3-28-2008

Race and Magnet School Choice: A Mixed-Methods Neighborhood Study in Urban Connecticut

Jesse Wanzer
Trinity College

Heather Moore
Trinity College

Jack Dougherty
Trinity College

Trinity College
HARTFORD CONNECTICUT

Race and Magnet School Choice:
A Mixed-Methods Neighborhood Study in Urban Connecticut

by Jesse Wanzer, Heather Moore, and Jack Dougherty
Cities, Suburbs, and Schools Research Project
at Trinity College, Hartford CT
http://www.trincoll.edu/depts/educ/CSS
email queries to Jack.Dougherty@trincoll.edu

Introduction

Since the *Sheff v O'Neill* city-suburban desegregation lawsuit was filed nearly two decades ago, 22 inter-district magnet schools have been established in metropolitan Hartford, Connecticut. These public schools of choice feature specialized curricular resources, designed to attract families from different racial and socio-economic backgrounds, in order to comply with the 1996 Connecticut Supreme Court ruling in favor of the *Sheff* plaintiffs. Yet while magnets were created for desegregation goals, they introduce new challenges for racial equity.

This study merges both quantitative and qualitative research methods to deepen our knowledge of the tensions between magnet school choice and racial desegregation at the neighborhood level. The quantitative section (part 1 below) uses Geographic Information System (GIS) computer mapping to analyze over 4,000 applications from families in the metropolitan region to six elementary-level magnet schools operated by the Hartford Public School system. This quantitative analysis concentrates on how three factors -- school quality, geography, and neighborhood racial demographics -- influence parental magnet school choice. Specifically, our quantitative research questions are:

1) School quality: What is the relationship between magnet application rates and standardized test scores, for both the neighborhood schools and the magnet schools?
2) Geography: How do magnet schools vary in their level of "magnetism," meaning the average distance they attract applicants?
3) Neighborhood race: How do magnet applicant rates vary across neighborhoods, and are they statistically representative of the racial demographics of each area?

Based on our quantitative finding that magnet school applicant rates varied widely by Hartford neighborhood school attendance zones (ranging from 5 to 21 percent across the city), we conducted a qualitative study (part 2 below). We focused on four neighborhoods (2 with the highest rates of magnet applicants, and 2 with the lowest rates) and conducted 36 door-to-door interviews with parents of school-age children to inquire about their motivations for applying (or not applying) to magnet schools. Our qualitative research questions were:

4) Neighborhood rate: How do Hartford parental rationales on magnet school choice vary in neighborhoods with high versus low magnet applicant rates?
5) Parental race: How do Hartford parental rationales on magnets vary by race?

In the quantitative and spatial analysis section (part 1), we found that the conventional factor of school quality, as measured by standardized test scores, does not fully explain Hartford elementary magnet school choice. Although high-scoring magnet schools have some "pull" effects that generate high numbers of applications ($R^2=0.42$), we found no comparable "push" effects showing a relationship between the number of applicants and the neighborhood school test scores ($R^2 = 0.19$). In other words, while higher-scoring magnets tend to receive higher numbers of applications, lower-scoring neighborhood schools generally do not produce greater proportions of "leavers" who wish to choose a magnet school.

A second factor, geography (measured as the average distance between applicants and a city magnet school) matters to some degree in parental choice, but likewise does not explain everything. The variation across magnet schools (ranging from a high of 3.2 miles to a low of 1.9 miles) in the relatively small city of Hartford (only 17 square miles) suggests that parents are not simply choosing a magnet based solely on the convenience of its location near their home.

But a third factor -- neighborhood racial demographics -- plays a stronger role in Hartford elementary magnet school choice than expected in this city of two dominant races, Blacks and Hispanics. When we compared the race of the applicant to the racial composition of the neighborhood school attendance zone were s/he resided, we found that in half of the city, Black students were statistically more likely to apply to magnets if they were a racial minority (relative to Hispanics); similarly, Hispanics were less likely to apply when they were the racial majority (relative to Blacks). In the other half of the city, we found no racial pattern.

In the qualitative section (part 2), while we did not find differences between parents in neighborhoods with high versus low magnet rates, we did detect significant differences between races. Choosers (meaning parents who applied to magnet schools in Spring 2007) in both high-choice and low-choice neighborhoods cited similar pull-factor motivations that attracted them to other schools. Likewise, non-choosers (who did not apply) in both types of neighborhoods expressed similar levels of satisfaction toward their child's current school, so did not apply elsewhere. However, several White parents flatly rejected Hartford public schools (magnet or neighborhood), while Non-White families did not follow this pattern. Instead, close to half of the Black respondents constructively criticized their child's neighborhood school.

By merging quantitative and qualitative methods to focus on Black, Latino, and White families' magnet school preferences across multiple neighborhoods in one Northeastern U.S. city, this study highlights the racial consequences of school choice. Policy advocates of school choice in general, and magnet school planners in particular, need to pay closer attention to the factors that influence parental choice. Beyond the conventional explanation that choice is driven by a market-based desire for improved school quality, or perhaps parents' pragmatic concerns about geographic convenience, we need to understand how a third factor -- race -- shapes public school choices. Given that magnet school choice was designed to enhance educational opportunities for all, we cannot ignore how magnets are being used by minority races to avoid contact with a majority race in several neighborhood schools (compare with Henig 1996; Saporito 2006). Although magnet schools were intended to promote racial desegregation, they may be operating in ways that run counter to this broader goal when no "controlled choice" policy is in place. In light of the recent US Supreme Court decisions in Louisville and Seattle, the hidden realities of race and magnet school choice deserve broader policy discussion.

Literature Review

The ongoing debate about voluntary school desegregation has raised many questions about the factors that influence magnet school choice patterns. Do these factors create additional inequalities beyond those that magnet schools were designed to address? Magnet school programs have caused increased concerns over their potential to intensify segregation due to social class inequalities among parents, such as differences in access to information, academic support, and means of transportation (Archbald, 1996). In Claire Smrekar and Ellen Goldring's (1999) interview-based study of magnet school choice in St. Louis and Cincinnati, they found that magnet schools increase inequality because parents represent a self-selected group with higher levels of education than parents who do not apply. They also contend that magnet schools tend to attract students from the neighborhoods in which they are located due to geographic convenience, thereby perpetuating social isolation. Overall, "creaming" effects allow magnets to flourish academically while local neighborhood schools remain stagnant.

Other researchers have used more quantitative methods to investigate how magnet schools contribute to racial inequality. In his study of Montgomery County, Maryland, Jeff Henig (1996) found that white applicants tend to apply to magnet schools with lower proportions of minority students, and that minority applicants tend to apply to schools with lower proportions of white students. Using more sophisticated methods, Sal Saporito (2006) used Geographic Information System (GIS) computer mapping to shed light on the school choice process. He linked school attendance boundary maps with residential information (from Census 2000) and school enrollment data (from NCES) for the twenty-two largest districts in the country. Saporito determined that public schools in those twenty-two districts would actually be less racially segregated if all of the children living in a district attended their neighborhood schools they were assigned to, rather than participating in school choice programs. Furthermore, he demonstrated that private, charter, and magnet schools actually help perpetuate racial isolation rather than help reduce it due to the fact that white families opt out of local neighborhood schools at higher rates than minority children.

Debates about the purpose of magnet schools have arisen in several localities, including the setting of this study, the metropolitan Hartford region in Connecticut. As a result of the *Sheff v O'Neill* school desegregation case, a 2003 settlement stated the goal of enrolling 30 percent of Hartford minority students in reduced isolation educational settings (such as interdistrict magnet schools and city-suburban transfer programs) by June 2007. One local study conducted by Trinity graduate Naralys Estevez (2006) used GIS, census tract information, and magnet application data to determine that applications to one particular magnet school were not statistically representative of the neighborhood demographics where students lived. She found that Black and Hispanic applicants were more or less likely to apply depending upon the racial demographics of the neighborhoods in which they lived in Hartford.

Magnet schools in the metropolitan Hartford region pose a problem for plans to reduce isolation. Magnet schools in the area have no control over who applies, even with vigorous marketing techniques, due to the fact that parents voluntarily apply to magnet schools. At best, magnet school administrators can only hope to attract students of different backgrounds that help it meet the *Sheff* standards. The fact is that even though they had hoped to attract white suburban students, for the most part magnet schools have been more popular among Black and Hispanic suburban families; of all minority applicants to magnet schools, sixty percent come from Hartford while only 40% come from the suburbs (Dougherty et al, 2007; Frahm, 2007). Bringing these facts together, it is no surprise that the 30 percent goal was not met in June 2007. The

original intention of *Sheff* was to help integrate students but Stanley Battle, a former administrator of Eastern Connecticut State University, was quoted a year earlier as saying, "We talk about integration, but we practice segregation" (Simpson, 2006). With this losing battle to initiate integration, the plaintiffs and defendants are back in court attempting to find a new agreement with new goals to work toward.

The current study draws upon the previous literature and develops a mixed-methods approach to understanding magnet school choice in metropolitan Hartford, but differs from these works in several ways. In comparison to Saprito's (2006) national-level analysis, the quantitative portion of this study is a local analysis, measuring how magnet school applications vary across different neighborhoods in one city, Hartford, which is comprised primarily of Black and Hispanic families. (Since the ratio of White students in Hartford Public Schools is very small -- approximately 5 percent -- our study concentrates only on Black and Hispanic populations). Furthermore, our investigation expands upon Estevez's (2006) study by analyzing application patterns for six magnet schools, rather than one. Similarly, in contrast to Smrekar and Goldring's (1999) comparison of two cities, the qualitative portion of this study analyzes parental responses to magnet school choice and how they differ across different types of neighborhoods within the City of Hartford.

Part One: Quantitative & Spatial Analysis of Magnet Applicants

Sources and Methods

For the quantitative portion of our study, we began by obtaining Spring 2007 application data for the 6 elementary magnet schools operated by the Hartford Public Schools. Based on the lottery application forms submitted by parents (see appendix), the data listed individual applicants by race, gender, current school and grade, and most importantly, their home street address. Although the Sheff desegregation legal case was grounded on both the racial and socio-economic isolation of students, the magnet application form does not request any socio-economic data from parents. Therefore, our study could not easily analyze this other important indicator. Furthermore, although there were 22 interdistrict magnet schools in the metropolitan region, we chose to focus only elementary-level magnets (due to the availability of standardized test data for grades 3-8, and the larger number of neighborhood school attendance zones at the elementary level), and those operated by the Hartford Public Schools (whose application data was more uniformly organized than the Capitol Region Education Council, another manager of magnet schools). Our analysis of these 6 magnets should not be extended to the 22 at large.

Most HPS elementary magnet applicants resided in the City of Hartford (72%), while others came from surrounding school districts (28%), most notably Bloomfield, East Hartford, Manchester, and New Britain. It is important to note that the percentage of racial minority students in the school districts with the highest levels of HPS magnet applications range from Hartford and Bloomfield (about 95% minority) to Manchester (46% minority).In addition, since each applicant could list two magnet school preferences on the form, we drew a distinction between number of *applicants* (2,573) versus the number of *applications* (4,187), to differentiate between the individuals who applied versus the frequency of the magnet schools they requested.

Table 1: Total Applicants to HPS elementary magnets, Spring 2007 lottery

Residence	Applicants (each child is one applicant)
City of Hartford	1853 (72%)
Suburbs	720 (28%)
Total	2573

Table 2: Total Applications to HPS elementary magnets, Spring 2007 lottery

Residence	Applications (each applicant may list 2 magnet schools)
City of Hartford	2958 (71%)
Suburbs	1229 (29%)
	4187

For much of our spatial analysis, we focused on magnet applicants who resided in the City of Hartford, due to the higher concentration of usable data. To compare magnet applicants relative to all students in each neighborhood, we obtained elementary-level enrollment data, by race and neighborhood school attendance zone, for the 2006-07 school year from the Connecticut State Department of Education. Note that this is the best available data. Indeed, a more accurate number of elementary-level students in each of the 26 zones would include those who attended schools outside of the public neighborhood school (eg. private, parochial, and the Project Choice city-suburban transfer program). Given that the vast majority of Hartford students attend neighborhood public schools, and the lack of centralized street address data for those enrolled elsewhere, our analysis rests on the best data available to us at this point in time.

Table 3. HPS Neighborhood Elementary School Zone Enrollment, 06-07, by Race

Elementary School Zone	Total Indian	Total Asian	Total Black	Total White	Total Hispanic	Percent Minority
Barnard	0	2	51	1	333	99.7%
Batchelder	4	12	113	20	361	96.1%
Betances	1	0	64	5	325	98.7%
Burns School	1	0	71	6	433	98.8%
Burr School	2	7	73	30	401	94.2%
Clark School	0	1	279	5	112	98.7%
Dwight	0	6	95	54	274	87.4%
Fisher	1	2	528	18	71	97.1%
Fox Elementary	1	7	131	49	643	94.1%
Hooker	0	6	99	24	273	94.0%
Kennelly	8	14	227	56	525	93.3%
King	0	1	595	3	66	99.5%
Kinsella	1	0	120	33	335	93.3%
McDonough	0	1	42	8	413	98.3%
Milner	1	1	275	3	124	99.3%
Moylan	1	0	75	7	500	98.8%
Naylor	2	7	96	120	351	79.2%
Parkville	0	17	117	41	386	92.7%
Rawson	2	0	397	3	20	99.3%
Sanchez	0	1	64	1	464	99.8%
Sand	0	0	183	3	165	99.1%
Simpson	0	2	313	11	45	97.0%

Twain	0	1	253	2	34	99.3%
Webster	3	8	325	56	233	91.0%
West Middle	0	12	389	15	323	98.0%
Wish	0	4	195	3	214	99.3%

To measure the relationship between magnet applications and school quality, we used standardized test achievement data from the Connecticut Mastery Test (CMT), available on-line from the "CMT Reports" website under contract by the Connecticut Department of Education. We used 4th grade scores (since every elementary school has a 4th grade) from the Spring 2006 test (since these were publicly available to parents at the time they applied to magnets in Spring 2007) and analyzed the percentage of students at or above the "proficiency" level (rather than "goal" level) to enhance statistical variation in the low-scoring Hartford Public School system. Finally, we averaged the three individual sub-test proficiency levels (for math, reading, and writing), rather than relying on pre-defined summary categories provided by the State.

Table 4. HPS Neighborhood School 4th Grade CMT Proficiency, Spring 2006

Elementary School Zone	Percent Proficient in Math	Percent Proficient in Reading	Percent Proficient in Writing	Percent Proficient in all 3 Tests
Barnard	35.9	24.3	51.4	37.2
Batchelder	65.5	36.2	63.2	55.0
Betances	26.1	10.9	19	18.7
Burns	23.2	17.9	32.4	24.5
Burr	44.9	34.7	58.3	46.0
Clark	64.3	53.7	70.7	62.9
Dwight	53.4	45.2	67.6	55.4
Fisher	43.4	37.8	77.1	52.8
Fox Elementary	44.4	29.3	56.6	43.4
Hooker	71.4	45.7	71.4	62.8
Kennelly	63.7	39.1	81.3	61.4
King	33.7	26.4	56.5	38.9
Kinsella	32.7	27.8	46.3	35.6
McDonough	51	29.4	58.8	46.4
Milner	20.5	14	25.6	20.0
Moylan	43.8	37.5	72.9	51.4
Naylor	64.1	39.1	68.8	57.3
Parkville	73.4	47	66.2	62.2
Rawson	62.5	56.3	81.3	66.7
Sanchez	50	25.9	61	45.6
Sand	44.8	13.8	75.9	44.8
Simpson	59.4	44.4	79	60.9
Twain	46.2	25.6	45.9	39.2
Webster	50.7	50.7	70.4	57.3
West Middle	42.1	30.7	49.3	40.7
Wish	50	34.1	52.4	45.5

Similarly, to compare differences between HPS elementary magnet schools, we obtained data on their CMT scores, racial composition, and total applications. It is relevant to note that all of these

magnet schools enroll between 73 to 96 percent minority students, which has presented serious problems in meeting Sheff desegregation requirements (see Dougherty et al, 2007). Furthermore, most schools are listed both as HPS neighborhood zones and magnet schools because they are being phased in as magnets, with the exception of Breakthrough Magnet (which was not a neighborhood-zoned school in recent years).

Table 5: HPS Elementary Magnet Achievement, Race, and Applications, 2006 & 2007

HPS Elementary Magnet	CMT 4th grade proficiency level Spring 2006				Percent minority Fall 2007	Total Applications Spring 2007
	Math	Reading	Writing	3 Tests		
Breakthrough (Character Ed)	73.9	60.9	82.6	72.5	73%	1681
Simpson Waverly Classical	59.4	44.4	79.0	60.9	95%	212
Noah Webster MicroSociety	50.7	50.7	70.4	57.3	86%	816
Annie Fisher Multiple Intell	43.4	37.8	77.1	52.8	96%	750
Mary Hooker Environ Sci	43.4	37.8	77.1	52.8	89%	329
Kinsella Arts	32.7	27.8	46.3	35.6	85%	399

Our spatial analysis is made possible by Geographic Information Systems (GIS), a collection of computerized tools that allow one to examine and present data geographically. GIS can be used in a multitude of facets including medicine, city planning, and environmental science. A unique task that GIS can complete is joining spatial data: assigning counts and summaries of point features (such as magnet applicant home addresses) to polygon features (such as neighborhood school attendance zones) (Gorr & Kurland, 2005). We used ArcGIS to illustrate elementary magnet school application patterns for this study, and to create many of the maps, joined magnet school application data such as race to geographic spatial data such as Hartford elementary school zones.

One primary use of GIS was the "geocoding" tool to plot magnet applicants' home address data as points on a map, to determine very specific information about their residential demographic information. We achieved geocoded matches for 92 percent of the total applicant pool, while the remaining 8 percent (330 out of 4,187) were left unmatched and not used in the analysis. (For the 1,853 applicants residing in the City of Hartford, we did additional interactive matching to increase the geocoding rate to nearly 100 percent for portions of the study below.) For confidentiality purposes, the exact location of individual student addresses cannot be shown publicly and must therefore be masked. To do this, we overlay boundary files (such as school attendance zones) to help differentiate sections for analysis. Next, we spatially join the plotted points to the spatial feature (elementary school zones) and can summarize each zone by percentage of applicants per zone to maintain the confidentiality. These summaries can be displayed in terms of graduated color schemes to show those zones with higher and lower rates. In sequence, images 1-5 briefly illustrate the geocoding process (Estevez, 2006).

Image 1: Application data:
Street Addresses

◇	A
1	Applications
2	35 Main St
3	606 First Ave
4	58 South Blvd
5	49 Main St
6	500 First Ave

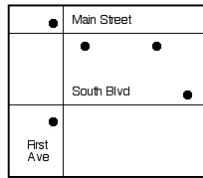*Image 2: Street Map*
With addresses (dots)

Image 3: Neighborhood
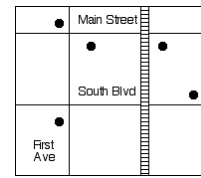*boundaries overlayed on map*
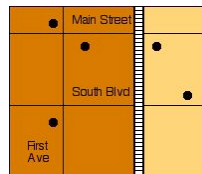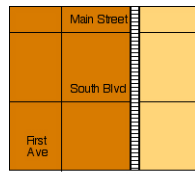
Image 4: Data groups
Represented by colors

Image 5: Dots removed
to maintain confidentiality

Another GIS component we used was the "near" tool, to determine which magnet schools are the most "magnetic," meaning that they attract students from the furthest distances. The near tool is designed to find the average distance of a set of multiple points to a single point. In the case of this analysis, we used the near tool to calculate distances for each plotted application to its respective magnet school. All of these point-distances can then be combined to achieve an overall point-distance average for each magnet school.

To determine whether the race of magnet applicants was statistically representative of their neighborhood school attendance zones, we performed a chi-square test for goodness of fit statistical analysis, based on our GIS spatial analysis data. The chi-square test for goodness of fit is an inferential statistic that allows meaningful analysis of one nominal variable (independent variable) but no continuous variable (dependent variable) in one population with the same variable (Glass & Hopkins, 1996; Estevez, 2006). For example, this test reveals if the percentage of Black applicants (nominal variable) who apply to elementary magnet schools is greater or less than expected (based on the number of Black students residing in each school zone). The end result of a chi-square analysis indicates whether the number expected significantly differs from actual. A result is statistically significant if the difference between groups could have occurred by chance alone in less than 1 time in 20 (Glass & Hopkins, 1996). This is expressed as a p value < 0.05. Table 6 below shows an example of chi-square conducted for one individual elementary school zone, Betances.

Table 6: Illustration of Computation of the Chi-Square Goodness of Fit from Student Percentages in the Betances School Zone

School Zone Enrollment 2006-07			*Betances Applicants from Spring 07 Lottery*			
Betances	Enrollment	Percentage	Applicants	Percentage	Expected	Significant
Black	64	16.5%	20	32.3%	12	Yes
Hispanic	325	83.5%	42	67.7%	50	Yes
Total	389		62			

$X^2 = (20-12)^2/12 + (42-50)^2/50 = 6.613$
Degrees of Freedom (df) = 1
$p < 0.01$

For this portion of the analysis, we focused only on the two dominant student racial groups -- Blacks and Latinos -- in the City of Hartford. Within the city school district, there were insufficient numbers of White, Asian, and American Indian applicants to make meaningful claims using chi-square analysis. Furthermore, we did not extend this portion of the analysis beyond the City of Hartford due to the lower concentrations of applicants in suburban elementary school zones.

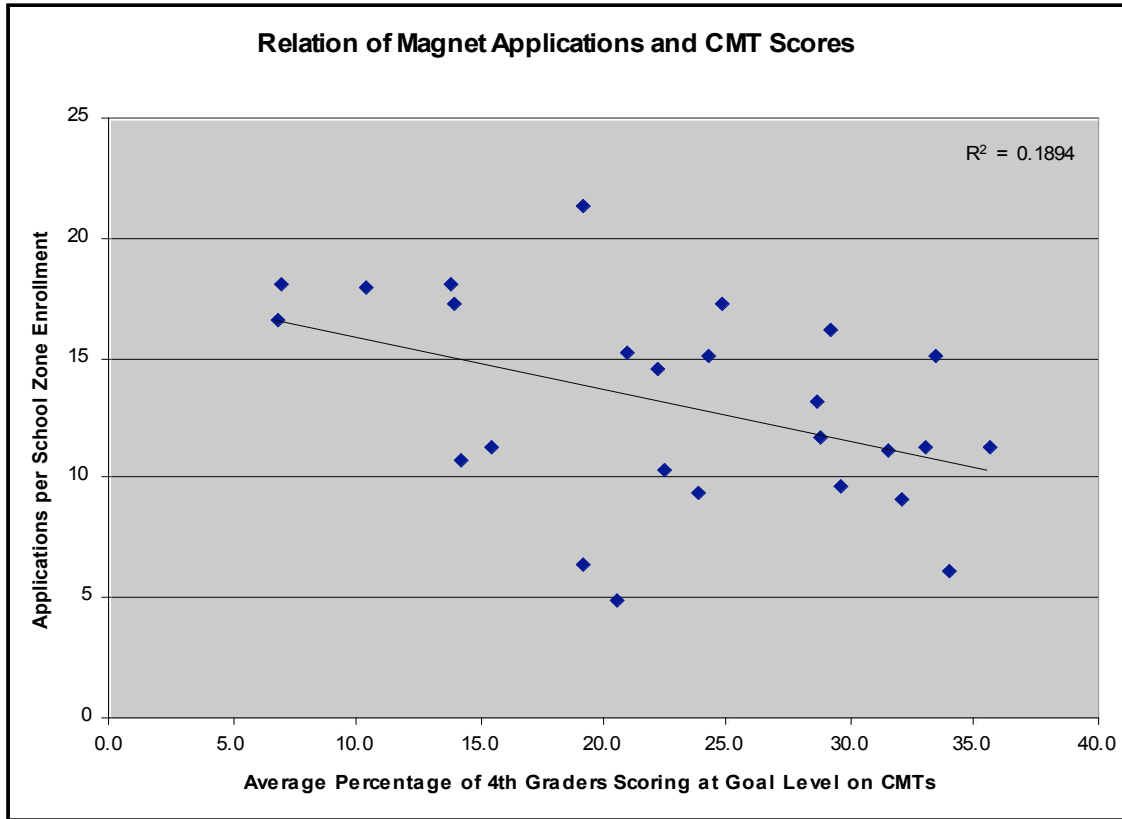## Results from Quantitative & Spatial Analysis

1) School Quality

Our study first asked: What is the relationship between magnet application rates and standardized test scores, for both the neighborhood schools and magnet schools? One commonly held belief is that school choice is driven by school quality. According to this belief, if a neighborhood school receives low scores on standardized tests, it would "push" parents away and make them more likely to apply to choice schools, such as magnets. Similarly, if magnet schools received high scores, they would "pull" parents and make them more likely to apply to these particular schools. For this model to be applicable to Hartford elementary magnet schools, we would expect to see relatively high correlations between application rates and schools.

However, our analysis found relatively modest relationships. Although high-scoring magnet schools have some "pull" effects that generate somewhat higher rates of applications (R^2=0.42 in Figure 1), we found no comparable "push" effects showing a relationship between the number of applicants and the neighborhood school test scores ($R^2 = 0.19$ in Figure 2). In other words, while higher-scoring magnets tend to receive somewhat higher rates of applications, lower-scoring neighborhood schools generally do not produce greater proportions of "leavers" who wish to choose a magnet school. (It is important to note that this finding does not include correction for statistical variance among applications.) Overall, it would appear that some other factors may be driving the magnet school choice process.

Figure 1: Modest "Pull" Relationship between Applications and Test Scores in Hartford Elementary Magnet Schools
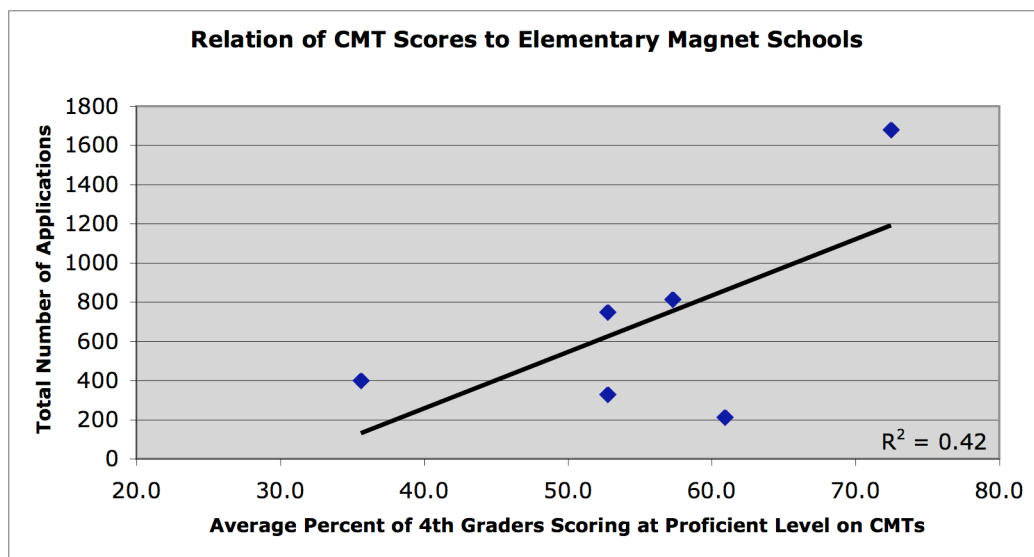
Figure 2: Weak "Push" Relationship between Magnet Applications and Test Scores at Hartford Elementary Neighborhood Schools

Relation of Magnet Applications and CMT Scores

$R^2 = 0.1894$

Y-axis: Applications per School Zone Enrollment

X-axis: Average Percentage of 4th Graders Scoring at Goal Level on CMTs

2) Geography

Next, our study asked: How do magnet schools vary in their level of "magnetism," meaning the average distance they attract applicants? Another common belief is that parent choice is driven by geographical convenience. According to this idea, parents are motivated to choose schools that are relatively close to their home residence, rather than fully participating in a market-choice model. If this model applied to the metropolitan Hartford region, we would expect to see relatively small, uniform average distances between applicants and magnet schools, representing essentially "neighborhood" choices.

However, the average distance between applicants and the magnet schools they selected had wide variation, ranging from 1.9 to 3.2 miles for the entire sample of applicants from the metropolitan region (see table 7 and map 1). Even when we narrowed the sample to applicants who resided in the City of Hartford only, the average distance ranged from 1.1 to 1.8 miles, in a relatively small city of only 17 square miles (see table 8 and map 2). (Note that this finding does not incorporate population density.) With the possible exception of one magnet school (Simpson-Waverly Classical), most applicants seem to be choosing beyond their local neighborhood. Factors other than geographical convenience seem to be driving the magnet choice process.

Table 7: Average Distance to Magnet School, for ALL Applicants

Magnet School	Average Distance (miles)
Simpson-Waverly Classical	1.9
Mary Hooker Environ Sciences	2.8
Noah Webster MicroSociety	2.9
Breakthrough (character ed)	3.1
Annie Fisher Multiple Intelligences	3.2
Kinsella Arts	3.2

Average Distance of All Applicants to HPS Elementary Magnets
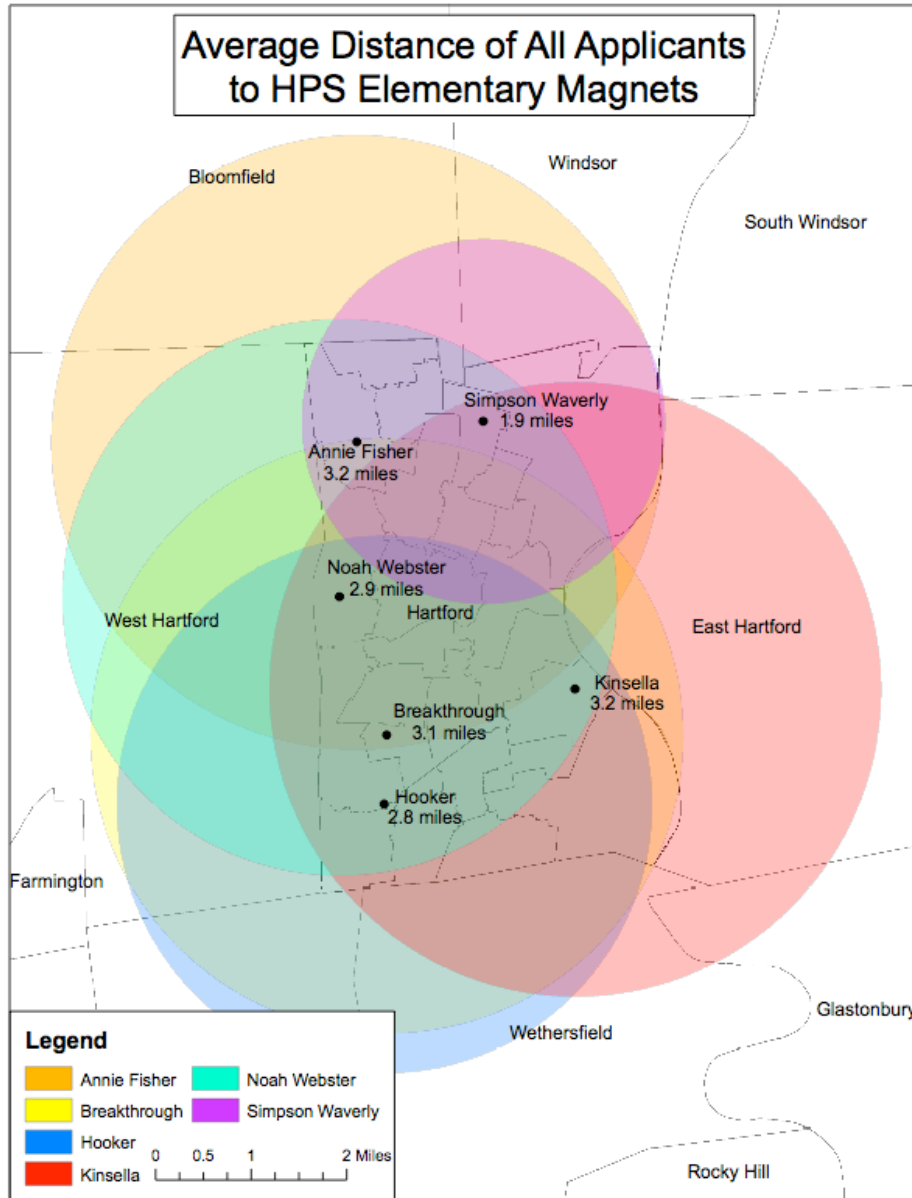
Table 8: Average Distance to Magnet School, for HARTFORD Applicants

Magnet School	Average Distance (miles)
Simpson-Waverly Classical	1.1
Noah Webster MicroSociety	1.4
Breakthrough (character ed)	1.5
Mary Hooker Environ Sciences	1.6
Kinsella Arts	1.6
Annie Fisher Multiple Intelligences	1.9

Average Distance of Hartford Applicants to HPS Elementary Magnets
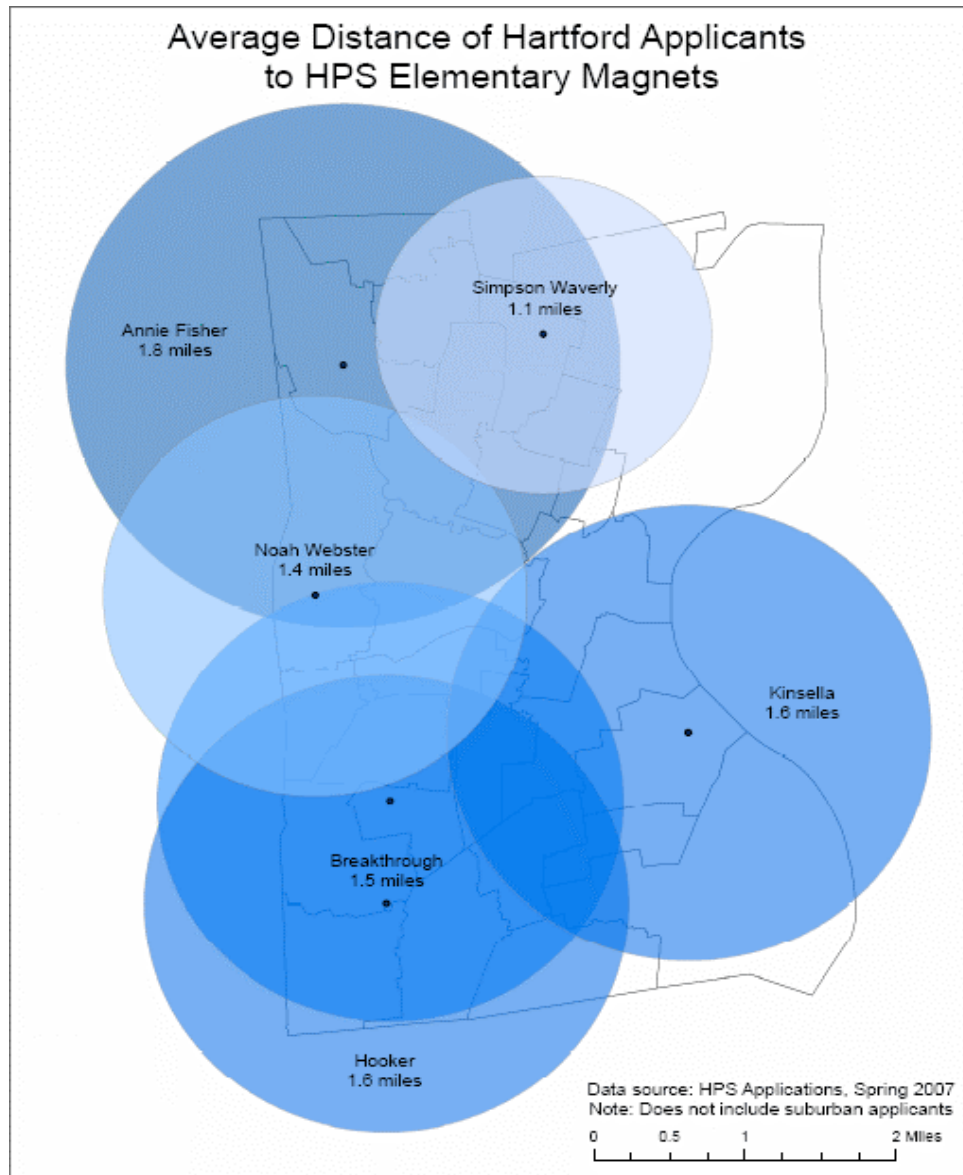
3) Neighborhood race

Finally, our study asked: How do magnet applications vary across neighborhoods, and are they statistically representative of the racial demographics of each area? Based on a previous study of one Hartford magnet school (Estevez 2006), we were particularly interested in whether an individual student's race, relative to the racial composition of their neighborhood school, had any influence on the decision to apply to magnet schools.

For this analysis, we geocoded nearly all 1,853 magnet school applications from residents in the City of Hartford, and placed them on top of HPS elementary neighborhood school zones (see map). But this map alone does not paint the best picture of applicant variation across neighborhoods. Instead, a better representation is to calculate applicants per school zone enrollment, because each neighborhood zone varies in size. (As noted above, this study used the best base numbers available to us, but does not include neighborhood students who enrolled in private schools or non-neighborhood public schools.)

Map 1. All Elementary Magnet Applications from Spring 2007 Lottery
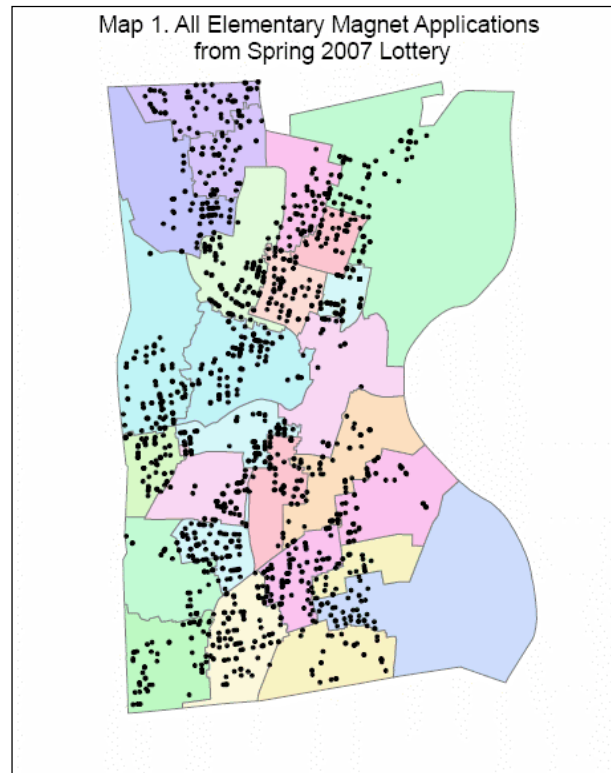
Table 9: HPS Elementary Magnet Applicants per School Zone Enrollment, Hartford only

Elementary School Zone	School Zone Enrollment	Magnet Applicants from Hartford	Magnet Applicants per Enrollment
Burr	513	25	4.9
Naylor	576	35	6.1
Barnard	387	25	6.5
Dwight	429	39	9.1
Fisher	620	58	9.4
Hooker	402	39	9.7
Sanchez	530	55	10.4
Kinsella	489	53	10.8
Kennelly	830	93	11.2
Clark	397	45	11.3
Fox Elem	831	94	11.3
Batchelder	510	58	11.4
Parkville	561	66	11.8
Webster	625	83	13.3
West Middle	739	108	14.6
McDonough	464	70	15.1
Rawson	422	64	15.2
Moylan	583	89	15.3

Simpson	371	60	16.2
Betances	395	66	16.7
Wish	415	72	17.3
King	665	116	17.4
Burns	511	92	18.0
Milner	404	73	18.1
Sand	351	64	18.2
Twain	290	62	21.4

We found that HPS elementary magnet applicant rates varied widely across city neighborhoods, ranging from a low of 5 percent in the Burr Elementary zone to a high of 21 percent in the Twain Elementary zone (with a median of 12 percent). At the low end, only 1 out of 20 Burr students are attempting to opt out of their school, while at the high end, more than 1 out of 5 Twain students are applying to go elsewhere. According to the map of this data below, while the three school zones with the highest magnet applicant rates are located in the city's North End (Twain, SAND, and Milner), none of these have a magnet school located in their immediate neighborhood.

Given the wide variation in magnet applicant rates, our study examined whether the race of the individual applicant, with respect to the racial demographics of the neighborhood school zone, had any influence on the magnet choice process. Overall, the Hartford Public Schools are comprised of two major racial groups: Black students (41 percent), who dominate the North End, and Hispanic students (52 percent), who dominate the South End.

Map 2. Elementary Magnet Applications per School Zone Enrollment
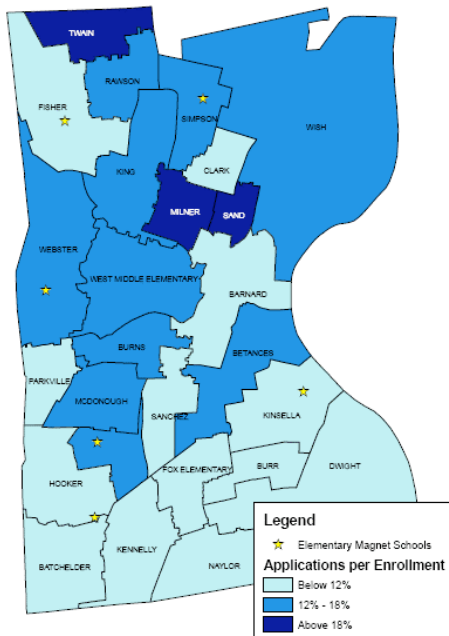
Dominated Elementary School Zones by Race for 2006-07 School Year
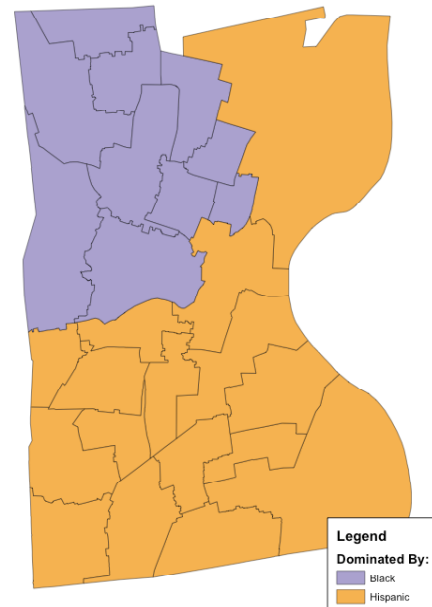
First, we tested whether Black students applied to HPS elementary magnets at expected rates given the number of Black students enrolled in the neighborhood school. Chi-square tests for Black applicants by school zone demonstrate the statistical significance of the uneven rates. Statistical significance means the likelihood that the difference found between groups could have occurred by chance alone. A result is statistically significant if the difference between groups could have occurred by chance alone in less than 1 time in 20. This is expressed as a p value < 0.05. For example, in the Burns school zone, it was expected that there would be 14 Black applicants applying to magnet schools. In actuality, 23 applied, which means that Black applicants are more likely to apply if they reside in the Burns school zone. Overall, across Hartford's 26 elementary school zones, Black applicants were more statistically more likely to apply in 10 zones, less likely in 2 zones, with insignificant results in the remaining 14 zones (see table 10). We also conducted the same analysis for Hispanic applicants and found the inverse relationship: Hispanics were more likely to apply in 2 zones, less likely to apply in 10 zones, with insignificant results for the remaining 14 zones (see table 11).

Table 10: Black Applicants, Expected versus Observed, by Hartford School Zone

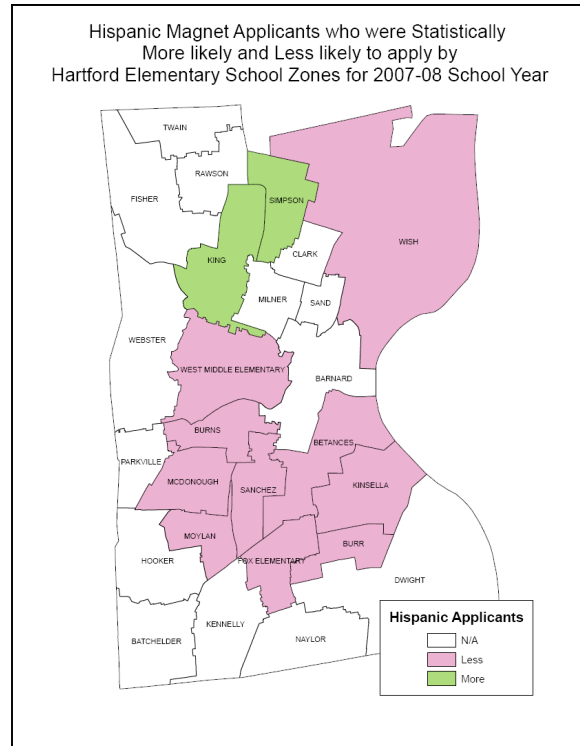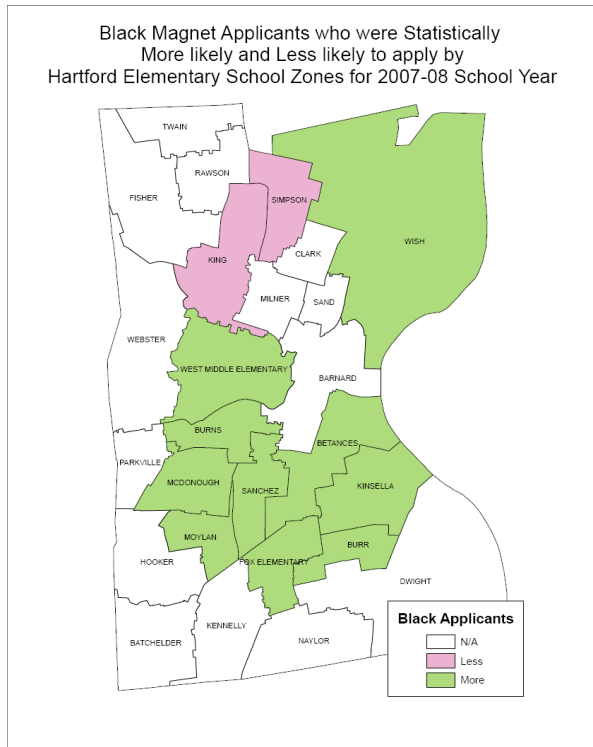| Elementary School Zone	Applicant's Race	Expected	Observed	Significant?	More or Less Likely
Annie Fisher	Black	49	47	No	NA
Barnard	Black	4	6	No	NA
Batchelder	Black	15	20	No	NA
Betances	Black	12	20	Yes	More
Burns	Black	14	23	Yes	More
Burr	Black	4	11	Yes	More
Clark	Black	33	37	No	NA
Dwight	Black	9	13	No	NA
Fox Elementary	Black	16	25	Yes	More
Hooker	Black	9	10	No	NA
Kennelly	Black	28	31	No	NA
King	Black	101	93	Yes	Less
Kinsella	Black	14	21	Yes	More
McDonough	Black	7	18	Yes	More
Milner	Black	50	54	No	NA
Moylan	Black	13	27	Yes	More
Naylor	Black	7	9	No	NA
Parkville	Black	14	11	No	NA
Rawson	Black	61	60	No	NA
Sanchez	Black	7	14	Yes	More
Sand	Black	33	30	No	NA
Simpson	Black	51	42	Yes	Less
Twain	Black	54	57	No	NA
Webster	Black	35	36	No	NA
West Mid Elem	Black	56	75	Yes	More
Wish	Black	36	56	Yes	More

Table 11: Hispanic Magnet Applicants, Expected vs Observed, by Hartford School Zone

Elementary School Zone	Applicant's Race	Expected	Observed	Significant?	More or Less Likely
Annie Fisher	Hispanic	7	9	No	NA
Barnard	Hispanic	22	19	No	NA
Batchelder	Hispanic	44	38	No	NA
Betances	Hispanic	50	42	Yes	Less
Burns	Hispanic	74	62	Yes	Less
Burr	Hispanic	20	13	Yes	Less
Clark	Hispanic	12	8	No	NA
Dwight	Hispanic	26	22	No	NA
Fox Elementary	Hispanic	72	63	Yes	Less
Hooker	Hispanic	25	24	No	NA
Kennelly	Hispanic	62	59	No	NA
King	Hispanic	13	21	Yes	More
Kinsella	Hispanic	37	30	Yes	Less
McDonough	Hispanic	57	46	Yes	Less
Milner	Hispanic	22	18	No	NA
Moylan	Hispanic	74	60	Yes	Less
Naylor	Hispanic	24	22	No	NA
Parkville	Hispanic	48	51	No	NA
Rawson	Hispanic	3	4	No	NA
Sanchez	Hispanic	46	39	Yes	Less
Sand	Hispanic	31	34	No	NA
Simpson	Hispanic	9	18	Yes	More
Twain	Hispanic	7	4	No	NA
Webster	Hispanic	25	23	No	NA
West Mid Elem	Hispanic	41	22	Yes	Less
Wish	Hispanic	29	16	Yes	Less

When we visualize these chi-square results on maps, an important racial pattern emerges. As previously noted, Hispanic students dominate 16 school zones, mostly in the city's South End. In 9 out of these 16 Hispanic-dominated zones, Black students were statistically more likely to apply to magnet schools than expected, and conversely, Hispanic students were less likely. Looking at the 10 Black-dominated school zones in the city's North End, the pattern was not as clear. Hispanics were more likely to apply in 2 out of 10 Black zones, though in 1 of these 10 zones, Blacks were more likely to apply. *Overall, in almost half of Hartford's school zones (11 out of 26), students who were the racial minority were more likely to apply to a magnet school* as a means of exiting their neighborhood school. In only 1 case (out of 26) were students who were the racial majority more likely to apply to a magnet school. The remaining 14 zones did not have statistically significant results by race.

Table 12: School Zones by type

Racial minority MORE likely to apply to magnet	11 (42%)
Racial minority LESS likely to apply to magnet	1 (4%)
No statistically significant difference	14 (57%)
Total	**26**

Black Magnet Applicants who were Statistically More likely and Less likely to apply by Hartford Elementary School Zones for 2007-08 School Year

Hispanic Magnet Applicants who were Statistically More likely and Less likely to apply by Hartford Elementary School Zones for 2007-08 School Year

These results suggest that race does play a part in the magnet school choice process. If race were not a factor, we would expect to see that the number of Black and Hispanic applicants would be proportional to the racial demographics of each neighborhood, but this was not the case. Instead, we found that in nearly half of the school zones, Black and Hispanic students were more likely to apply when they were the racial minority in their neighborhood public school. One possible explanation may be that Hartford students who are the racial minority in their neighborhood school zone are more likely to feel alienated, and seek an alternative to their current situation (though this analysis cannot test that hypothesis). In any case, school choice advocates and magnet school planners should look more closely into the ways that same-race affinity may influence the choice process, particularly regarding Black and Hispanic students at the neighborhood level.

Part Two: Qualitative Analysis of Parent Interviews

Based on our two major quantitative findings regarding magnet school applicant rates (ranging from 5 to 21 percent across neighborhoods) and the influence of race in the choice process, we designed a qualitative study to answer our next research question: *How do Hartford parental rationales on magnet school choice differ between neighborhoods with high versus low rates of applicants, and to what extent is race involved?*

Methods and Sources

We created an interview guide for parents with school-age children who did (and did not) chose to apply to a magnet school in Spring 2007. Drawing on our previous experience with interview-based research at public and private school choice fairs, we designed open-ended questions about parental motivations for choosing (or not choosing) to apply, and perceptions of

current schools as well as magnet schools. The interview guide began with questions about where their child currently attended school, and proceeded on whether or not the parent chose to apply to magnet schools for their child. If the parent answered *yes*, they were asked why they chose the schools they applied to, with follow-up prompts about possible factors (such as convenience, magnet curriculum, and dissatisfaction of the child's current school). If the parent answered *no*, they were asked a series of questions about why they did not apply to magnet schools (with similar prompts about familiarity, convenience, and current school satisfaction). The most intriguing question was towards the end of the interview, when we asked about parents' perceptions of their neighborhood elementary school, and whether they perceived differences in educational outcomes in neighborhood schools compared to magnet schools. The interview concluded with demographic questions about the children's race/ethnicity and parental level of education. All interviews were recorded to capture the parents' responses in their own words. The five members of our interviewing team all had previous experience interviewing parents about school choices. The team included African-American, White, and Hispanic students, and two students also had Spanish language skills. (See interview guide in appendix). Our project received Institutional Review Board approval.

To select parents for interviewing, we focused on 4 elementary school attendance areas: the 2 with the highest magnet applicant rates (Twain, 21% and SAND, 18%) and the 2 with the lowest rates (Burr, 5% and Naylor, 6%). Both of the high-rate schools were located in predominantly Black student areas, and both of the low-rate schools were located in predominantly Hispanic student areas. None of the four had a magnet school located inside their boundaries. Using our street maps from ArcGIS, our interview teams focused on the census block groups with the highest levels of magnet choosers in both high- and low-rate neighborhoods, then went door-to-door in these four neighborhoods during late afternoons and weekends in October-November 2006 to request interviews with parents of school-age children.

Overall, we conducted 36 parent interviews. We identified "choosers" (who applied to magnet schools) and "non-choosers" (who did not apply), as well as a small number of parents who had applied to magnet schools in previous years. Not surprisingly, our largest sample of "non-choosers" was found in neighborhoods with the lowest rate of magnet applicants (see table 13). Most families we interviewed were Black or Hispanic (39% each), though we identified Whites and others as well (see table 14). The educational level of most parents (58%) was a high school diploma or below, and they had children ranging in age from pre-K to the 12th grade.

Table 13: Parent Interviews by Neighborhood Type and Chooser Status

	High-rate magnet applicant neighborhood	Low-rate magnet applicant neighborhood	Total
Choosers	5	7	
Non-choosers	5	16	
Others (applied and enrolled in magnets in previous years)	2	1	
Total	**12**	**24**	**36**

Table 14: Interviews by Race of the Child

Black	14
Hispanic	14
White	5
Multi-racial	2
Asian	1

Analysis of Qualitative Interviews

1) No meaningful differences between high- versus low-rate neighborhoods

To our surprise, *we did not find meaningful differences between parents in neighborhoods with high versus low rates of magnet school choice.* One way we coded the qualitative data was to look for the prevalence of "pull" motivations (submitting an application due to a strong attraction toward a magnet school) versus "push" motivations (submitting an application due to a strong desire to avoid the current neighborhood school). These two categories are not mutually exclusive, and we coded interview transcripts to be either pull, push, both, or neither.

When we examined "choosers" (parents who applied to magnet schools), they *expressed similar levels of "pull" (rather than "push") motivations in both high- and low-rate neighborhoods.* In the high-rate neighborhood, 3 out of 5 parents who applied to magnets cited their primary reason as an attraction toward the magnet school, similar to the 5 out of 7 magnet applicants in the low-rate neighborhood. Most choosers cited magnet school educational opportunities and reputation as their main reason for applying. For example, one parent from a low-rate neighborhood who applied to Hartford Magnet Middle School the previous academic year stated, "My niece goes there and it has a good reputation…"(Naylor: Heather #6).

In the same manner, when we interviewed parents who did not apply to magnets ("non-choosers"), they had *similar levels of satisfaction with their children's current school in both high- and low-rate neighborhoods.* For example, 4 out of 5 non-choosers in the high- rate neighborhoods were satisfied with their child's current school, compared with 12 out of 16 non-choosers in the low-rate neighborhoods. In the SAND neighborhood school zone, with a high rate of magnet applicants, we typically heard parents state, "The kids are doing good there. Most of their teachers were my teachers. They take care of them" (SAND, Heather #2). Likewise, a typical parent in the Naylor school zone, with low rates of magnet applicants, also looked positively on the neighborhood school. ". . .For the younger ones they are doing so well. When you got a good thing going, why change it?" (Naylor, Heather #5).

We do not claim that parents were making the most informed choices about schools for their children. In fact, some non-choosers stated that they did not apply to magnets due to a lack of information about those schools. But what is striking is that this lack of information occurred with the same frequency in both types of neighborhoods. For instance, 1 out of 5 parents from high-rate areas, compared to 4 out of 16 parents in low-rate areas, responded about their lack of magnet school information. Based on our very small comparison, we did not find any meaningful difference between the type of information available to parents based on the level of magnet choice in their neighborhood.

2) Racial differences in talking about school choices

One of the most salient themes in the interview transcripts was a racial difference between how parents talked about public and private school choices in Hartford. In the 36 door-to-door interviews conducted for this study, 5 White parents with school-age children participated, all who lived in the South End of the city, in neighborhoods with low rates of magnet school applicants. While our study officially labeled 4 out of 5 White families as "non-choosers" (with respect to magnet schools), 3 of them had chosen private or parochial schools. The sole White parent who applied to a Hartford magnet school did so based on a strong desire to avoid her neighborhood high school.

Overall, about half of the White families flatly rejected Hartford public schools -- whether neighborhood or magnet -- while none of the non-White families followed this pattern. When asked about magnet schools and their specialized curricula, one White parent responded, "Never thought of it. I just knew I was never sending them to Hartford schools" (Naylor: Heather #21). She would not consider sending her children to a magnet school because she continued to perceive it primarily as a "Hartford public school," a category that she had dismissed in her mind. A second White parent justified her decision not to apply to a magnet school on the grounds that her children "have always had a Catholic school education" (Naylor: Heather #2). These two White parents' decisions not to apply to magnets reflected their categorical rejection of Hartford's public schools, in any shape or form.

A third White parent gave some consideration to applying to a nearby magnet school (located about 1.5 miles away), but decided against it due to the neighborhood in which it was located. "I'm not crazy about the location of magnet schools," the parent remarked. "It would have been nice if, for example there is [a magnet school] in the Flatbush area, and my daughter wants to go there. But I would have put the school here [in the Naylor neighborhood], and bused those kids here, instead of us going into that kind of neighborhood" (Naylor: Heather #8). This parent's decision not to apply to a nearby magnet school (in a predominantly Hispanic neighborhood) reflects the privileged attitudes of some Whites who refused to participate in magnets unless they were offered on their own terms, in the comfort zone of their own neighborhood.

When comparing interview transcripts by race, we found that *none of the 31 Black, Latino, or Asian parents flatly rejected Hartford public schools (magnet or neighborhood) in the way that some Whites did.* For example, when we asked one Hispanic parent whether she would consider applying to magnet schools, she stated, "Of course…they are better than the public schools" (Burr: Heather #11). This statement is reflective of the reality for many families, especially lower-income people of color within the city of Hartford. First and foremost, some families may not be able to afford to provide their children with the best possible education money can buy (i.e. a private school education). With this statement being made, it is obvious why parents would opt to provide their children with the best possible opportunities available to their children, but within a monetary bracket that was in fact affordable: free of charge. In this respect, many non-white families are only able to consider public school choice for their children, and in turn many options such as the prospects of magnet school choice help to enforce the notion that non-white families will be able to provide their children with educational opportunities while paying for their child's elementary, middle and secondary schooling.

Interestingly, close to half of African-American respondents tended to constructively criticize their neighborhood school, rather than reject them. For instance, when asked about magnet school choice, 6 out of 14 African American families spoke about wanting the best educational opportunities for their children's neighborhood schools. One parent whose children attended the SAND school observed, "There isn't much that they do with them to make them really think and focus. So, I'm just trying to find something that will challenge them more and get better grades. . ." (SAND: Cintli #1). Other African American parents had similar perceptions about their child's neighborhood schools. Many families gave suggestions on ways that these schools could provide better services to their students, as opposed to flat out rejecting these schools as possible sites of instruction for their child, as some Whites did. About half of the Black parents spoke of educational options for their children critically, and expressed ways that neighborhood schools could provide more educational opportunities for their students, and other

more technical suggestions for these public schools. Furthermore, Black families who applied to magnet schools typically cited their primary reason as wanting the best educational opportunities for their children. When asked if they were dissatisfied with their child's current neighborhood school, many Black respondents would reply "no," but would continue to cite ways in which the neighborhood school could be improved.

Conclusion

Overall, this mixed-methods neighborhood-level analysis emphasizes the degree that race influences the magnet school choice process in ways not fully addressed by previous studies. Our quantitative and spatial analysis revealed that while school quality and geography are important, we cannot ignore the role that race appears to play in the decision to apply to a magnet school. Applications are not occurring proportionately by race. In nearly half of the neighborhoods, Black and Latino families were more likely to apply if they were the racial minority in their elementary school attendance area. These findings suggest (but do not prove) that those students who are in a racial minority in their current neighborhood school may feel uncomfortable for racial, cultural, or social reasons and feel the need to try and opt out to a school where they will be in contact with more students similar to them.

Our qualitative analysis of 36 door-to-door interviews with Hartford parents of school-age children in four attendance areas found more meaningful differences by race, rather than the rate of magnet applicants per neighborhood. While half of the White parents flatly rejected the concept of applying to Hartford's public magnet schools (or any Hartford public school), not a single Black, Latino, or Asian parent followed the same pattern. By contrast, African-American parents were more likely to "constructively criticize" how their neighborhood public schools could be improved, rather than dismissing them entirely.

Together, these findings should begin to alarm magnet school planners in particular, and proponents of school choice at large. Based on our small-scale study of one Northeastern urban area (and only a segment of 22 interdistrict magnet schools located there), it appears that magnet school choice may not be working as originally intended. According to our spatial analysis, the availability of magnets may possibly lead to increased levels of racial isolation (between Blacks and Hispanics in the same neighborhood school), counter to the racial integration goal for which they were designed. Furthermore, based on our small set of interviews, magnets schools do not appear to be engaging White parents in the same ways that they are engaging non-White parents in selected Hartford neighborhoods. Overall, if magnet schools are not doing the job that they were meant to do, it might be time to take a new approach toward improving educational opportunities for all.

Appendix

APPLICATION FOR SEPTEMBER 2007
HARTFORD HOST INTERDISTRICT MAGNET SCHOOLS

1. **It is expected that parents and students understand and intend to comply with the academic, program and uniform requirements of each Magnet School selected on this application.**
2. **Only one application per student.**
3. Application will not be processed unless all requested information is provided.
4. Indicate your school selection or selections for Hartford Host Magnet Schools only.
5. The form must be signed by a parent or legal guardian.
6. Please notify the Magnet School Office of any address or telephone changes.
7. RETURN APPLICATION TO THE MAGNET SCHOOLS OFFICE BY: **FRIDAY, FEBRUARY 16, 2007, 3:30 pm**

Hartford Public Schools   Tel: 860-695-8839
Magnet School Office   Fax: 860-722-8514
960 Main Street – 5th Floor   Hours: 8:30 a.m. – 3:30 p.m.
Hartford, Connecticut 06103   **www.hartfordschools.org**

HARTFORD RESIDENTS ONLY
Are you selecting a Magnet School(s)
as a No Child Left Behind request?
☐ YES   ☐ NO

Please *PRINT* the following information:

1. Name of Student: _____
   LAST NAME   FIRST NAME   M.I.

2. Address: _____
   NO.   STREET   APT. NO.   CITY   ZIP CODE

3. Student's Date of Birth: _____ Gender (check one): ☐ Female   ☐ Male

4. Race (Please check only one): ☐ American Indian ☐ Asian ☐ Black ☐ Hispanic ☐ Caucasian
   We are required by law to report racial information about our applicant and enrollment pools.

5. Print Parent/Legal Guardian Name: _____ Home Phone_____

6. Parent /Legal Guardian Work Phone: _____ Cell: _____

7. Student's current school: _____ City:_____

8. Grade applying to for **NEXT** school year (September, 2007): _____

9. School Selections: Please indicate school name in order of preference:

   1st Selection (school name):_____

   2nd Selection (school name):_____

10. List any brothers or sisters, living with applicant, attending one of the Magnet Schools selected above:

   NAME OF CHILD   PRESENT MAGNET SCHOOL   GRADE

   _____   _____   _____

   _____   _____   _____

11. How did you hear about Magnet Schools? (Check all that apply):
☐ TV ☐ Newspaper ☐ Website ☐ School ☐ Friends/Family ☐ Mailer ☐ Other _____

X _____
   SIGNATURE OF PARENT OR LEGAL GUARDIAN (REQUIRED FOR APPLICATION TO BE VALID)   DATE

I am applying for placement of my child at the Magnet School(s) indicated on this form. I understand that the information provided by me on this application will be checked for accuracy, and that false information will disqualify the applicant.

KEEP YELLOW COPY FOR YOUR RECORDS

Appendix: Interview guide

Hello, my name is_____from Trinity College, would you be willing to participate in a two minute interview about your children's school choice right now? Your participation is completely voluntary, and anonymous. (If yes) Is it okay to tape record you?
1. Do you have school aged children?
    a. (If the answer is NO, say thank you and GOODBYE!)
2. What are their current grades?
3. What schools are the attending?
    a. Is it a neighborhood school? Magnet? Private? Parochial? Suburban Project Choice?
4. Last spring, did your child apply to any magnet schools?
5A. Which magnet schools did your child apply to?
   -Why are you interested in those magnet schools for your child?
        -Like Curriculum?
        -Convenience?
        -Dissatisfaction with current school?
5B. Why didn't you consider applying to magnet schools?
        -Dislike curriculum?
        -Inconvenience?
        -Satisfaction with current school?
6A. How did you learn about magnet schools?
6B. Did you receive information about magnet schools?
7. What are your perceptions of the neighborhood school that your child attends (or would have attended)?
8. Would you consider applying to private/parochial schools? Why or why not?

   Demographics
   Children
   male/female_____
   child's race or ethnicity _____
   how much schooling have you (parent/guardian) completed?
        -Some h.s.,
        -h.s. diploma,
        -some college,
        -college degree,
        -graduate degree

FOR INTERVIEWER ONLY		
Interviewer Name_____	Interview Number___	Neighborhood Zone_____
Address_____		

Works Cited

Archbald, D. (1996). Measuring school choice using indicators. *Educational Policy*, 10, 88-108.

Estevez, N. & Dougherty, J. (2006). "Are Magnet Schools Attracting All Families Equally? A GIS Mapping Analysis of Latinos." Conference paper presented at the American Educational Research Association, April 2006. http://www.trincoll.edu/depts/educ/CSS/research

Dougherty, J. et al. (2007) *Missing the Goal: A Visual Guide to Sheff vs. O'Neill School Desegregation: June 2007*. Report by the Cities, Suburbs and Schools Research Project at Trinity College & the University of Connecticut Center for Education Policy Analysis. <http://www.trincoll.edu/depts/educ/CSS>

Frahm, R. (2007, June 13) Desegregating Hartford's Schools: A losing battle, so far. *The Hartford Courant,* p.A.1

Glass, G.V. & Hopkins, K.D. (1984) *Statistical Methods in Education and Psychology*. MA: Allyn & Bacon.

Gorr, W.L. & Kurland, K.S. (2005). *GIS Tutorial: Workbook for ArcView 9.0*. NY: ESRI

Henig, J. R. (1996). The Local Dynamics of Choice: Ethnic Preferences and Institutional Responses. In B. Fuller, R. F. Elmore, & G. Orfield (Eds.), *Who chooses? who loses? : culture, institutions, and the unequal effects of school choice.* New York: Teachers College Press.

Saporito, S. & Sohoni, D. (2006). Coloring Outside the Lines: Racial Segregation in Public Schools and Their Attendance Boundaries. *Sociology of Education*, *79*(2), 81-105.

Simpson, S. (2006, July 23). A decade of half measures: 10 years after a Hartford mother and son forced city schools to integrate progress has dragged. *The Hartford Courant*, New England Section.

Smrekar, C., & Goldring, E. (1999). *School Choice in Urban America: Magnet Schools and the Pursuit of Equity*. New York: Teachers College Press.

Acknowledgements

Note on funding

Note on collaboration

This co-authored paper represents a collaborative effort between student and faculty co-authors at Trinity College. Jesse Wanzer (who will receive his bachelor's degree in Educational Studies and Psychology in May 2008) researched and wrote the quantitative & spatial mapping analysis for his senior project in Educational Studies. Heather Moore (who will receive her bachelor's degree in Educational Studies and American Studies in May 2008) researched and wrote the qualitative analysis of interviews for her senior project in Educational Studies. Jack Dougherty, Associate Professor of Educational Studies, advised both students as they designed, conducted, and wrote up their research, and he also took the primary role in merging the two studies together into this revised paper.