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Do Magnet Schools Attract All Families Equally?

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Running head: ARE MAGNET SCHOOLS ATTRACTING ALL FAMILIES

Are Magnet Schools Attracting All Families Equally?

A GIS Mapping Analysis of One Inter-district Magnet School

Educational Studies Senior Project

Naralys Estevez ‘06

Trinity College

DRAFT SUBMITTED December 15, 2005

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Acknowledgements

I would like to thank my family for their unconditional support, their strong conviction in education and for instilling a love of learning in me that will continue to flourish. Jessy thanks for all the talks! Thank you Alex for your love and support when I needed it the most!

Much love to my friends the gatitas for understanding the times that I couldn't hang out! Gracias Alain for your friendship and great discussions on magnet school equity and racism in the U.S.

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A special thanks to Professor Reuman for his exceptional ability to explain statistics, his willingness to be thorough and hand write answers to mathematical questions, scan and send them to me through email during GIS Bootcamp. I really appreciate all the time you assisted me even when you didn't have to. True altruism exists!

Thanks to Jamie Carroll, Diana Sinton and Bill Hegeman at Middlebury College for teaching me great GIS skills. Rastor is faster but vector is corrector! When in doubt…right click!

Finally, a very special thanks to Jack Dougherty. Your mentoring and guidance went beyond the research study and has helped me grow in many ways! Thanks for making my senior year that much better! I hope to continue being your apprentice!

School choice programs in metropolitan Hartford have provided families with new outlets for pursuing quality education for their children. Magnet schools in particular, have been very popular because they tout innovative programs and curriculums. Currently there are a total of 19 inter-district magnet schools in the Hartford region which were all created with the purpose of reducing racial and socio-economic isolation under the 1996 Sheff vs. O'Neill decision. Almost ten years later, magnet schools in the Hartford region and their purpose for achieving educational equity have been contested by many. The goal of this study is to examine the question, "are magnet schools attracting all families equally?" In order to effectively answer this question, this quantitative study will draw upon magnet school application data and district enrollment data as well as Geographic Information Systems (GIS) tools to map out application patterns for one specific magnet school.

The argument I have developed is founded on a focused analysis of one inter-district magnet school called the Montessori Magnet School (MMS). I am arguing that the number of MMS applicants is not statistically representative of the neighborhood demographics the students are coming from. At the census tract level, chi-square tests for goodness of fit reveal discrepancies between census tract racial demographics and application racial demographics for Black and Hispanic students. In general there are

some clusters of statistically significant application trends. Specifically, Black applicants were more likely to apply to the MMS if they resided in the south end, west end and sections of the north end of Hartford. In contrast, Hispanic students were less likely to apply if they resided in the west end of Hartford but were more likely to apply in small sections of the south end and north end of Hartford. These patterns suggest that Montessori Magnet school applicants are not always statistically representative of their geographic residential demographics. However, one should not generalize these findings to the other inter-district magnet schools as this school may or may not be representative of the other 19.

Significance

This question is significant to study because there is a lack of objective research conducted in the Hartford region to test the claims made by the media and other public discussion arenas about magnet schools' potential to "cream" students or create a "brain drain" in non-magnet public schools. Also, past research has focused on broader geographic units of analysis such as town or school district level of analysis. However, this study will not only focus on the school district level of analysis but will also concentrate more on smaller units of geography such as neighborhood level of analysis. By focusing on smaller geographic units, a more specific and detailed understanding of student demographics which will allow for more sophisticated statistical analysis can be achieved.

In addition, as the number of magnet schools and students attending magnet schools continue to grow, the issue of equity may consequently shape future policy

makers decisions to deem magnet schools as an effective or ineffective solution to desegregation and equity for all. At a recent conference sponsored by Trinity College and UCONN on school choice programs in the Hartford-area, magnet schools and equity was a salient issue discussed by many people in attendance. Prominent policy makers such as Mayor of Hartford Eddie Perez, and the executive director of Capitol Region Education Council (CREC) Bruce Douglas were panelist speakers at this conference and were presented with several questions from the audience about the possible effects that these school choice programs may present for both students who participate in the programs and those who don't. Therefore, at the most basic level, this study can potentially provide policy makers and magnet school administrators with greater insight on the nature of application patterns to magnet schools. With more knowledge about the types of students they are attracting to their schools, magnet school administrators will be able to cater their marketing efforts by possibly targeting those populations that may not be readily applying to their schools.

Finally, by investigating if magnet schools are attracting families equally, this research can pave the way for future investigators to analyze several other components of magnet school equity. For instance, conducting a comprehensive qualitative analysis of why Hartford region parents choose magnet schools will be helpful in understanding the decision making process. Also, a study looking at inter-racial relationships in magnet schools will shed light on the process of integration in these schools. Most importantly, with these studies, policy makers will be forced to reexamine if magnet schools are an appropriate tool for improving educational outcomes for all.

Local Public Debate and National Literature Review

Magnet schools in the Hartford-area present an interesting paradox in school choice plans to reduce racial and socio-economic inequality in schools. Since parents voluntarily choose to apply to magnet schools, the schools have minimal control over who applies, despite various marketing techniques. Consequently, the schools can only hope that they attract students from different racial and economic backgrounds in order to achieve the goals mandated by the Sheff vs. O'Neill 2003 settlement. As Elizabeth Horton Sheff states, "That's the essence of Sheff. It talks about culture, it talks about diversity, it talks about standards (Gottlieb, 2004)." However, unexpected issues about who the schools are attracting have been a source of concern for many.

But the problem of racial imbalance continues to plague magnet schools in Hartford. For instance, in 2004 the Classical Magnet School had a total of 96% minority students attending their school. None of the students in the magnet school were white students from the suburbs. In addition, only 15% of the students from the Hartford Magnet Middle School were White and out of these White students only 54 students were from the suburbs (Frahm, 2004). Even more complicated is that the magnet schools are attracting more minority families from the suburbs than they are White families (Frahm, 2004). These application and enrollment patterns pose several issues for successful school desegregation especially because school officials have the added pressure under the Sheff settlement to balance these patterns which often times translates into denying minority students spots in their schools. As a result, the perplexing balancing act to reach the goals proposed in the Sheff settlement raises concerns for many in the public. Stan Simpson a columnist from the Hartford Courant asserts his frustration with the current desegregation anomaly. He states, "…is a little unsettling…most White students haven't

been historically disenfranchised, discriminated against or relegated to inferior public institutions. Now, many get an edge in enrolling at some of the city's promising schools (Simpson, 2004).” School officials and leaders have the difficult task of addressing these critical issues because their policy shapes the prized educational opportunities afforded to some and denied to others.

These local debates in the city of Hartford reflect an extensive national debate over school choice plans and equity. Magnet schools and whether they attract all families, which is known as the “creaming” effect, has sparked a lot of controversy. Creaming can take many forms and include the creaming of high- achievement students, higher socio-economic status families, and creaming by race. Many critics of magnet schools argue that the schools attract only the top students from neighborhoods which may actually lead to more public schools being segregated by social class (Smrekar & Goldring, 1999). According to a U.S. News and World Report, magnet schools have the potential to be elitist, attracting and selecting only the brightest and smartest students of the neighborhood schools. The report highlights that magnet schools, “are moving toward a two-tiered system of public education… skim off top students and teachers and garner a disproportionate share of resources, leaving nonselective neighborhood schools to struggle with disproportionate numbers of tough-to-educate low-income students (Linnon et. al, 1991).”

In addition, Moore and Davenport (1989), claim that magnet schools are a “new and improved sorting machine” because in practice not all students have the option of attending one. For instance, magnet schools with selective admission criteria such as entrance exams, behavior records and requirements for previous coursework can promote

inequity because students at risk (low-achieving or behavioral problems) who have the greatest learning needs are not benefiting from such admissions requirements (Moore & Davenport, 1989). Also, even magnet schools without restrictive admissions practices who instead employ a lottery have the potential to introduce inequities. In some cases, parents have been encouraged by school principals and other school staff to lie about their racial background or declare a non existing sibling in the school in order to have an advantage in getting accepted into that school (Moore & Davenport, 1989).

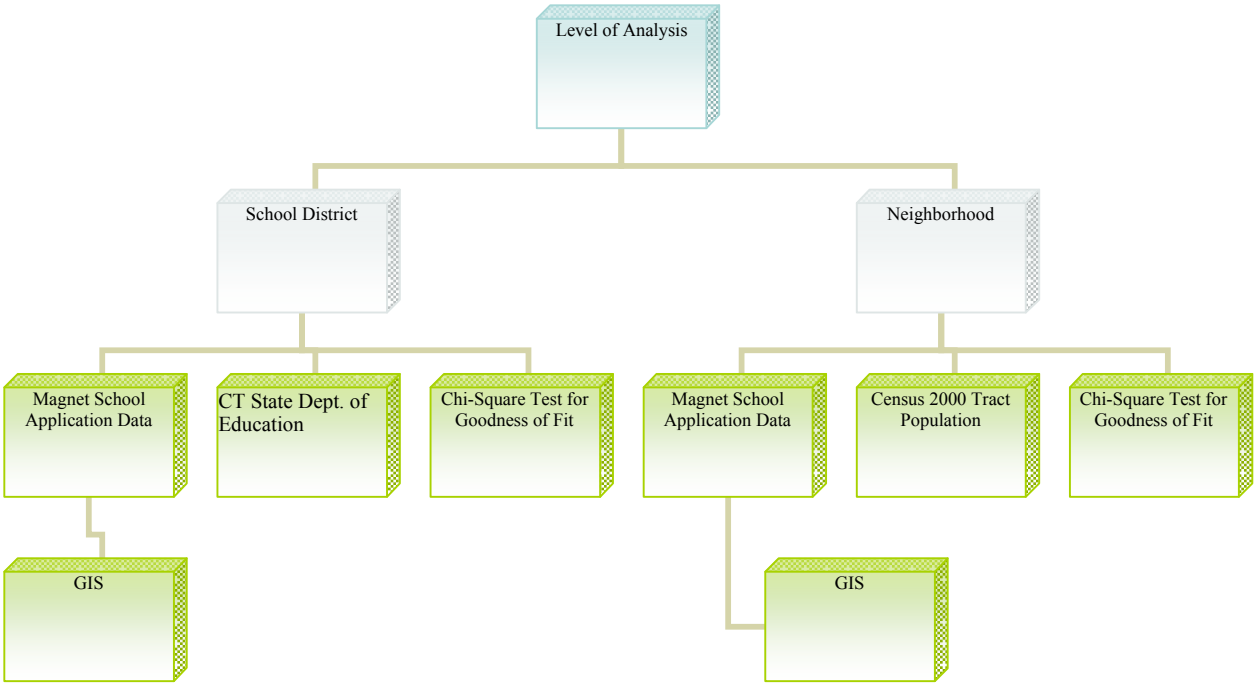
Further, studies show that magnet schools attract better-educated and higher-income families who are less likely to be under-employed than those families who do not choose magnet schools (Smrekar & Goldring, 1999). Metz (1989) maintains that because magnet schools are made to be distinctive and attractive some creaming is consequently unavoidable. For instance, parents who are more educated and wealthy are more likely to pursue and research educational alternatives for their children. Also, their children will be more likely to be high achievers, care about education and be well behaved in class (Metz, 1989). A study conducted by Archbald (1996), found that neighborhoods that had higher proportions of college educated people, had higher rates of students enrolled in magnet schools. These patterns may be correlated with the fact that people who are more educated may have more access to information and therefore could readily gain knowledge about choosing a magnet school for their child. Consequently, Whites and middle class parents may disproportionately benefit from a magnet school because they have mastered the admission process leaving many minority and low income students who cannot easily exercise choice at an unequal disadvantage.

Finally, Hadderman (2002) noted that affluent families participate more in school choice plans and were more likely to attend a chosen school than underprivileged families. By race, Blacks were more likely than Whites to attend a public school and a school preferred by their parents (Hadderman, 2002). The aforementioned examples of how magnet schools can cream from the top raise several concerns about magnet schools ability to promote true equity in education.

Although the local public debate and the national literature suggests that magnet schools may be "creaming" students, this research study does not intend to examine if creaming is occurring in the city of Hartford magnet schools. Instead, this paper quantitatively explores if magnet school student applications are statistically representative of the racial demographics from which the students reside in.

Methodology

The main purpose of this study is to statistically compare magnet school application data to geographic data (District and Neighborhood) to see if magnet school applicants are statistically representative of the residential demographics they come from. To conduct my analysis, I had to draw information from magnet school application data, school district enrollment data and Census 2000 data. I also performed a chi-square test for goodness of fit statistical analysis and a spatial analysis using Geographic Information Systems (GIS). The diagram below illustrates the levels of analysis and sources I used for my study.



Although there are a total of 19 inter-district magnet schools in the Hartford region, I have only chosen to do an in depth racial analysis on one magnet school. This magnet school is the Montessori Magnet School (MMS) located across the street from Trinity College on the learning corridor. I only chose to do an in depth racial analysis on MMS rather than 2-3 schools superficially because it was one of the only schools that provided both student street addresses and racial application data for 2005-2006 for the neighborhood analysis. Other schools such as the University of Hartford Magnet School, provided student street addresses but did not have racial application data. I could have analyzed another school such as the Metropolitan Learning Center (MLC) because it provided both student street address and racial application data but it was not going to be a good comparison with MMS because the MLC is a middle school and I wanted to limit the variability among schools for my claims.

I only chose race as a variable to analyze because I could conduct this analysis at both the district and neighborhood level comparing student district enrollment and individual applicants to the magnet school. However, this task would become exponentially more difficult if I examined student achievement and socio-economic status at the neighborhood level because of privacy concerns regarding the release of individual Connecticut Mastery Test (CMT) scores and family income.

School District Level

A. Enrollment Data

The school district enrollment data was downloaded from the Connecticut State Department of Education website at www.csde.state.ct.us/public/cedar/districts/index.htm. Specifically, I clicked on the link named "non public and public school enrollment by race and district" and downloaded the public school data for each of the years from 2001-2004 for Asian, White, Hispanic, and Black students for 8 school districts. These select 8 school districts were chosen because of the number of MMS applications received from each school district which as will be explained later is important for the chi-square analysis. Table 1 below shows an example of the compiled district data.

Table 1. *Select School District Enrollment from 2001-2004 by Race*

District	Total White	Total Hispanic	Total Black	Total Asian	District Total
Bloomfield	553	495	9057	97	10202
East Hartford	10647	8487	10494	1647	31275
Hartford	4588	47633	36111	796	89128
Manchester	19352	4280	5704	1338	30674
New Britain	12738	21045	7294	1017	42094
West Hartford	27163	14107	3504	3148	47922
Wethersfield	12121	1180	581	389	14271
Windsor	7734	1331	7962	739	17766

B. Application Data

Similar to the school district enrollment data, I also gathered MMS application racial data for the same 8 school districts. The application data contained student racial information for 2001-2005. I also formatted the application data by calculating student percentages by race for each school district which was crucial information for the chi-square analysis. Table 2 illustrates basic MMS student data by school district for 5 years.

Table 2. *MMS Application Data by Race and School District: 2001-2005*

SendingDistrict	White	Hispanic	Black	Asian	Total Apps
Bloomfield	8	5	90	2	105
East Hartford	21	36	58	3	118
Hartford	84	423	450	32	989
Manchester	25	15	23	5	68
New Britain	18	14	14	7	53
West Hartford	46	30	31	14	121
Wethersfield	29	11	6	8	54
Windsor	27	12	69	4	112

C. Chi-Square Test

The chi-square test for goodness of fit is an inferential statistic that allows a meaningful analysis of one nominal variable (independent variable) but no continuous variable (dependent variable) in one population to a different population with the same variable (Glass & Hopkins, 1984). For example, in the case of this research I am asking

the question is the percentage of Black (nominal variable) students who apply to the MMS greater or less than expected by chance? Or, greater than or less than the percentage of Black students enrolled in the school district?

In order for the chi-square test to work well some sources suggest that no more than 20% of the cells should have expected frequencies less than 5 (Morgan, 2001). However a chi-square statistic can be accurate even if the expected frequency is as low as 2 (Camilli & Hopkins, 1977, 1979; as cited in Glass & Hopkins, 1984). Therefore, for my research I decided to select towns that had expected frequencies that were greater than five. I also chose towns that had application data for all years from 2001-2005. However, as will be discussed later, at the neighborhood level I decided to use the rule that only census tracts with total observed applications of 2 or more would be analyzed. Table 3 shows an example of a chi-square analysis conducted at the district level.

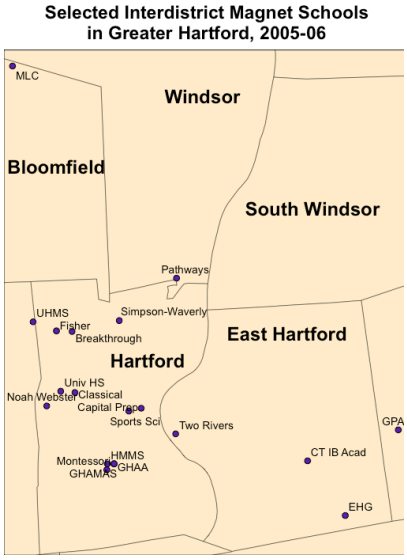
Table 3. *Illustration of Computation of the Chi-Square Test of Goodness of Fit from Student Percentages for East Hartford.*

District Enrollment 2001-2004				*MMS Apps 2001-2005*		
East Hartford	Observed	Percentage		Observed	Percentage	Expected
White	10647	0.34		21	0.18	39.87
Hispanic	8487	0.27		36	0.30	31.78
Black	10494	0.33		58	0.49	39.30
Asian	1647	0.05		3	0.03	6.17
Total				118		
Chi-square	2572.10					
p<.001	Sig					

$X^2 = (118-39.87)^2/39.87 + (118-31.78)^2/31.78 + (118-39.30)^2/39.30 + (118-6.17)^2/6.17 = 2572.10$
Degrees of Freedom (df) = 3
p <.001

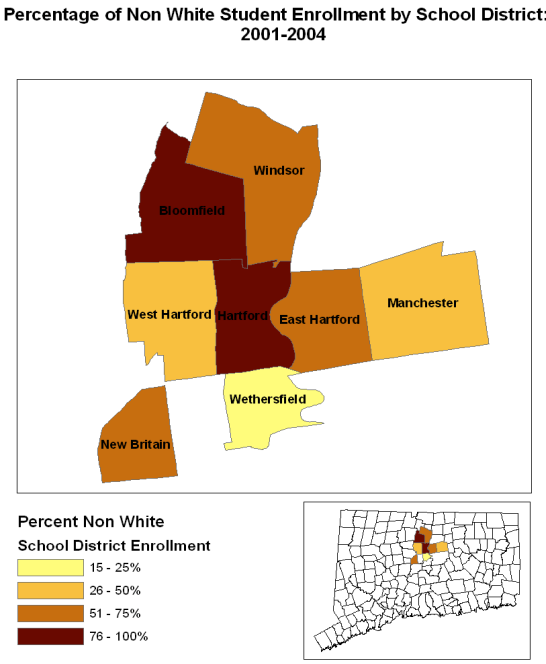
D. GIS Analysis

Map A. *Location of Magnet Schools*



Geographic Information Systems is a collection of tools that allow one to examine geographic problems. To work with GIS is mainly to work with maps. GIS are everywhere from transit, water and police departments to even the tax assessors office (Ormsby et. al, 2004). Map A and B are examples of a maps one can create using ArcGIS which is a computer software program that allows you to create maps and conduct spatial analyses. I used ArcGIS to illustrate magnet school application patterns for this study. In order to develop some of the maps, I had to join magnet school application data such as percentage of students who applied to MMS, to geographic spatial data such as towns in Connecticut and then symbolized the data by groups represented by colors. More examples of these maps will be illustrated in the Findings section of this study.

Map B.



Neighborhood Level

A. Application Data

Unlike the school district level analysis, the neighborhood analysis was more complicated and therefore required additional application data which I had to request from CREC. This data was student street addresses, and through a confidentiality agreement (See appendix), my request was granted and I was able to conduct a deeper level analysis of the MMS applicant pool with GIS as will be discussed later.

The level of geography that I chose for the neighborhood analysis was Hartford city census tracts. I only chose to conduct an analysis of Hartford city census tracts for Black and Hispanic applicants and not of other census tracts in different towns because there were not enough White or Asian applicants at the census tract level to make an insightful analysis. As previously mentioned, I decided to only select those tracts that had a minimum acceptable total observed applicants of two because it was less restrictive and the chi-square test is still accurate with small samples (Glass & Hopkins, 1984). Finally, although I had access to application years from 2001-2005, I only had student street addresses for 2005-06 and could not conduct a neighborhood level analysis for the other previous years because the application database has been changed as the students move to different locations. Consequently, it will be impossible for us to decipher which students have changed their addresses and which students have not. As a result, the probability that I could have some students in the sample size represented more than once increases, therefore making it possible to achieve misrepresentative results.

B. Census 2000 Tract Population Data

Racial demographics for neighborhood level analysis were downloaded from the census bureau homepage at www.census.gov. Specifically, I got information from Hartford city census tracts from American Fact Finder on the Census Bureau at www.factfinder.census.gov. I chose the SF1 data set because it contained education variables rather than just general population variables. I then created a custom table for the specific variables that I wanted. For instance, I chose census tract, Connecticut State and Hartford County as my geography. I then chose the variable P12 which was sex by age of the total population of school age students 5-17 for both males and females. I downloaded White, Black, Hispanic, and Asian racial data for the total population and then broke it down to the 5-9 age groups because it is the approximate age span of students enrolled in the Montessori magnet school. By looking at students in those census tracts ages 5-9, I conducted a more accurate statistical analysis by comparing student census tracts demographics with student applications. Table 3 shows an example of the downloaded census data.

Table 4. *Illustration of Census 2000 Tract Population Data*

GEO_ID	SUMLEVEL	GEO_NAME	P012002	P012004
Geography Identifier	Geographic Summary Level	Geography	Total population: Male	Total population: Male; 5 to 9 years
14000US09003330100	140	Hartford County,	1006	77
14000US09003400100	140	Hartford County,	3392	241
14000US09003400200	140	Hartford County,	2252	202
14000US09003400300	140	Hartford County,	3203	215
14000US09003405100	140	Hartford County,	1461	85
14000US09003405200	140	Hartford County,	2210	128
14000US09003405300	140	Hartford County,	2859	182

C. Chi-Square Test

The chi-square test at the neighborhood level was computed similarly to the one at the school district level. However, as noted previously, the variables used were different because I only used Black and Hispanic applicants for 2005-06 application year and compared those applicants with Census 2000 school aged students living in only Hartford city tracts. Table 5 shows an example of the chi-square analysis at the neighborhood level.

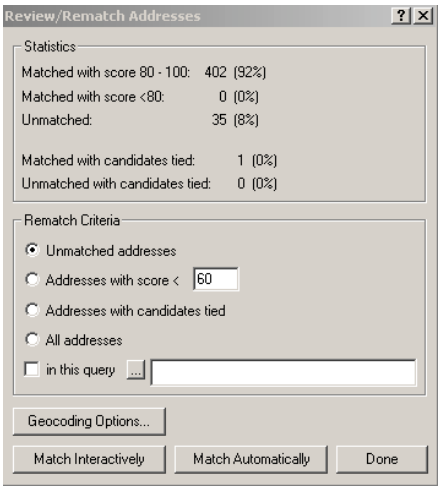
Table 5. *Illustration of Computation of the Chi-Square Test for goodness of Fit from Student Percentages in One Census Tract.*

Census 2000 Tract Population age 5-9				MMS Applicants 05-06		
9003504800	Observed	Percentage		Observed	Percentage	Expected
Black	78	0.23		5	0.45	2.49
Hispanic	186	0.54		6	0.55	5.93
Total				11		
Chi-square	33.474463					
p < .001 Sig						

$\chi^2 = (11-2.49)^2/ 2.49 + (11-5.93)^2/5.93 = 33.47$
df (1)
p < .001

D. GIS Analysis

Image A: *Geocoding Dialog Box*



Since the neighborhood analysis was more complicated than the school district level analysis, I had to use advanced GIS tools to help strengthen my spatial analysis. Using a process known as geocoding which essentially takes street address information and plots it as a point on a street map (similar to finding directions on map quest), I was able to visualize where the student applicants live and therefore know specific information about their location's demographic information. In order to geocode, I first obtained (through a confidential agreement with CREC) individual MMS applicants' street address data (reference dataset) in an excel file. After cleaning and formatting the excel file for the analysis, I converted the excel file into a database file (dbf). ArcGIS 9.1 then matches (See Image A) the street addresses with a street map (shapefile). Some addresses may not be recognizable by the program which then requires me to match the addresses myself (Match Interactively)[1]. After the addresses are matched the program plots the exact location of the addresses on street segments (features) as individual points on the map (Geocode). I can then place (overlay) any boundaries lines that I wish to add on the map such as census tracts or elementary school zones to help distinguish sections for the analysis. These sections can additionally be distinguished by adding colors (graduated color ramp) to symbolize density or direction. Finally, the program masks/removes the individual addresses and combines them (Spatial join) to protect

[1] Those addresses that are unmatched even after matching them interactively are discarded and not used for the analysis.

family confidentiality so that no individual applicant can be identified. Simply stated, the program "throws" away the addresses and compiles the information attached to the address to be symbolized by different colors or symbols. Sequentially, images 1-6 briefly illustrate the gecoding process.[2]

Image 1: Application data: Street Address

Image 2: Street Map

Image 3: Street Map With addresses (dots)

[2] Many of the skills needed for the GIS analysis were learned at a 2 week Faculty/Student immersion GIS workshop in Middlebury College in the summer of 2005. I additionally used the book….as a source for..

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

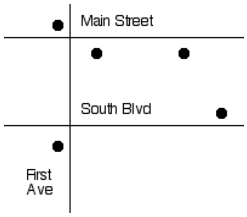


Image 4: Neighborhood boundaries overlayed on street map

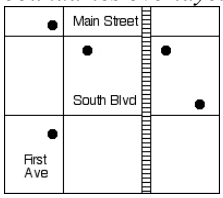


Image 5: Data Groups represented by colors

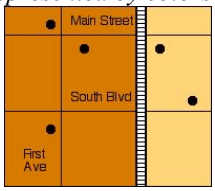
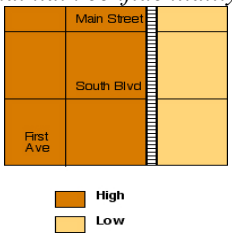


Image 6: Dots remove to maintain confidentiality



Ethical Standards

Although my study was mainly an archival analysis and I did not interact with human participants, an Institutional Review Board form was filled per request of the Capitol Region Education Council (CREC) to ensure confidentiality of records. In addition, a memo of understanding was created to clarify the arrangements made between CREC and Trinity College researchers. Please see appendix for more details.

Findings

School District Level

At the school district level disproportionate amounts of students are applying to MMS. Specifically, as shown in Table 6, the most applicants are coming from Hartford with a total of 61% of applications over 5 years. Further, MMS applicants also vary by race and school district as illustrated in Table 7. For instance, in Hartford, the majority of the applicants were Black and Hispanic, 45.5% and 42.8% respectively. In contrast, over half of the applicants in Wethersfield were White (53.7%) while only 11.1% were Black applicants. In additional, Figure 1. shows the collective distribution of applicants by race over 5 years. Again, Blacks and Hispanics had the most applications with a total of 45% for Blacks and 33% for Hispanics. There were only 16% and 5% White and Asian applicants respectively over the five years.

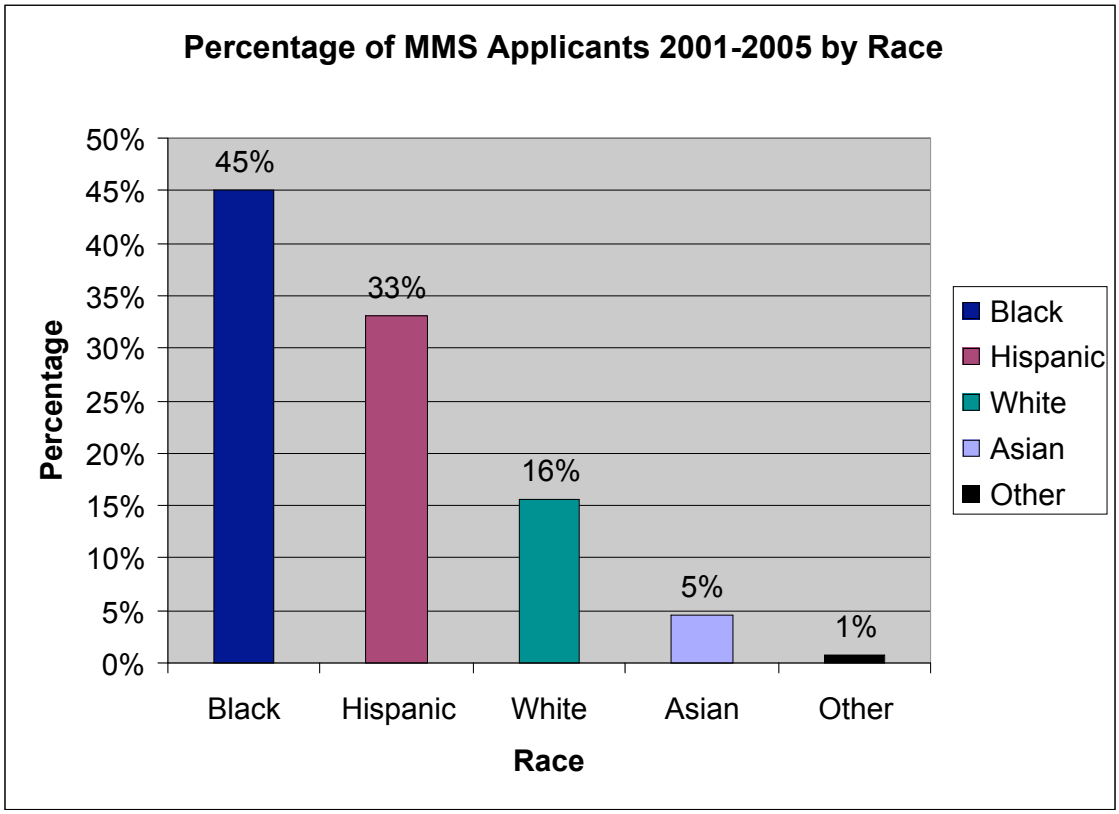
Table 6. *MMS Applicants from 2001-2005 by School District*.

SendingDistrict	Total Apps	Percent
Bloomfield	105	6.5%
East Hartford	118	7.3%
Hartford	989	61.0%
Manchester	68	4.2%
New Britain	53	3.3%
West Hartford	121	7.5%
Wethersfield	54	3.3%
Windsor	112	6.9%

Table 7. *Percentage of MMS Applicants by Race and School District*

SendingDistrict	Black Percent	Hispanic Percent	White Percent	Asian Percent
Bloomfield	85.7%	4.8%	7.6%	1.9%
Windsor	61.6%	10.7%	24.1%	3.6%
East Hartford	49.2%	30.5%	17.8%	2.5%
Hartford	45.5%	42.8%	8.5%	3.2%
Manchester	33.8%	22.1%	36.8%	7.4%
New Britain	26.4%	26.4%	34.0%	13.2%
West Hartford	25.6%	24.8%	38.0%	11.6%
Wethersfield	11.1%	20.4%	53.7%	14.8%

Figure 1. *Percentage of MMS Applicants by Race for 2001-2005 at the School District Level*



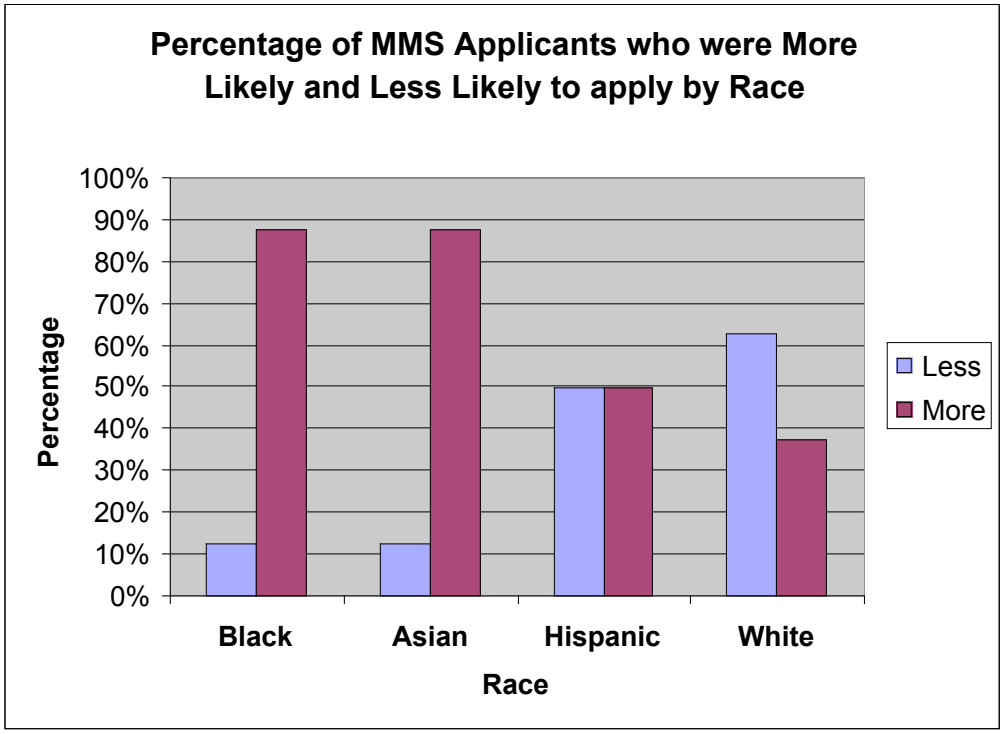
Chi-square analyses at the school district level reveal that the uneven numbers of MMS applications by race are statistically significant. For instance, Table 8 shows that all 8 school districts had statistical significance at the α .001 level. However the direction of this significance varied by race. For example, White applicants who lived in Hartford were more likely than expected to apply to MMS while Hispanics were less likely than expected to apply, χ^2 (3, N = 989) = 128817.59, p<. 001. In contrast, White applicants from Wethersfield were less likely to apply than there numbers would suggest while Black and Hispanic applicants were more likely to apply, χ^2 (3, N = 54) = 3651.68, p<. 001. Figure 2 illustrates the percentages of applicants by race who were more likely or less likely to apply.

Finally, GIS analyses also demonstrate unique application patterns by school district and race. In general, the patterns reveal that Black applicants were less likely to apply to MMS if they resided in Bloomfield, while Hispanics were less likely to apply to MMS if they resided in Hartford, West Hartford, New Britain and Bloomfield . Asians were only less likely to apply if they were from East Hartford, while Whites were less likely to apply if they resided in East Hartford, West Hartford, Wethersfield, Manchester and Windsor. Maps 1-4 show these patterns.

Table 8. *Statistical Significance by School District*

SendingDistrict	Significant	P- Value
Bloomfield	Yes	* p <.001
East Hartford	Yes	* p <.001
Hartford	Yes	* p <.001
Manchester	Yes	* p <.001
New Britain	Yes	* p <.001
West Hartford	Yes	* p <.001
Wethersfield	Yes	* p <.001
Windsor	Yes	* p <.001

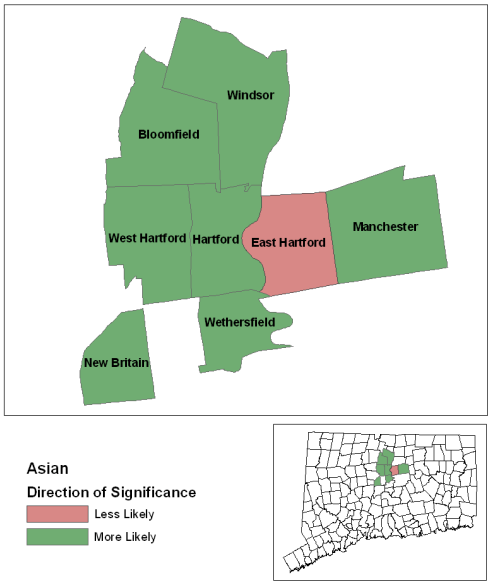
Figure 2. *Percentage of MMS Applicants by Race who were More Likely and Less Likely than expected to Apply from 2001-2005.*



Map 1-4: *Illustration of MMS Applicants by Race for 2001-2005 who were Statistically More Likely or Less Likely to apply by School District.*

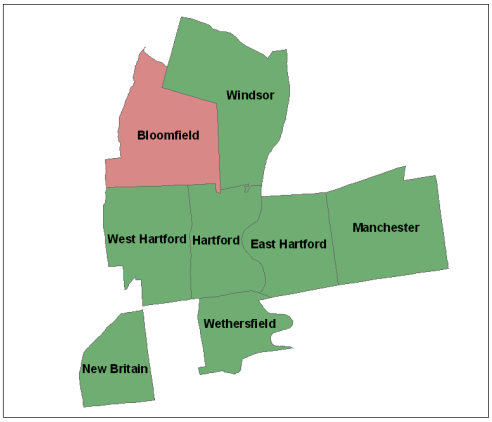
Map 1.

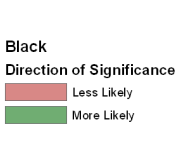
Asian MMS Applicants from 2001-2005 who were Statistically More Likely or Less Likely to apply by School District (Chi-Square Analysis)

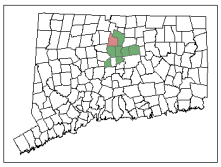


Map 2.

Black MMS Applicants from 2001-2005 who were Statistically More Likely or Less Likely to apply by School District (Chi-Square Analysis)

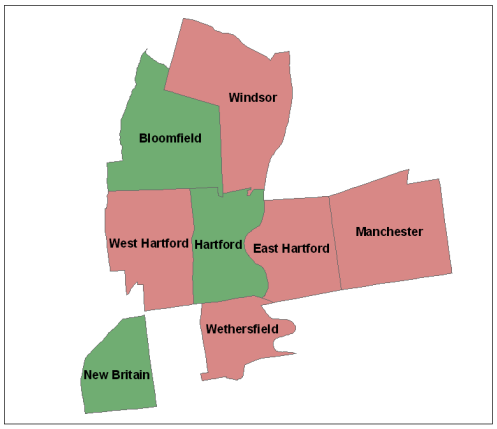






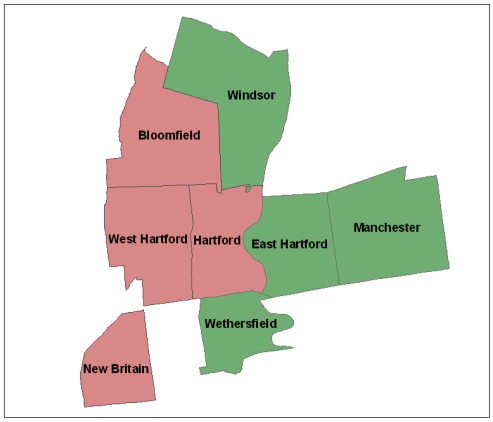
Map 3.

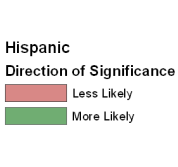
White MMS Applicants from 2001-2005 who were Statistically More Likely or Less Likely to apply by School District (Chi-Square Analysis)

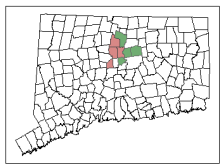


Map 4.

Hispanic MMS Applicants from 2001-2005 who were Statistically More Likely or Less Likely to apply by School District (Chi-Square Analysis)







Neighborhood Level

Student application data for the 2005-06 school year and Census 2000 Hartford city tract population indicate that families are applying to MMS at unequal numbers by race. Similar to the trends observed at the school district level, more Black and Hispanic families are applying to the MMS by census tract. For instance, in census tract 09003502300, there were no White applicants. However, a substantial 69% and 31% of the applicants were Hispanic and Black respectively. Table 9 and 10 shows the raw number of applicants and percentage of applicants by selected Hartford city tracts with 7 or more total applications.

Table 9. *MMS Application data 2005-06 by Race and Selected Hartford City Census Tracts*

Tract	Black	Hispanic	White	Other	TOTAL
09003502300	5	11	0	0	16
09003502800	2	11	0	1	14
09003502700	9	3	1	0	13
09003504800	5	6	1	1	13
09003500100	3	8	0	1	12
09003503900	11	1	0	0	12
09003502400	6	4	1	0	11
09003502600	4	6	1	0	11
09003503000	0	10	1	0	11
09003504900	4	6	1	0	11
09003503800	5	2	0	0	7
09003504400	3	1	3	0	7

Table 10. *Percentage of MMS Applicants by Race and Selected Census Tracts for 2005-06*

Tract	Percent Black	Percent Hispanic	Percent White
09003502300	31%	69%	0%
09003502800	14%	79%	0%
09003502700	69%	23%	8%
09003504800	38%	46%	8%
09003500100	25%	67%	0%
09003503900	92%	8%	0%
09003502400	55%	36%	9%
09003502600	36%	55%	9%
09003503000	0%	91%	9%
09003504900	36%	55%	9%
09003503800	71%	29%	0%
09003504400	43%	14%	43%

Chi - square tests for Black and Hispanic applicants at the census tract level demonstrate that the uneven numbers of applicants by tract are statistically different. For example, 72% of the 43 tracts in Hartford showed statistical significance while 12% did not show statistical significance and 16% were not applicable. Chart 2 below illustrates this distribution.

Additional racial tract analyses shed light on a tendency for Black applicants to be more likely than their numbers would suggest to apply to MMS, but show a different

trend for Hispanic applicants. For instance, 55% of Black applicants were more likely to apply while only 19% of Hispanic applicants were more likely to apply to MMS than expected. Instead, 48% of Hispanic applicants are applying to MMS as expected while 29% of Black applicants are applying at a rate that would be expected. Even more specific, in census tract 9003502400, Blacks were more likely to apply than expected while Hispanics were less likely to apply than expected, χ^2 (1, N = 10) = 33.90 p<. 001. Table 11 and Chart 3 further demonstrates this pattern.

Chart 2. *Pie Chart showing the Percentage of Hartford City Census Tracts for 2005-06 With and Without Statistical Significance*.

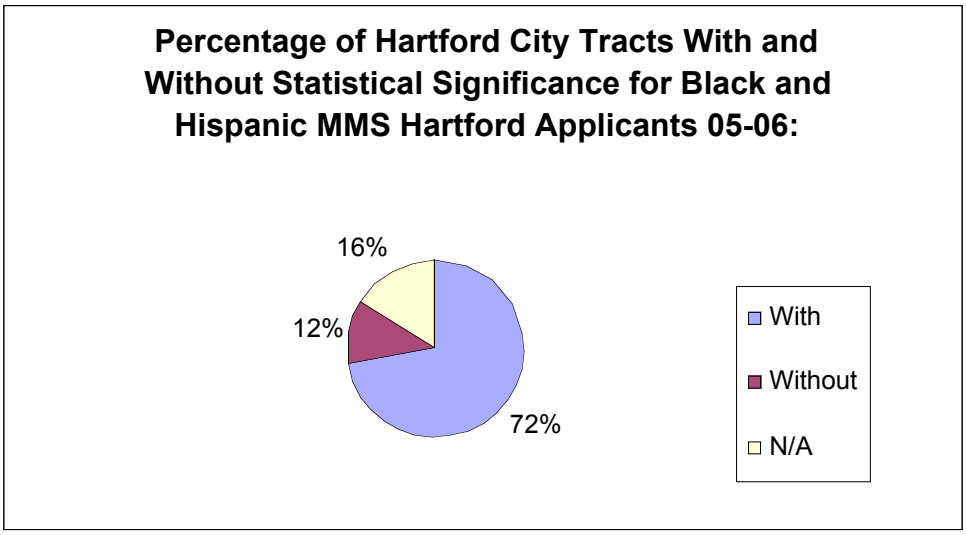
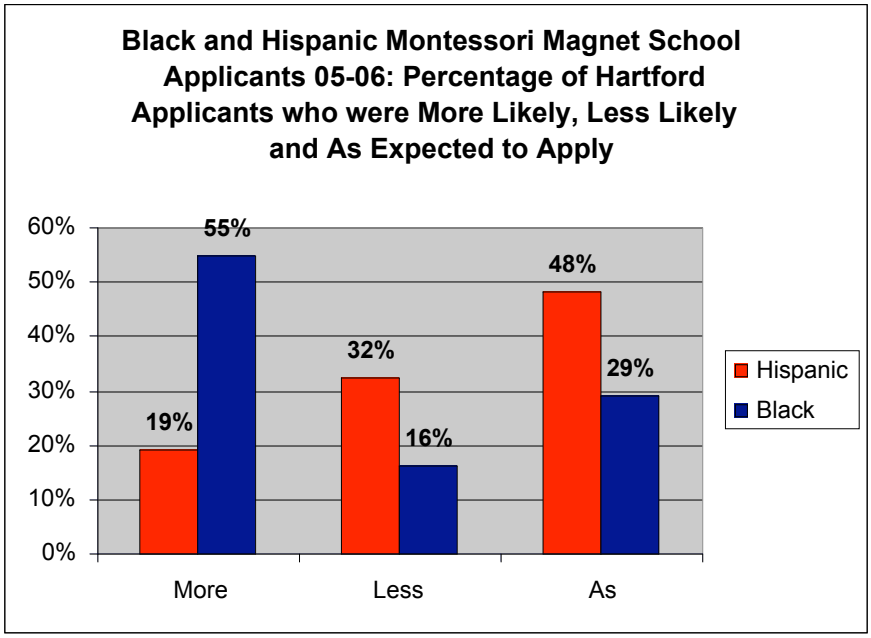


Table 10. *Black and Hispanic Applicants that were More Likely (M), Less Likely(L) and As Expected(A) to Apply by Selected Census Tract.*

Tract	Statistically Significant	Black (more, less, as expected)	Hispanic (more, less, as expected)
09003500100	Y	M	A
09003500200	Y	A	A
09003500300	Y	M	L
09003500400	Y	M	A
09003500500	N		
09003500700	N/A		
09003500900	Y	A	A
09003501000	Y	M	L
09003501100	Y		
09003501200	Y	M	L
09003501300	N		
09003501400	Y	A	A
09003501500	Y	L	M
09003501700	N		
09003501800	Y	A	A
09003502100	Y		
09003502300	Y	M	M
09003502400	Y	M	L

Chart 3. *Percentage of Black and Hispanic MMS applicants for the 2005-06 school year who were More likely, Less Likely or As Expected to apply by Selected Census Tracts.*

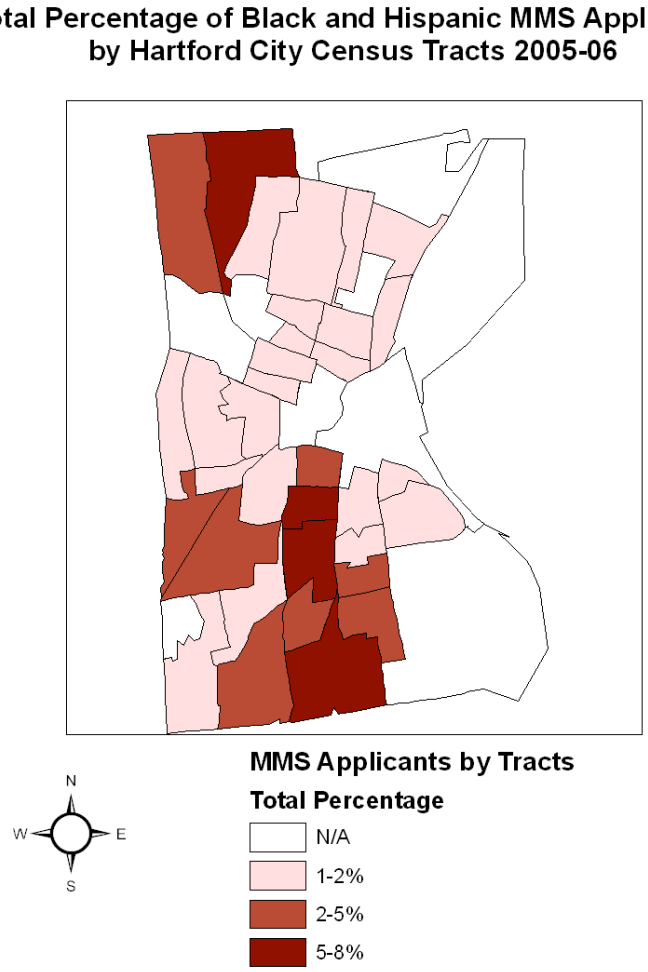


GIS spatial analyses illustrate geographic patterns that reveal application trends in specific Hartford city census tracts. For instance, the higher percentages of students applying to MMS were located in the North End and South End of Hartford with 5-8% of the applications located in these areas. Map 5 shows the distribution of applications in Hartford city census tracts. Furthermore, broken down by race, most tracts with 75-100% of Black applicants were located in the North End, while most tracts with 75-100% for Hispanic applicants were located in the South End and North End of Hartford (As shown in maps 6-7).

GIS spatial analyses of chi-square statistical tests have also demonstrated discrepancies between Black and Hispanic MMS applicants at the census tract level. As shown in Map 8, Black applicants were statistically more likely to apply to MMS if they resided in the West End, South End and clusters of the North End of Hartford. Unlike Black applicants, Map 9 shows that Hispanics were less likely to apply if the resided in

the West End, but were more likely to apply in small parts of the South End and North End of Hartford and as expected to apply in most parts of Hartford. These trends support the claim that MMS applicants are not always statistically representative of the geographic demographics from which they reside in.

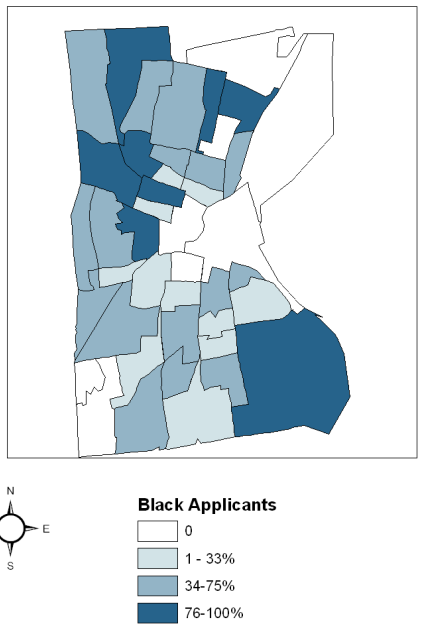
Map 5. *Percentages of 2005-06 MMS Applicants by Hartford City Census Tracts*



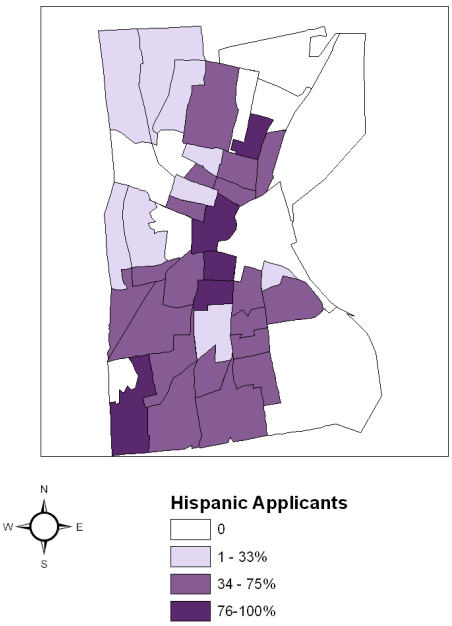
Map 6.

Map 7.

Percentage of Black Applicants 2005-06
by Hartford City Census Tracts

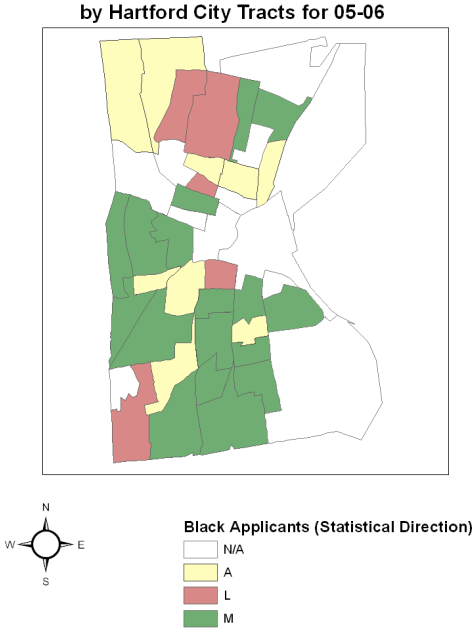


Percentage of Hispanic Applicants 2005-06
by Hartford City Census Tracts



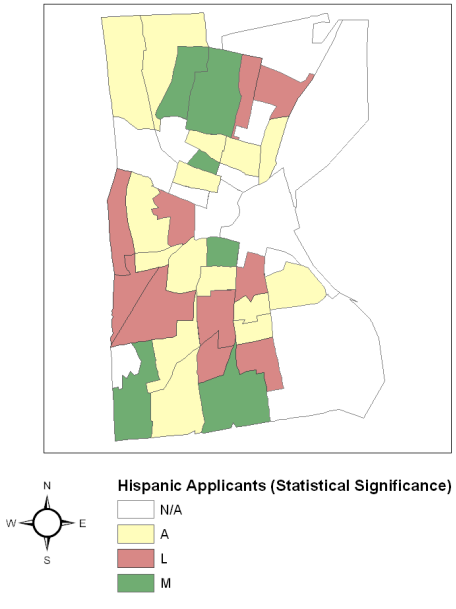
Map 8.

Black MMS Applicants who were Statistically
More likely, Less likely and As Expected to apply
by Hartford City Tracts for 05-06



Map 9.

Hispanic MMS Applicants who were Statistically
More likely, Less likely and As Expected to apply
by Hartford City Tracts for 05-06



Discussion

In a social climate where educational opportunities are strongly linked with race and class, there is an unsettling knowledge that the nature of these educational opportunities are not equal for all. Even more alerting is the fact that race has also become synonymous with space such that the phrase "racialization of urban space" has been coined to describe how housing for Black, the lower class and other minorities have been restricted to urban cities as a result of racism and uneven development (Gotham, 2002).

In an attempt to remedy the social disparities that exist in the current social order, schools have become a popular reform tool to equalize society. Innovative school choice options, such as magnet schools have increasingly grown out of the demands for desegregation. These magnet schools were designed with special curricular opportunities emphasizing the sciences, arts and technology in order to attract families to their schools. Most magnet schools are located in urban areas in hopes to draw both the disadvantaged families that reside in the urban areas and the more affluent families from the suburbs. The rationale behind these magnet schools was that by attracting a diverse mix of families, schools would become more ethnically and socio-economically diverse and less racially segregated. However, as I have shown in my analysis, magnet schools are not without contest and many question their ability to attract all families equally.

The results of my study indicate that families are not applying equally to MMS. At both the school district and neighborhood level, more Blacks and Hispanics are applying at larger numbers than Whites and Asians. At a more focused neighborhood

analysis, Blacks are 55% statistically more likely to apply to MMS while Hispanics are only 19% more likely.

Possible speculations for these findings could be that White families from the suburbs may be satisfied with their current school choice for their child, while Black and Hispanic families may be feeling pushed away or disappointed in the quality of education their child receives from their neighborhood public school. Smrekar & Goldring (1999) acknowledge that many parents who participate in school choice plans express dissatisfaction with their neighborhood public school. Also, maybe marketing efforts are not reaching White and Asian families as readily as they are reaching Black and Hispanic families. These findings reflect the spirit of the local debate that more racial minorities are applying to MMS than Whites and calls attention to the challenges faced by policy makers as they struggle to find a solution to the desegregation anomaly. Further, these findings may cause some to wonder if it really should be alarming that more racial minorities are applying to magnet schools when the fact of the matter is that these schools were designed to provide better educational opportunities to the disadvantaged.

Although there is no simple solution or one best way to address the current magnet school controversy, some recommendations can be made to facilitate parents' rights to exercise choice. For instance, since Asian families are not applying as readily as Black and Hispanic families, marketing efforts should focus on disseminating information to target more Asian populations and to cater to the language needs that may pose as barriers to these families.

Perhaps of paramount significance is creating an awareness that equal educational opportunities is a right that should be available to all and should not be dependent on

one's race or socio-economic class. Although tension will always exist on what is considered the best or right way to improve the quality of education in our school system that tension should not overpower the necessity of doing what is in the best interest of the child. The challenge rests not simply on reforming education, but genuinely recognizing the needs of those who will be affected by it the most.

Limitations of the Study & Future Studies

Methodological limitations of this study should not be undermined. There could have been several factors affecting the results of this study. One important factor is that the application data itself may have not been accurate. The application data received in the excel worksheet from CREC were typed in manually and could have had errors. Also, the applicants themselves may have provided faulty information in order to improve their chances of getting accepted into the lottery.

The data used from the census was not the most precise data to use because it has almost been 6 years since it first became available and since that time the census tract demographics in Hartford could have changed. A more accurate comparison would have been to use census tract demographics for the same year that I was analyzing the application data, but it was obviously not available.

Future studies in the city of Hartford should conduct an in depth application pattern analysis on all 19 magnet schools and compare findings from school to school. In addition, quantitatively and qualitatively examining parental motivations for applying to magnet schools could help inform policy makers and help us better understand the context of magnet schools. Finally, in order to add meaningful findings to the debate on

creaming, future studies should use additional variables such as income and student achievement.

References

Archbald, D. (1996). Measuring school choice using indicators. Educational Policy, 10 (1), 88-108.

Census 2000. http://factfinder.census.gov/home/saff/main.html?_lang=en

Connecticut State Department of Education. http://www.state.ct.us/sde/

Frahm, R. (2004, May 1). Whites mostly shun city magnet schools. *The Hartford Courant*, p.A1.

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

Gottlieb, R. (2004, October 23). Magnet schools attract many but issues of funding and racial imbalance keep institutions from achieving full success. *The Hartford Courant*, p. B3.

Gotham, K.F. (2002). *Race, real estate and uneven development*. NY: SUNY Press

Hadderman, M. (2002). School choice. Trends and issues. *ERIC Clearing House*, 1-113.

Linnon, N., Tharp, M., Arrarte, A.M., Barry, P., Toch, T., & Cooper, M. (1991). Schools that work: Magnet schools that limit admission may be a proven way to educational excellence, but the raise some difficult questions about equity. *U.S. News and World* , p. 58

Metz, M. (1986). *Different by de*sign. New York: Routledge.

Moore, D.R., & Davenport, S. (1989). *The new improved sorting machine*. Chicago: Designs for Change.

Morgan, G.A., Griego, O.V., & Gloeckner, G.W. (2001). *SPSS for windows: An introduction to use and interpretation in research*. New Jersey: Lawrence Erlbaum Associates.

Ormsby, T., Napoleon, E., Burke, R., Feaster, L., & Groessi, C. (2004). Getting to know ArcGIS desktop 2nd edition. US: ESRI Press.

Smrekar, C. & Goldring, E. (1999). *School choice in urban America*. NY: Teachers College Press.

Appendix

Memo of Understanding between the
Capitol Region Education Council (CREC) and the
Cities, Suburbs, and Schools research project at Trinity College (CSS)

July 27, 2005

The CSS research project agrees to work with CREC to assist with data analysis of **magnet schools**. Either party may revoke this agreement if unsatisfied for any reason.

Specifically, CREC agrees to provide CSS with street address & zip code data for applicants and participants in CREC-managed interdistrict magnet schools. CSS will use our ArcGIS software to sort the data into larger geographical units, such as:

-- elementary school zones (neighborhood schools that students would have attended if they had not participated in the program)

-- census block groups (areas defined by the US Census Bureau, consisting of approximately 1,500 people, which would allow us to infer the demographic characteristics of applicants' neighborhoods)

As a condition of this partnership, CSS remains committed to protecting the confidentiality of individual CREC program participants. CSS promises never to release any street address data (or any other personally-identifying information) obtained in this study. Furthermore, CSS will share all of the products of our research (charts, maps, reports, etc.) with CREC to help identify trends and patterns.

Although this archival research does not involve interactions with human subjects, we have submitted an application to Trinity's Institutional Review Board (IRB) to clarify our arrangements regarding the security of confidential data. All address data obtained from CREC will be stored in a secure CSS subfolder in the Trinity computer server (known as "docex"), which can be accessed via password only by the project director (Jack Dougherty), the ArcGIS student research assistant (Naralys Estevez '06), and the system administrator. Our copy of the address data will be destroyed one year after the conclusion of the study.

_____ _____
CREC signature date

_____ _____
CSS research project signature date

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