools

ID	School Name	Performance	School Level	Nmbr Stdts	Nbhd MFI	Student MFI
21	Morehead Elementary	84.1%	Elem	324	$71,118	$54,601
Nbhd % Af Am	**Students % Af Am**	**% Out of Zone**	**AZ Area (km2)**	**Underserved**	**Encompassing HS**	**Encompassing HS Perf**
3.25%	6.48%	54.01%	3.96	No	Grimsley	76.40%

all over Greensboro and has a SMFI of $57,762 and a student body in which 19.65% of the students come from majority African American neighborhoods.

Magnet elementary schools located in higher income white neighborhoods with larger attendance zones also perform well, but do not have a as much of a mix of students. General Greene and Morehead (Figures 16-19) are both located in mostly white upper income neighborhoods with incomes of $56,486 and $71,118 and only 5.56% and 3.25% of the neighborhood populations being African American. Both schools perform well with scores of 80.7% and 84.1%, but only accept 65% and 54% of their students from outside their attendance zone. The greater potential number of white middle class applicants resulting from the more affluent location of such schools further decreases the overall proportion of applicants from African American neighborhoods, results in less of a mix of students. Respectively, only 12.57% and 6.48% of the students that attend General Greene and Morehead live in majority African American neighborhoods.

Magnet Themes May Influence Performance

Different magnet school themes appear to perform differently than each other, and may even attract students from different backgrounds, making average performance between themes different. This study group does not contain enough schools to make this assessment, however, factors such as school location, SES and out-of-zone attendance still appear to influence school performance *within* themes (Table 7). Comparing magnet schools with the same theme in the Guilford County school district, school SES as determined by the SMFI appears to have the greatest effect on school performance. When there is a significant difference in school SES, the school with the

higher SES has the higher performance score, demonstrated by the differences between the International Baccalaureate High Schools. High Point Central has greater out-of-zone attendance, but SMFI is still much lower than Grimsley's. The City of High Point's lower aggregate median family income likely gives its schools a performance disadvantage. When school SES is not significantly different, out-of-zone attendance appears to make the difference as can be seen between the Montessori Elementary Schools and the Science and Technology Middle Schools. When a school has both greater SES as well as out-of-zone attendance, it should have a distinctly higher performance, as is witnessed in the district's Global Studies Elementary Schools.

Table 7 - Comparison of School Performance by Theme

Global Studies Elementary					
City	*School*	*Performance*	*Student Mean MFI*	*% Af Am*	*% Out of Zone*
Greensboro	**Brooks Global**	90.1	$57,762	19.65%	100%
High Point	**Johnson Street**	67.8	$48,743	15.56%	83%
Montessori Elementary					
City	*School*	*Performance*	*Student Mean MFI*	*% Af Am*	*% Out of Zone*
Greensboro	**Erwin**	77	$50,955	41.35%	100%
High Point	**Triangle Lake**	61.1	$52,307	24.79%	86.20%
Science & Technology Middle					
City	*School*	*Performance*	*Student Mean MFI*	*% Af Am*	*% Out of Zone*
Greensboro	**Aycock**	65.7	$43,183	43.30%	45.53%
High Point	**Welborn**	59.4	$43,501	39.43%	5.86%
International Baccalaureate High					
City	*School*	*Performance*	*Student Mean MFI*	*% Af Am*	*% Out of Zone*
Greensboro	**Grimsley**	76.4	$59,555	24.79%	10.99%
High Point	**High Point Central**	61.1	$44,794	20.87%	25.61%

Specialization Limited by School Size

In the Guilford County school system, elementary schools typically serve fewer students per school than middle schools and high schools, while high schools are

typically larger than middle schools. The larger a magnet school is, the less specialized its program can logically be. For this reason, there are many more elementary magnet themes available because there are necessarily more physical magnet elementary schools with fewer students in each. There is not likely to be an extremely large number of students interested in a Spanish Immersion school, but there is an interest in Greensboro. Jones Elementary is a small enough school to offer this program, even if it the whole student body may not participate, but such a program at the high school level would be difficult to fully implement if the district is limited to traditionally large high school campuses that hold over 1,000 students.

Guilford County has several small magnet high schools that serve between 100 and 300 students each. This includes middle college high schools, which are specialized by theme as well as academic performance, and early college high schools which are specialized only by academic performance. The district also has a performing arts high school (Weaver Education Center) that has about 250 students. Other high school magnet programs take a school-within-a-school approach, where magnet students take specialized classes within a larger high school environment. Greensboro's approach of using smaller high schools allows a large variety of secondary programs.

Is Magnet School Performance Predictable?

In the following sections, I will use multiple regression to predict magnet school performance and magnet school student body average family income. Although my previous explorations of these variables through Pearson's correlation coefficient were

helpful, multiple regression allows us to use several factors simultaneously in our predictions while also establishing what factors are most important.

Table 8 - Regression Analysis 1 Variables

Variable Name	Definition and Description
Dependent Variable	
Performance	NC Dept of Education (0 - 100)
Independent Variables	
Student MFI	Average MFI value of student address points for each school
Percent Out of Zone	Percentage of Magnet Students that attend school from outside attendance zone
Underserved (dummy)	Schools that teach exclusively underserved or underachieving students, 0= exclusively underachieving students, 1 = not exclusive
Number Students	Number of students attending a school
School Level	Elementary/Middle = 0, High School = 1
Neighborhood MFI	Census Block Group Level data at School Location
Neighborhood % African American	Census Block Group Level data at School Location
Students Percent African American	Percent of students from majority African American neighborhoods

All the statistical analyses in this study, including the multiple regression analysis, are performed using the statistical analysis program Statistical Package for the Social Sciences (SPSS). Variables were tested to be sure that only limited colinearity exists between them. Several variables were tested to establish the best mix of statistically significant factors (Table 8), but only three variables were included in the final equation. The multiple regression equation is:

$$Y_{exp} = b_1X_1 + b_2X_2 + b_3X_3 + a,$$

where Y_{exp} is School Performance, b_1, b_2 and b_3 are the weights for predictors X_1 (SMFI), X_2 (Underserved) and X_3 (Percent Out of Zone) and a is the intercept. The variable "Underserved" is a dichotomous variable to control for the district's middle college high

schools, whose students are exclusively considered underserved. A 0 is assigned to such schools, while a 1 is assigned to all other magnet schools. Middle college high schools that also have an early college component to them are not considered to teach exclusively underserved students and are assigned a 0 for this variable. By using these three variables, the performance composite of a magnet school is quite predictable (R^2 = .823). All three variables are significant to the .05 level (Table 9).

Table 9 - Regression Analysis 1: School Performance

Dependent Variable: School Performance	**R = .907**		**R Square = .823**	**Sig. > .000**	
Variable	Unstandardized Coefficients		**Standardized Coefficients**	t	**Sig.**
	B	Std. Error	**Beta**		
Constant	-29.418	8.256		-3.563	**.001**
SMFI	.001	.000	**.538**	6.151	**> .000**
Underserved	38.930	4.940	**.674**	7.880	**> .000**
Percent Out of Zone	.124	.052	**.226**	2.405	**.023**

The "Underserved" variable is the most important with a standardized coefficient of .674, meaning that performance is expected to decrease in a school whose mission is to serve underachieving students. The unstandardized beta predicts that a school's score will decrease by 38.93 percentage points if a school teaches exclusively underserved students. SMFI is also important with a standardized coefficient of .538. School performance will increase by .001 unit for every one unit increase of SMFI. Put another way, for every $1,000 increase in SMFI, there will be a 1% increase in school performance. Magnet school performance increases as its student body's SES increases, just as conventional school performance does. The variable most unique to magnet schools, the percent of students attending from outside the school's attendance zone is

less important than the other two factors, but is statistically significant with the standardized coefficient of .226. For every .124 percent increase in out-of-zone students, there will be a one point increase in school performance. By replacing the out-of-zone percentage variable with attendance zone area, the R^2 value is still a robust .818.

Can Average Family Income of Magnet School Students Be Predicted?

Because the assertion of this paper is that magnet schools could be used to assist with neighborhood revitalization, it is logical that we should be able to not only predict school performance of magnet schools, but also the average family income of its student body. It is well established that SES is a good predictor of school performance, but some magnet schools perform adequately without attracting many students from middle or upper income families. Again, many variables were tested to establish the best mix

Table 10 - Regression Analysis 2 Variables

Variable Name	Definition and Description
Dependent Variable	
Student MFI	Average MFI value of student address points for each school
Independent Variables	
Number Students	Number of students attending a school
Percent Out of Zone	Percentage of Magnet Students that attend school from outside attendance zone
Underserved (dummy)	Schools that teach exclusively underserved or underachieving students, 0= exclusively underachieving students, 1 = not exclusive
School Level	Elementary/Middle = 0, High School = 1
Neighborhood MFI	Census Block Group Level data at School Location
Neighborhood % African American	Census Block Group Level data at School Location
Students Percent African American	Percent of students from majority African American neighborhoods

of statistically significant factors (Table 10), but only three variables were included in the final equation. The multiple regression equation will again be:

$$Y_{exp} = b_1X_1 + b_2X_2 + b_3X_3 + a,$$

but Y_{exp} is Mean Student Family Income, b_1, b_2 and b_3 are the weights for predictors and X_1 is the Number of Students, X_2 is the Percent African American, X_3 is Percent Out of Zone and a is the intercept.

Table 11 - Regression Analysis 2: Student Mean Family Income (3 variables)

Dependent Variable: Student Mean Income	**R = .898**		**R Square = .807**	**Sig. > .000**	
Variable	Unstandardized Coefficients		**Standardized Coefficients**	t	**Sig.**
	B	Std. Error	**Beta**		
Constant	47570.12	4361.945		10.906	**> .000**
Number of Students	5.795	2.793	**0.273**	2.075	**0.047**
Percent Out of Zone	120.582	38.099	**0.432**	3.165	**0.004**
Percent African American	-304.805	34.981	**-0.755**	-8.713	**> .000**

As it turns out, student mean family income for magnet schools can also be predicted with three variables, this time to an R^2 value of .807 (Table 11). The percent of students attending the school from majority African American neighborhoods proved to be the most important variable with a standardized coefficient of -.755, meaning that the average income of the student body will decrease as African American student attendance increases. Using the unstandardized coefficient, we can predict that SMFI will decrease by $304.81 for each percentage increase of students from majority African American neighborhoods. The percent of students attending from outside the attendance zone is the next important factor with a standardized coefficient of .432. For each percentage point increase of out-of-zone students, we predict that SMFI will increase by $120.58. The number of students in the school is also an important factor with a standardized

coefficient of .273. For an increase of 100 students, we would predict a SMFI increase of $579.50.

These three variables make it possible to predict the income of a magnet school's students fairly reliably, even without assuming the school's performance score. It should be emphasized that these factors do not necessarily predict school performance, but are being used to predict the level of attraction middle and upper class families have to a school and neighborhood. A more precise prediction can be made for SMFI by adding some variables to the equation. By adding school performance to the equation (Table 12), we can test to see if middle and upper income families are truly attracted to high performing magnet schools.

Table 12 - Regression Analysis 3 Variables

Variable Name	Definition and Description
Dependent Variable	
Student MFI	Average MFI value of student address points for each school
Independent Variables	
Number Students	Number of students attending a school
Percent Out of Zone	Percentage of Magnet Students that attend school from outside attendance zone
Underserved (dummy)	Schools that teach exclusively underserved or underachieving students, 0= exclusively underachieving students, 1 = not exclusive
School Level	Elementary/Middle = 0, High School = 1
Neighborhood MFI	Census Block Group Level data at School Location
Neighborhood % African American	Census Block Group Level data at School Location
Students Percent African American	Percent of students from majority African American neighborhoods
Performance	NC Dept of Education (0 - 100)

The multiple regression equation will have a fourth variable this time, making it:

$$Y_{exp} = b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + a,$$

Y_{exp} again is Student Mean Family Income, b_1, b_2 and b_3 are the weights for predictors X_1 (Percent African American), X_2 (Performance), X_3 (Percent Out of Zone), X_4 (School Level) and a is the intercept. The "School Level" variable is dichotomous with high schools being assigned 1 and elementary/middle schools assigned 0.

Table 13 - Regression Analysis 3: Student Mean Family Income (4 variables)

Dependent Variable: Student Mean Income	**R = .961**		**R Square = .924**	**Sig. > .000**	
Variable	Unstandardized Coefficients		**Standardized Coefficients**	t	**Sig.**
	B	Std. Error	**Beta**		
Constant	34267.048	3201.65		10.703	**> .000**
Percent African American	-208.075	26.682	**-0.515**	-7.798	**> .000**
Percent Out of Zone	55.756	14.961	**0.2**	3.727	**0.001**
School Level	5815.266	1127.67	**0.302**	5.157	**> .000**
Performance	231.809	33.158	**0.455**	6.991	**> .000**

The R^2 value for student mean family income rises to .924 when the school performance and school level are also taken into account (Table 13). In this model, the percent of students from majority African American neighborhoods is still the most important factor with a standardized coefficient of -.515. The unstandardized coefficient predicts a $208.08 decrease in SMFI for every 1% increase of students from majority African American neighborhoods. The school performance is the next most important factor with a standardized coefficient of .455. We can predict that for every one point performance increase, there will be a $231.81 increase in SMFI. The school level standardized coefficient is .302, predicting that, given the other factors, better performing high schools are more likely to have students from higher income families. A high school with similar variables to an elementary or middle school will have a SMFI of $5,815.27 more. The percent of students from outside the school attendance zone is also

important with a standardized coefficient of .200. We predict that SMFI will increase by $55.76 for every percentage-point increase of out-of-zone students.

CHAPTER V

CONCLUSIONS & FUTURE DIRECTIONS

Profile of Neighborhood Revitalizing Magnet Schools

If middle-class families are to be attracted to central cities, the problem of poor performing schools must first be addressed. Despite strong neighborhood ties to school performance, this thesis has found a way to insert high performing schools into low-income neighborhoods, which may help central cities to attract middle and upper income families. By proving that magnet schools can attain high performance scores despite locations in low socioeconomic neighborhoods and that these schools indeed attract students from well-off families, I have crafted a scientific model that municipalities and neighborhood revitalization groups can use to make center city neighborhoods attractive to more people, while also raising the tax base of these areas.

The cartographic evidence, the results of correlation coefficient and regression analyses all tell us that the profile of a high performing magnet school is one that does not exclusively serve underachieving students, has a student body from more affluent families and also serves a large proportion of its students from outside the area surrounding the school. The second regression analysis tells us that student mean family income (SMFI) will be highest in secondary schools with few African American students that mainly serve students from outside the school's attendance zone and do not exclusively serve underachieving students. Schools that also have high performance scores predictably attract more students from high-income families. These results are

interesting in that, by reading between the lines, one could conclude that a neighborhood renewal project using magnet schools may avoid many of the negative consequences of gentrification.

The results of the second regression analysis find that the percent of the student body originating from majority African American neighborhoods is highly negatively correlated to SMFI. This finding does not mean that African American student participation would be discouraged in a high performing magnet school, it is more of a reflection of the proportion of African Americans in the neighborhood surrounding the school. As we saw earlier, the percent African American of a school's neighborhood is a strong predictor of that school's proportion of students from majority African American neighborhoods. The percent of students coming from majority African American neighborhoods is not a factor in my regression analysis predicting school performance (Table 9). There are several elementary magnets that get high performance scores while attracting most of their students from majority African American neighborhoods. Rather, these results indicate that a school will better attract students from high income families if it is located in a neighborhood that is not majority African American. This result may simply be a reflection of the low family income of many majority African American neighborhoods, not the issue of race itself.

Policy Recommendations

Although school districts are seldom known to coordinate with other governments or organizations when building new schools or implementing new learning programs, there are examples of this type of compromise. One example in North Carolina is the

Downtown Elementary School, in the City of Winston-Salem. The Downtown Elementary School is a magnet school that teaches students from pre-school to fifth grade, located in the city's downtown. What makes this school different from other magnets is its partnership with Reynolds American, a company with a large presence in the city's downtown. Students whose parents work for the company, along with students who live in the city's central urban core, are given priority to attend the school (Winston-Salem Forsyth County Schools, 2008). This example is important because it gives the precedent of a school district working with an outside entity (a corporation) to locate a school in a specific area while giving priority enrollment to a specific group of students. This model could be expanded by a city government to locate a school in a neighborhood, or neighborhoods, of its liking.

The best way to implement a magnet school neighborhood development program may be to put a series of these schools in several city neighborhoods. A diversity of locations would give students from a variety of backgrounds a chance to attend a more specialized school and it would have a better chance of winning the backing of the city government if these schools were in the wards or districts of many city council members, rather than just one. Neighborhoods not ripe for an influx of middle class homeowners at the time of the program's introduction may be ready for such a transition in the future. Should this program fail to attract families to its targeted neighborhoods, it may still succeed in slowing suburban development surrounding new schools in a city's periphery. If students are attending magnet schools close to the city center, the school district will have less demand for classrooms in other areas of the city.

In order to best attract middle class families and economic investment, a neighborhood should be selected based on its housing stock and its place within the city's priorities. Historically middle and upper class neighborhoods would be the best site for such a project, because the housing stock here would better attract families since units would have greater square footage and other amenities. Such a neighborhood should be close to the city center, taking advantage of older, underused infrastructure while also cutting down on trip lengths for young professionals working in high-end downtown service industries. Neighborhoods that are eligible for historic designation would also be a good choice for magnet school insertion, as historic designation gives tax credits for residential and commercial renovation, attracting the sort of investment that leads to increased property tax roles. Although the results of this study find that as the proportion of African American students attending a school increases, the average family income of the student body decreases, race should not be used as a factor in siting these schools. If these results were used to forge an economic development policy, the result would be more likely to be an increase in racial and economic segregation, not what was originally intended by the introduction of magnet schools.

For such a project to be feasible, an elementary school should be used. Elementary schools are smaller than middle and high schools, making them less expensive to run. They do not have as much need for athletic facilities for after-school activities, letting them take up less physical space. Perhaps most importantly for this project, they serve the youngest students in the school system. If childless couple "pioneer" gentrifiers often leave their neighborhoods when they have children that reach

school age, a high performing magnet school in their vicinity may keep them from moving if they live in its attendance zone.

Most of the magnet elementary schools in this study serve between 250 and 350 students with the greatest number being just over 500 students. The better performing schools serve 25% or fewer of their students from inside their attendance zones. This school should not have an extremely specialized curriculum, but one that has a wide attraction, like a global studies program, rather than a science or engineering program. Such programs are needed, but until interest in them increases, they should not be used as a basis for neighborhood development. Assuming each family has an average of 1.5 students in an elementary school at a time, this would give about 60 households priority seating in an attendance zone for a school with 350 students. Of course, not every household in the attendance zone would have school age children at the same time, so this could be a sizable neighborhood that benefits from such an investment. As neighborhood investment increases along with median income, the attendance zone could be made larger without negatively affecting school performance. In time, the school could even transition to a conventional neighborhood school rather than a magnet.

Because of the necessity of this project to use elementary schools, students from a wider variety of socioeconomic backgrounds can be incorporated into a school with a high performance composite. The second regression analysis in this study does not predict that a secondary magnet school attracts more high income students so much as it predicts that high-performing secondary schools are more uniformly serving students from solely high income families. This means that SMFI is less predictable in magnet

elementary schools. This is actually a positive result for this research as it means that students from low socioeconomic backgrounds are participating in high performing elementary schools and that using such schools to promote neighborhood investment will not do so at the expense of school diversity and equality of access to a quality education.

Any entity that would want to implement a magnet school neighborhood revitalization program should pay close attention to the racial components of this study. Racial proportions of a school's students are a large factor for parents in deciding to which schools to send their children. However, a neighborhood renewal program should not favor citizens based on their race, especially when the education of children is involved. A city that does not educate its children equitably would not only be unethical, it would also be responsible for an underclass citizenry that would have greater long-term costs than an investment in schools and teachers would ever cost.

The goal of this proposal would be to create an economic environment that attracts investment and raises the standard of living in certain neighborhoods. Projects that affect the balance or performance of a school should not be engaged in lightly. However, by examining the variables that affect school performance and demographics, this project could be implemented with a high degree of certainty over its outcomes. The worst case scenarios for such a project would be either a lack of neighborhood investment or too much gentrification, resulting in a high rate of displacement. Should this project not result in increased neighborhood investment, city investment in a school is not necessarily a bad investment overall. On the other hand, if a high rate of gentrification occurs, programs to help victims of this process could be implemented. However, what I

would hope to happen as a result of this idea would simply be a slow and steady increase of middle class families in the targeted neighborhoods. Instead of young families leaving the neighborhoods they invested in, they would see a better reason to stay.

Future Directions

Other School Variables

As was stated earlier, although student SES is a strong predictor of school performance, it is by no means the only variable that contributes to a school's success or failure. A program that uses magnet schools for neighborhood renewal should more fully investigate what features make a school successful. A school with the best teachers and administration available would be a good start.

High School Attendance Zones

This study would benefit if it had a larger sample of magnet schools with the same depth of individual student information available here. One of the interesting findings of this research was the strong tie between magnet elementary and middle school performance with their encompassing public high school's performance. Because high school zones do not include other high school zones, relationships were only evaluated with twenty of the studied magnet schools. Although the correlation between the two variables was high, a further investigation of this phenomenon using more schools should be performed.

Within-School Segregation

Some of the magnet schools in Guilford County act as multiple schools in one building. It is possible that some of the programs that attract students from outside the

school's neighborhood cluster these students in magnet classrooms, creating a school divided along class lines. This practice would not greatly affect aggregated school performance scores, but it may affect parental decisions about what schools to send their children to. By knowing how each school mixes its students, a better model of magnet school performance could be made.

Cost Analysis

Of course, for this idea to get any serious consideration, a cost/benefit analysis must be performed. Cities spend a great deal of money attempting to stop neighborhood deterioration and encourage development. A school is more than a building, however. It needs teachers, administrators, computers, buses and bus drivers, to name only some of the recurring expenses involved with its operation.

Although a magnet school that is used for community development may not serve many more than 400 students, it would take those students from other schools within the district, assuming a closed system. The increased costs of running a magnet school in this capacity would be mainly building, administrative, transportation and start-up costs. Considering students would move from other schools to attend a magnet school, teachers and staff could be moved to accommodate this change. Once this monetary figure is calculated, it could be compared to other neighborhood development programs. Adaptive reuse has been used to house school facilities and should be encouraged for a project like this one to make building costs cheaper and in keeping with neighborhood character.

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Appendix A. Components of School Performance Evaluation

Components of the ABCs:Grades K-8 (NC State Board of Education, 2007, p. 2)

Statewide accountability testing is done in grades 3-8 and includes the following components:

- End-of-grade tests in reading and mathematics in grades 3-8 are used in both growth and performance composites.
- Writing assess for grades 4-7 are used in the performance composite only.
- Computer Skills Tests in grade 8 are used in the performance composite.
- End-of-course test results for students in K-8 are used in growth and performance.
- Alternative assessments for some students with disabilities are included in the performance composite and AYP.

Components of the ABCs: High Schools (NC State Board of Education, 2007, p. 2)

- End-of-course tests in Algebra I, Algebra II, Biology, English I, Geometry, US History and Civics, and Economics
- Growth is calculated using previous test assessments
- Current year-to-baseline (average of two previous years) comparison of percentages of students completing College/University Prep or College Tech Prep courses of study
- ABCs dropout rate (current year versus two-year baseline) weighted by ¼ average daily membership

- Gain in passing rate on high school competency tests from the end of 8th grade to the end of 10th grade
- Alternative assessments for some students with disabilities are included in the performance composite and AYP only.

Appendix B. Magnet Schools: School Performance
Weighted by Number of Students

ID	*School Name*	*Number Students*	*Performance*
1	Aycock Middle	716	65.7
2	Bluford Elementary	296	70.1
3	Brooks Global	341	90.1
4	Brown Summit Center	241	87.2
5	David D Jones Elementary	503	77.7
6	Dudley High	1463	51.7
7	Early College at Guilford	169	97.7
8	Erwin Montessori	272	77.0
9	General Greene Elementary	334	80.7
10	Grimsley High	1747	76.4
11	GTCC Middle College High	179	77.0
12	High Point Central High	1433	61.1
13	High Point GTCC Middle College	141	55.7
14	Johnson Street Elementary	257	67.8
15	Lincoln Academy	599	76.6
16	Middle College @ GTCC Greensboro	67	35.6
17	Middle College at Greensboro College	132	78.1
18	Middle College High at Bennett	150	18.7
19	Middle College High at NC A&T	161	17.6
20	Montlieu Avenue Elementary	364	58.7
21	Morehead Elementary	324	84.1
22	Murphey Traditional Academy	357	61.8
23	Parkview Village Elementary	252	54.8
24	Peeler Open Elementary	294	59.3
25	Penn-Griffin Middle	643	59.4
26	Philip J Weaver Ed Center	258	90.3
27	Smith Academy	1414	47.5
28	Southern Guilford High	1047	61.4
29	T Wingate Andrews High	1132	42.1
30	Triangle Lake Montessori Elem	355	61.1
31	W M Hampton Elementary	106	45.2
32	Waldo C Falkener Sr Elementary	367	66.5
33	Washington Elementary	202	43.6
34	Welborn Middle	870	59.4
		Weighted Avg:	***62.66%***

Appendix C. Conventional Schools: School Performance Weighted by Number of Students

School Name	*Nmbr Students*	*Perf*	*School Name*	*Nmbr Students*	*Perf*
Alamance Elementary	628	73.9	Mendenhall Middle	906	78
Allen Jay Elementary	304	54.7	Millis Road Elementary	472	87
Allen Jay Middle	701	62.4	Monticello-Brown Summit	529	77.2
Allen Middle	868	60.8	Nathanael Greene Elem	321	76.5
Archer Elementary	267	65.7	Northeast Guilford High	1260	64.3
Bessemer Elementary	303	50	Northeast Guilford Middle	889	65.3
Brightwood Elementary	467	57.5	Northwest Guilford High	2220	85.1
Caesar Cone Elementary	261	50.2	Northwest Guilford Middle	1090	89.6
Clara J Peck Elementary	189	62.5	Northwood Elementary	402	63.4
Claxton Elementary	309	82.6	Oak Hill Elementary	300	53.3
Colfax Elementary	706	84.4	Oak Ridge Elementary	413	89.4
Cyrus P Frazier Elem	252	56.3	Oak View Elementary	427	68.2
Eastern Guilford High	1110	62.3	Otis L Hairston Sr Middle	963	58.1
Eastern Middle	911	63.2	Page High	1692	70.9
Edwin A Alderman Elem	235	68.8	Pilot Elementary	539	81
Fairview Elementary	399	56.2	Pleasant Garden Elementary	365	80.3
Ferndale Middle	714	46.5	Rankin Elementary	525	51.3
Florence Elementary	502	83.7	Sedalia Elementary	206	72
Gibsonville Elementary	280	72.7	Sedgefield Elementary	365	62.7
Gillespie Park Elementary	197	56.9	Shadybrook Elementary	421	80.9
Guilford Primary	249	72.8	Southeast Guilford High	1270	71.4
Hunter Elementary	271	64.7	Southeast Guilford Middle	1088	73.1
Irving Park Elementary	375	74	Southern Elementary	178	67.7
James Y Joyner Elem	230	74.5	Southwest Elementary	542	86.1
Jamestown Elementary	370	68.5	Southwest Guilford High	1278	70.7
Jamestown Middle	1889	74.2	SW Guilford Middle	1010	79.7
Jefferson Elementary	559	82	Sternberger Elementary	271	79.2
Jesse Wharton Elem	700	72	Stokesdale Elementary	334	78.2
John Van Lindley Elem	227	75	Summerfield Elementary	576	91.5
Julius I Foust Elementary	200	59.7	Sumner Elementary	387	58.6
Kernodle Middle	917	91.3	Union Hill Elementary	345	51.3
Kiser Middle	720	61.1	Vandalia Elementary	137	69.2
Lucy Ragsdale High	2239	72.3	Western Guilford High	1518	73.3
Madison Elementary	334	75.2	Wiley Elementary	101	43.1
McLeansville Elementary	99	63.2		Weighted Avg:	***71.62%***

Appendix D. Guilford County Magnet Schools: All Data

ID	School Name	Performance	School Level
1	Aycock Middle	65.7	0
2	Bluford Elementary	70.1	0
3	Brooks Global	90.1	0
4	Brown Summit Center	87.2	0
5	David D Jones Elementary	77.7	0
6	Dudley High	51.7	1
7	Early College at Guilford	97.7	1
8	Erwin Montessori	77	0
9	General Greene Elementary	80.7	0
10	Grimsley High	76.4	1
11	GTCC Middle College High	77	1
12	High Point Central High	61.1	1
13	High Point GTCC Middle College	55.7	1
14	Johnson Street Elementary	67.8	0
15	Lincoln Academy	76.6	0
16	Middle College @ GTCC Greensboro	35.6	1
17	Middle College at Greensboro College	78.1	1
18	Middle College High at Bennett	18.7	1
19	Middle College High at NC A&T	17.6	1
20	Montlieu Avenue Elementary	58.7	0
21	Morehead Elementary	84.1	0
22	Murphey Traditional Academy	61.8	0
23	Parkview Village Elementary	54.8	0
24	Peeler Open Elementary	59.3	0
25	Penn-Griffin Middle	59.4	0
26	Philip J Weaver Ed Center	90.3	1
27	Smith Academy	47.5	1
28	Southern Guilford High	61.4	1
29	T Wingate Andrews High	42.1	1
30	Triangle Lake Montessori Elementary	61.1	0
31	W M Hampton Elementary	45.2	0
32	Waldo C Falkener Sr Elementary	66.5	0
33	Washington Elementary	43.6	0
34	Welborn Middle	59.4	0

ID	Beg Grd	End Grd	Underserved	Number Students
1	6	8	1	716
2	0	5	1	296
3	0	5	1	341
4	6	8	1	241
5	0	5	1	503
6	9	12	1	1463
7	9	12	1	169
8	-1	5	1	272
9	0	5	1	334
10	9	12	1	1747
11	9	12	1	179
12	9	12	1	1433
13	9	12	0	141
14	0	7	1	257
15	4	8	1	599
16	9	12	0	67
17	9	12	1	132
18	9	12	0	150
19	9	12	0	161
20	-1	5	1	364
21	0	5	1	324
22	-1	5	1	357
23	-1	5	1	252
24	0	5	1	294
25	6	9	1	643
26	9	12	1	258
27	9	12	1	1414
28	9	12	1	1047
29	9	12	1	1132
30	-1	6	1	355
31	-1	5	1	106
32	-1	5	1	367
33	-1	5	1	202
34	6	8	1	870

ID	Student Mean Inc	Nbhd MFI	Nbhd Pct Af Am	Af Am Nbhd
1	43183	27232	49.23	0
2	40249	32043	96.92	1
3	57762	54083	7.61	0
4	52437	40250	23.82	0
5	46774	17583	89.11	1
6	37242	32043	96.92	1
7	69190	63250	3.96	0
8	50955	22000	70.88	1
9	54276	56486	5.56	0
10	59555	54083	7.61	0
11	60405	90000	4.11	0
12	44794	25481	31.59	0
13	56383	13750	73.8	1
14	48743	41538	34.73	0
15	52731	32043	96.92	1
16	45524	86665	8.38	0
17	59347	36406	7.76	0
18	39063	31111	97.42	1
19	44421	32143	97.39	1
20	47977	32000	44.51	0
21	54601	71118	3.25	0
22	42091	54464	24.61	0
23	32695	33958	90.88	1
24	48122	36346	97.26	1
25	45188	27159	31.97	0
26	66264	36406	7.76	0
27	40890	43750	27.04	0
28	48309	45781	3.19	0
29	45931	46250	31.35	0
30	52307	34097	60.43	1
31	33075	19172	90.64	1
32	34596	38220	63.33	1
33	26126	28281	96.55	1
34	43501	46250	50.38	1

ID	Nmbr Out of Zone	Pct Out of Zone	AZ Area (km2)	Nmbr Out of Zone
1	326	45.53	11	326
2	221	74.66	0.96	221
3	341	100.00	0	341
4	241	100.00	0	241
5	375	74.55	1.45	375
6	240	16.40	32.83	240
7	169	100.00	0	169
8	272	100.00	0	272
9	218	65.27	4.06	218
10	192	10.99	41.76	192
11	179	100.00	0	179
12	367	25.61	51.02	367
13	141	100.00	0	141
14	213	82.88	0.86	213
15	599	99.17	3.62	599
16	67	100.00	0	67
17	132	100.00	0	132
18	150	100.00	0	150
19	161	100.00	0	161
20	87	23.90	16.55	87
21	175	54.01	3.96	175
22	266	74.51	1.51	266
23	156	61.90	1.75	156
24	263	89.46	2.33	263
25	208	32.35	24.46	208
26	258	100.00	0	258
27	111	7.85	37.14	111
28	168	16.05	138.29	168
29	276	24.38	34.33	276
30	306	86.20	1.6	306
31	78	73.58	5.63	78
32	191	52.04	5.27	191
33	47	23.27	1.95	47
34	51	5.86	31.1	51

ID	Nmbr Af Am Students	Pct Af Am Students	Encompassing HS	Encompassing HS Perf
1	310	43.30	Dudley	51.7
2	201	67.91	Dudley	51.7
3	67	19.65	Grimsley	76.4
4	60	24.90	Northeast	64.3
5	208	41.35	Grimsley	76.4
6	1262	86.26	N/A	N/A
7	5	2.96	Western	N/A
8	83	30.51	Dudley	51.7
9	42	12.57	Grimsley	76.4
10	433	24.79	N/A	N/A
11	20	11.17	Ragsdale	N/A
12	299	20.87	N/A	N/A
13	22	15.60	H P Central	N/A
14	40	15.56	H P Central	62.1
15	190	31.72	Dudley	51.7
16	22	32.84	Grimsley	N/A
17	20	15.15	Grimsley	N/A
18	81	54.00	Grimsley	N/A
19	63	39.13	Grimsley	N/A
20	79	21.70	Andrews	42.1
21	21	6.48	Grimsley	76.4
22	107	29.97	Smith	47.5
23	162	64.29	Andrews	42.1
24	107	36.39	Dudley	51.7
25	144	22.40	H P Central	62.1
26	22	8.53	Grimsley	N/A
27	473	33.45	N/A	N/A
28	208	19.87	N/A	N/A
29	337	29.77	N/A	N/A
30	88	24.79	Andrews	42.1
31	83	78.30	Dudley	51.7
32	299	81.47	Dudley	51.7
33	190	94.06	Dudley	51.7
34	343	39.43	Andrews	42.1