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THE INTEGRATING (AND SEGREGATING) EFFECT OF CHARTER, MAGNET, AND TRADITIONAL ELEMENTARY SCHOOLS: THE CASE OF FIVE CALIFORNIA METROPOLITAN AREAS[*]

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ABSTRACT

For most children the racial composition of their neighborhood determines the racial composition of their school. Segregated housing patterns translate into a highly segregated educational system, which can then result in disparities in educational opportunities and an institutionalized mechanism for the reproduction of racial inequality. To better understand the extent to which the racial composition of charter and magnet schools deviates from their neighborhood composition, we analyze public elementary schools in five California metropolitan. Our findings suggest that individual schools can expose children to a more racially integrated or segregated educational environment than their local neighborhood. Magnet schools, on average, provide students with a more integrated environment than the local neighborhood, while charter schools provide a more segregated environment.

INTRODUCTION

In 1954 *Brown v. Board of Education* dismissed the notion of "separate but equal," but America's schools remain racially segregated and unequal. School segregation exists, in part, because of the persistence of housing segregation and limited integration programs. Despite this, little is known about the current conditions of racial segregation across schools and neighborhoods. This paper examines the extent of racial segregation in public schools by exploring the relationship between school and residential integration in five metropolitan areas of California. Particular attention is given to the role of charter and magnet schools, as well as other factors associated with racial integration among schools.

The nexus between school and residential segregation is based on the simple fact that most young children attend a nearby public school; consequently, the racial composition in most schools closely mirrors the composition in the local neighborhood. A simple one-to-one relationship, however, is mediated by numerous factors—including charter and magnet school status. We cannot directly and definitively determine why school and residential racial compositions diverge in some cases and not in others, but an examination of the variation across charter, magnet, and traditional schools can highlight meaningful associations for decision makers and areas of interest for future research.

To better understand the prevalence of racial segregation in California's public schools and the role charter and magnet schools play, we address two primary questions:

1. *How do charter and magnet schools influence levels of segregation?* We expect charter and magnet schools—which have broad attendance area definitions—to allow school racial compositions to deviate from the neighborhood composition. Whether these schools provide children with a more racially integrated environment than the school's

surrounding neighborhood or result in greater racial isolation depends on the systematic selection processes.

2. *What other factors influence school integration levels?* The racial composition of a school is hypothesized to be a function of the racial composition of the school's formal attendance area, the racial composition of student transfers to the school (i.e. busing), and student selection out of the school/attendance area (i.e. private school attendance).

The intra-metropolitan analysis of school integration presented below indicates that different school types can, in fact, affect the integration of segregated neighborhoods. On average, magnet schools are more integrated, relative to their local neighborhood, and charter schools are less integrated. Even after controlling for district, school, and neighborhood factors, the effect of charter and magnet schools persists. Overall, the findings suggest that particular educational and residential contexts influence the extent of racial integration within California's metropolitan areas.

CONTEXTUALIZATION OF SEGREGATION AND EDUCATIONAL QUALITY

Previous research provides some evidence that students benefit from integrated schools. Test scores, college attendance rates, and employment outcomes have been found to improve for students in integrated schools, although generalized implications are mixed (Braddock, 1980; Braddock and McPartland, 1989; Cook, 1984; Crain and Mahard, 1983; Hanushek, Kain and Rivkin, 2001; Rivkin, 2000; Scholfield, 1995; Wells and Crain, 1994). A meta-analysis conducted by Wortman and Bryant (1985) examined 31 studies on school desegregation and African American achievement, and found a positive effect equivalent to about two months of educational gain. In addition, students in integrated schools are more adept at studying and

working in diverse settings as students, and are confident about working in such settings as adults (Kurlaender and Yun, 2000). This latter benefit of integration will only become more relevant as the nation continues to grow more racially and culturally diverse.

Despite the above analyses, school segregation remains prominent throughout the United States. In 1998, about 70 percent of African American students and 75 percent of Hispanic students attended a predominantly minority school (Orfield, 2001). Worse, a trend of school "resegregation" emerged during the 1990s (Orfield and Yun, 1999), despite a slight decrease in residential segregation (Lewis Center, 2001; Glaeser and Vigdor, 2001).

National analysis of the relationship between metropolitan levels of school and residential segregation finds that residential segregation is the most important factor in determining the level of school segregation, but other factors also influence the degree of school segregation (Ong and Rickles, 2001). Evidence of the significance of these other factors (including the metropolitan area's per capita income and the fragmentation of the schooling system) suggests there are ways to lower school segregation through governmental action.

The extent of student mobility and school choice can influence the degree of racial integration within the educational system. Children can be bussed from one school to another to promote integration, although the policy shift from mandated desegregation plans to voluntary plans limits the use of busing programs (Rossell, 1994). More and more, busing programs are used to overcome problems of over-crowded urban schools with a potential indirect effect on integration. Magnet schools were created as a (voluntary) mechanism to integrate schools by attracting white students into minority-dominated central-city schools. Therefore, by design magnet schools should help integrate segregated neighborhoods (Rossell, 1979).

Charter schools can attract students away from their local neighborhood school because enrollment is not confined to local neighborhood attendance zones. Charter schools, therefore, are likely to cause levels of school integration to diverge from levels of residential integration, but the direction of this impact depends on the selection process. California law states that the racial composition of a charter school should reflect the racial composition of the district it is located in—suggesting that charter schools should serve to help integrate segregated neighborhoods. However, the UCLA Charter School Study (1998) found that this requirement has not been enforced and that charter schools exercise considerable control over the type of students they serve. Unfortunately, empirical evidence on charter schools and racial integration is severely limited and does not support a strong conclusion (Gill, Timpane, Ross, and Brewer, 2001; Wells, Holme, Lopez, and Cooper, 2000).

Like charter schools, private schools may also sever the tie between residential neighborhoods and schools. Some evidence indicates that an individual's (or family's) income and race, among other factors, affect the decision to attend a private school (Buddin, Cordes, and Kirby, 1998; Figlio and Stone, 2001). Such a selection process can result in systematic differences between neighborhood and school racial composition. A nation-wide study of private school racial enrollment patterns by Reardon and Yun (2002) found that private schools are generally more segregated than public schools. The implications of high private school segregation for public school segregation are not clear, however. While data limitations prevent a direct assessment of a private school impact on integration, the role of mediating factors such as income and race can be examined.

DATA AND METHODOLOGY

To understand whether schools play a role in integrating segregated neighborhoods, we compare the level of racial integration in elementary schools to the level of racial integration in each school's attendance area. Since actual local school attendance area boundaries are not readily available for most school districts, our analysis focuses on five California metropolitan statistical areas (MSAs) in which we developed a method to generate proxy school attendance boundaries.

Overview of the Study Areas

The five metropolitan areas selected (out of the 25 MSAs in California) for the analysis are: Los Angeles-Long Beach, San Diego, San Jose, Vallejo-Fairfield-Napa, and Yuba City. We selected these five MSAs because they represent California's racial, geographic, economic, political, and cultural diversity. Figure 1 displays the geographic location and public elementary school enrollment characteristics of the five selected MSAs. The MSAs represent the Bay Area, Central California, and Southern California, as well as urban, suburban, and agricultural areas. Perhaps more importantly, the five metropolitan areas selected represent the range of overall segregation levels found across California's metropolitan areas. Table 1 reports overall school and residential segregation levels for each of California's 25 MSAs.

Figure 1: Metropolitan Areas Selected for Analysis

Metropolitan Statistical Area (Counties Included)	Public Elementary School Enrollment
Los Angeles-Long Beach (Los Angeles)	
Total Enrollment	873,784
% African American	10.5%
% Asian/Pacific Islander	9.3%
% Hispanic	62.7%
San Diego (San Diego)	
Total Enrollment	252,763
% African American	8.4%
% Asian/Pacific Islander	9.8%
% Hispanic	40.8%
San Jose (Santa Clara)	
Total Enrollment	128,167
% African American	3.5%
% Asian/Pacific Islander	27.5%
% Hispanic	36.3%
Vallejo-Fairfield-Napa (Napa, Solano)	
Total Enrollment	46,497
% African American	16.4%
% Asian/Pacific Islander	11.2%
% Hispanic	26.0%
Yuba City (Sutter, Yuba)	
Total Enrollment	14,393
% African American	3.6%
% Asian/Pacific Islander	14.4%
% Hispanic	25.9%

Table 1. Overall Segregation Levels for California Metropolitan Statistical Areas

	African American		Asian/Pacific Islander		Hispanic	
Metropolitan Statistical Area	Residential Segregation	School Segregation	Residential Segregation	School Segregation	Residential Segregation	School Segregation
Los Angeles-Long Beach	72.5	66.9	55.9	53.9	67.2	69.9
San Diego	61.6	58.9	55.4	51.4	57.2	54.3
San Jose	49.4	45.6	49.5	47.8	56.8	57.9
Vallejo-Fairfield-Napa	55.7	53.3	53.1	47.2	31.0	43.4
Yuba City	37.1	36.7	38.4	36.0	29.7	36.4
Average for all 25 MSAs (mean)	50.3	47.4	46.0	43.8	45.6	50.1
Weighted Average for all 25 MSAs (mean)	63.8	60.4	52.5	50.4	57.4	60.0
Minimum Value for all 25 MSAs	27.7	28.3	28.9	27.3	12.4	22.6
Maximum Value for all 25 MSAs	78.4	73.0	62.8	64.7	67.2	70.0

Notes: Segregation scores are based on the dissimilarity index, which indicates the percentage of one racial group that would have to relocate to be evenly distributed with non-Hispanic whites in the metropolitan area. The index ranges from zero to 100, with zero indicating perfect integration and 100 indicating complete segregation. The weighted mean is weighted by the size of the relevant racial group population.
Sources: Authors' tabulations from the 1999/00 CDE data for public elementary schools, and the Census 2000 data for 5-10 year-olds.

Data Sources

The analysis relies primarily on 1999/00 data from the California Department of Education (CDE) and Census 2000 Summary File 1 (SF1) data from the U.S. Census Bureau. To assess both school and neighborhood racial composition we define five mutually exclusive racial categories: African Americans (non-Hispanic), Asians/Pacific Islanders (non-Hispanic), Hispanics, Whites (non-Hispanic), and Others (non-Hispanic).[*]

For all public schools in California, the CDE annually collects enrollment data as part of its California Basic Educational Data System (CBEDS), which allows for the assessment of school and district racial composition. We restrict the analysis of school integration to public elementary schools as defined by the CDE data for the 1999/00 school year.

[*] Included in the Other category are Native Americans and Multi-Race individuals.

The Census 2000 data are used to determine the characteristics of neighborhoods around California schools. The 2000 census provides the most recent and comprehensive data on the residential location of racial populations, as well as select housing characteristics. The SF1 data provides summaries of various age groups by detailed racial and ethnic categories, which allows for more refined comparisons between school and neighborhood racial compositions. We restrict the analysis of neighborhood integration to the five to nine year-old population.

Measuring School and Neighborhood Integration

To understand whether schools play a role in integrating segregated neighborhoods, we calculate an "integration index" for each public elementary school in the five study MSAs, and calculate a comparable "integration index" for the school's attendance area. The school's level of integration is then compared to the level of integration in the school's attendance area to assess whether it provides a more racially integrated environment than the surrounding neighborhood.

The geographic boundary for school attendance areas (SAA) is approximated based on school district boundaries and each school's proximity to other schools.[†] Census data at the census block level are then aggregated up to the SAAs to get the racial characteristics of the area each school is most likely to draw its student body from. At the block level the data allow us to restrict the analysis of residential integration to the five to nine year-old population.[‡]

[†] Geographic Information Systems (GIS) software is used to generate a Thiessen polygon for each school, restricting the polygon borders to school district boundaries. A Thiessen polygon is a boundary around a point (in this case a school) created in such a way that the polygon's border is located equidistant from each adjacent point (Bernhardsen, 1999).

[‡] The five to nine year-old population is the closest race-specific approximation of the elementary school-age population currently available from the 2000 Census at this low level of geography. Unfortunately, the SF1 census files do not provide non-Hispanic race breakdowns for the five to nine year-old population at the block level (except for non-Hispanic whites). To make the census race counts as comparable as possible to the CDE counts, we

To measure the level of racial integration at each school and SAA we calculate an integration index (I) that indicates the relative degree to which each school's (or SAA's) racial composition is representative of the overall metropolitan area composition. Using this relative, or parity, measure means we are defining a perfectly integrated school (or SAA) as one where the racial composition is identical to the overall racial composition of the metropolitan area. The index ranges from zero to one, with a score of one indicating that the school/SAA racial composition is identical to the metropolitan area's racial composition. The lower the index, the less representative the school/SAA is relative to the metropolitan area. The integration index is calculated using the following equation:

$$\mathrm{I} = 1 - \sum_{i=1}^{n} \left[\frac{N_i}{N} - \frac{n_i}{n} \right] / 2$$

Where N is the total enrollment/population for the metropolitan area, N_i is the enrollment/population of the ith racial group in the metropolitan area, n is the total enrollment/population in the school/SAA, and n_i is the enrollment/population of the ith racial group in the school/SAA.

imputed the number of non-Hispanic African Americans, non-Hispanic APIs, and non-Hispanic "Others" based on the distribution at the census tract level and the reported racial counts for each block.

SCHOOL AND NEIGHBORHOOD INTEGRATION

To better understand the underlying factors that influence overall segregation levels one needs to examine the dynamics of school enrollment within metropolitan areas. This section compares the level of racial integration in schools to the level of racial integration in each school's surrounding neighborhood to test possible factors that may be associated with school integration. Within the five study metropolitan areas, we give particular attention to the differences between charter schools, magnet schools, and traditional (or "regular") public elementary schools.

Unlike traditional public elementary schools, charter and magnet school enrollment is not confined to narrow attendance boundaries. Magnet schools, by design, are meant as a mechanism for integration—creating specialized programs to attract a diverse student population from across a district or city. Whether magnet schools actually achieve their designed intent is an empirical question investigated in this analysis, although we hypothesize that magnet schools are more integrated than regular public schools.

Generally established to escape the bureaucratic maze of local district policies, the direct or indirect effect of charter schools on integration is less transparent. With the ability to attract students from neighborhoods throughout the metropolitan area, charter schools possess the potential to integrate segregated neighborhoods. However, charter schools can also serve as a mechanism for select students to "escape" their local school attendance area. If such selection differs systematically by race, charter schools may result in a more segregated learning environment.

Table 2 reports the average racial composition of public elementary schools in the five selected metropolitan areas by MSA and school type. Overall, the distribution of non-Hispanic

white students across regular, magnet, and charter schools is consistent. Asian/Pacific Islander and Hispanic students are under-represented in charter schools, on average, while African American students are over-represented in magnet schools, and more surprisingly, in charter schools. This pattern generally persists across the metropolitan areas, with a few notable exceptions. In San Diego, non-Hispanic whites are under-represented in magnet and charter schools, and Hispanic students are over-represented in magnet schools. In San Jose, Hispanic students are over-represented in magnet and charter schools while API students are under-represented. The small number of charter schools in three of the metropolitan areas limits the ability to make any metropolitan-specific generalizations about these schools. It is still important, however, to learn as much as possible about the potential implications of charter schools since they are a relatively new educational option and continue to grow in popularity.

Table 2. Racial Composition of Public Elementary Schools, by School Type

	Number Schools	Average Enrollment	Average Racial Composition				
			% Afr. Am.	% API	% Hispanic	% Other	% White
All Five MSAs							
All Schools	1942	677.1	9.4%	12.0%	49.0%	1.1%	28.3%
Regular Schools	1761	674.7	8.4%	12.3%	49.1%	1.1%	28.9%
Magnet Schools	126	789.5	15.9%	10.9%	50.7%	0.6%	22.0%
Charter Schools	55	494.1	27.8%	4.3%	40.9%	1.7%	23.6%
Los Angeles							
All Schools	1176	743.0	10.7%	10.2%	58.1%	0.5%	20.3%
Regular Schools	1068	740.7	9.6%	10.3%	59.2%	0.5%	20.3%
Magnet Schools	77	842.5	16.1%	12.5%	50.8%	0.4%	20.2%
Charter Schools	31	575.6	35.9%	3.5%	37.2%	0.7%	19.4%
San Diego							
All Schools	400	631.9	8.7%	9.2%	38.8%	1.9%	41.5%
Regular Schools	345	633.6	6.8%	9.4%	37.6%	2.0%	44.3%
Magnet Schools	36	758.5	20.1%	8.8%	48.2%	0.9%	22.1%
Charter Schools	19	360.9	21.3%	6.1%	41.3%	3.0%	28.2%
San Jose							
All Schools	243	527.4	3.5%	26.0%	33.7%	1.4%	34.2%
Regular Schools	230	525.2	3.5%	27.1%	32.1%	1.4%	34.6%
Magnet Schools	12	576.3	2.9%	7.5%	61.2%	1.0%	27.5%
Charter Schools	1	454.0	5.5%	11.2%	70.3%	0.0%	13.0%
Vallejo-Fairfield-Napa							
All Schools	85	538.1	14.6%	9.4%	26.2%	1.9%	47.9%
Regular Schools	80	541.7	15.5%	9.9%	24.7%	1.8%	48.0%
Magnet Schools	1	385.0	0.5%	3.6%	8.1%	0.0%	87.8%
Charter Schools	4	505.5	1.0%	0.4%	59.7%	2.7%	36.3%
Yuba City							
All Schools	38	378.8	2.6%	10.2%	24.5%	6.3%	56.4%
Regular Schools	38	378.8	2.6%	10.2%	24.5%	6.3%	56.4%
Magnet Schools	0	.	.	.	.	.	.
Charter Schools	0	.	.	.	.	.	.

Notes: Reported numbers are restricted to public elementary schools in the five MSAs. Magnet schools are identified as a school with any magnet program enrollment. In a limited number of cases (4) charter schools also had magnet programs. We classified all such schools as charter schools.
Source: Authors' tabulations from the 1999/00 CBEDS, California Department of Education.

Levels of Integration among California Schools

To understand the extent to which schools integrate the metropolitan area elementary school-age population, we calculate an integration index score (as described above) that indicates the relative degree to which each school's (or SAA's) racial composition is representative of the overall metropolitan area composition. We then focus the analysis on the difference between the

level of integration within the public elementary school population and the five to nine year-old population in the surrounding neighborhood. Table 3 reports the summary statistics for the school and neighborhood integration index, and the difference between the two (Integration Difference). As noted above, the integration index can range from zero (no integration) to one (completely integrated). The integration difference, therefore, can range from negative one to positive one. An integration index of zero suggests no difference between the school and its approximated school attendance area (SAA). A negative integration difference suggests that the school is less integrated than the SAA, while a positive integration difference suggests that the school is more integrated than the SAA—i.e., the school is integrating segregated neighborhoods.

Table 3. School and Neighborhood Integration Index Summary Statistics

Variable	Mean	Std. Dev.	Minimum	Median	Maximum
School Integration	0.68	0.15	0.10	0.70	0.97
Neighborhood Integration	0.68	0.15	0.20	0.70	0.97
Integration Difference	0.00	0.10	-0.64	-0.01	0.60

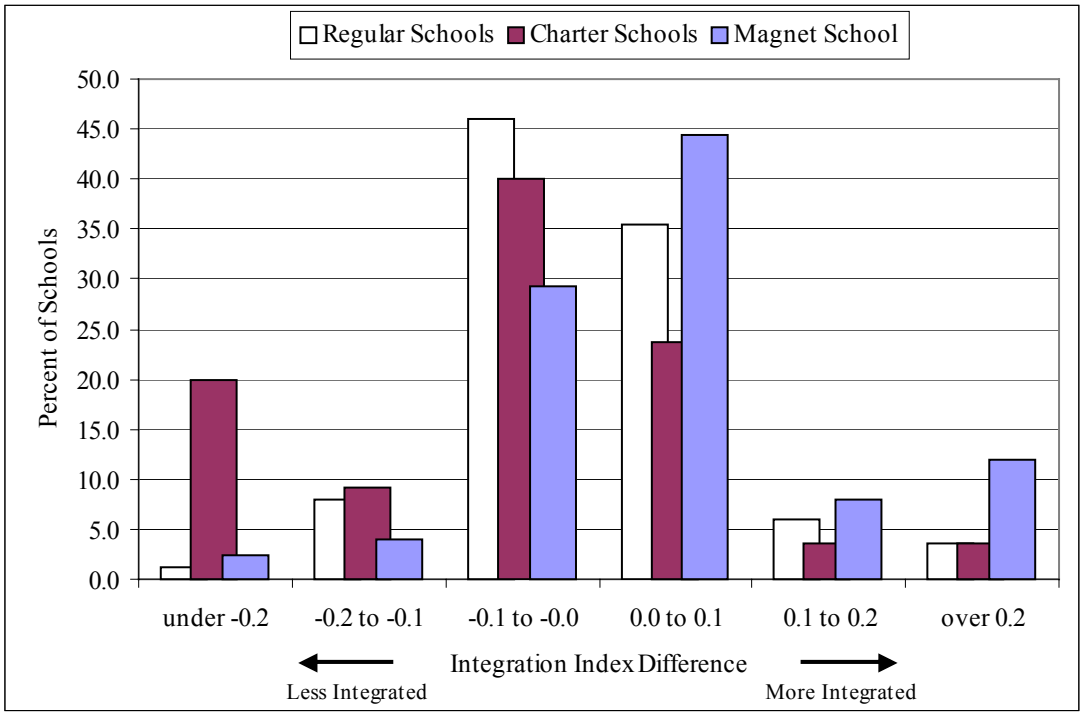
Note: N = 1942.
Sources: Authors' tabulations from the 1999/00 CBEDS, California Department of Education, and Census 2000, SF1, U.S. Bureau of the Census.

On average, there is no difference between school and neighborhood integration—reflecting the strong connection between school and residential segregation. As with metropolitan-wide segregation levels, however, levels of integration within metropolitan areas are far from a uniform phenomenon. More importantly, the integration difference varies significantly by school type.

Figure 2 displays the distribution of the integration index difference for regular, charter, and magnet schools. While the majority of all schools have an integration index difference between -0.1 and 0.1, noticeable differences exist on the tails of the distribution. About 20 percent of

charter schools have an integration index difference under -0.2, suggesting that they are less integrated relative to the SAA than regular and magnet schools (where less than five percent fall in the under -0.2 category). On the other side of the distribution, about 12 percent of magnet schools have an integration index difference over 0.2, suggesting that they are more integrated relative to the SAA than regular and charter schools (where less than five percent fall in the over 0.2 category).[§]

Figure 2. Integration Index Difference Distribution, by School Type



Sources: Authors' tabulations from the 1999/00 CBEDS, California Department of Education, and Census 2000, SF1, U.S. Bureau of the Census.

On average, the integration index difference for magnet schools (0.04) is statistically significantly greater than the difference for regular schools and the integration index for charter schools (-0.08) is statistically significantly lower than that for regular schools. These differences are not consistent across the metropolitan areas, however. Table 4 reports mean integration

[§] A chi-square test indicates a statistically significant difference ($p < .001$) in the integration index difference distribution by school type.

index scores by metropolitan area and school type. The table also reports the results of two-tailed t-tests conducted on the integration difference values. In the Los Angeles-Long Beach and San Diego metropolitan areas, magnet schools are, on average, statistically more integrated than regular schools in their respective MSA. While charter schools in all five metropolitan areas had a negative integration index, on average, only in San Diego was the difference significantly lower than the average regular school integration difference.

The average integration difference for regular public elementary schools also varies across metropolitan areas. The overall average integration index difference for regular schools is zero—suggesting that the school population is virtually identical to the SAA population—but in four of the five metropolitan areas the average integration difference is significantly different from zero. Only in the Los Angeles-Long Beach MSA is the average integration index difference greater than zero. The positive difference for regular schools suggests that on average these schools help integrate segregated neighborhoods, possibly through student transfer and busing programs.

Table 4. School and Neighborhood Integration Index by MSA and School Type

		School Integration		Neighborhood Integration		Integration Difference	
	N	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
All Five MSAs							
All Schools	1942	0.68	0.15	0.68	0.15	0.00	0.10
Regular Schools	1761	0.69	0.15	0.69	0.15	0.00	0.09
Magnet Schools	126	0.68	0.15	0.64	0.15	0.04 **	0.13
Charter Schools	55	0.55	0.21	0.63	0.19	-0.08 **	0.17
Los Angeles							
All Schools	1176	0.67	0.16	0.66	0.16	0.01	0.10
Regular Schools	1068	0.68	0.16	0.67	0.16	0.01 ++	0.10
Magnet Schools	77	0.69	0.15	0.63	0.16	0.06 **	0.13
Charter Schools	31	0.52	0.22	0.56	0.21	-0.04	0.17
San Diego							
All Schools	400	0.69	0.14	0.70	0.12	-0.02	0.10
Regular Schools	345	0.69	0.13	0.71	0.12	-0.02 ++	0.09
Magnet Schools	36	0.67	0.16	0.63	0.12	0.04 *	0.12
Charter Schools	19	0.59	0.20	0.74	0.11	-0.15 **	0.17
San Jose							
All Schools	243	0.68	0.12	0.71	0.11	-0.03	0.09
Regular Schools	230	0.68	0.12	0.70	0.11	-0.02 ++	0.08
Magnet Schools	12	0.69	0.11	0.72	0.13	-0.03	0.10
Charter Schools	1	0.64	.	0.85	.	-0.21	.
Vallejo-Fairfield-Napa							
All Schools	85	0.72	0.11	0.76	0.10	-0.04	0.08
Regular Schools	80	0.72	0.11	0.76	0.10	-0.04 ++	0.07
Magnet Schools	1	0.57	.	0.63	.	-0.07	.
Charter Schools	4	0.61	0.13	0.70	0.03	-0.09	0.12
Yuba City							
All Schools	38	0.79	0.09	0.80	0.11	-0.02	0.10
Regular Schools	38	0.79	0.09	0.80	0.11	-0.02	0.10
Magnet Schools	0	.	.	.	.	.	.
Charter Schools	0	.	.	.	.	.	.

Notes: A two-tailed t-test was used to test the integration index difference. Regular schools were tested to see if the average is different from zero. Magnet and charter schools were tested to see if the average is different from the MSA's regular school average.
+ statistically different from zero at $p < 0.05$ level.
++ statistically different from zero at $p < 0.01$ level.
* statistically different from MSA's regular school average at $p < 0.05$ level.
** statistically different from MSA's regular school average at $p < 0.01$ level.
Sources: Authors' tabulations from the 1999/00 CBEDS, California Department of Education, and Census 2000, SF1, U.S. Bureau of the Census.

Factors Associated with Integrated Schools

Other factors besides school type can affect the degree of school integration. As discussed above, characteristics of the district, school, and neighborhood can influence the degree of racial

integration at a given school. We use ordinary least squares (OLS) regression analysis to isolate the effect of charter and magnet school status, and further examine some of the forces associated with variation in the integration index difference across schools.

Specific variables are included to gauge the importance of metropolitan, district, school, and neighborhood factors on the level of a school's integration index difference. Table 5 reports the results from five OLS models: (1) the full model based on all schools with available data in all five MSAs; (2) sub-sample 1A excludes schools in the Los Angeles-Long Beach MSA; (3) sub-sample 1B excludes schools not in the Los Angeles-Long Beach MSA; (4) sub-sample 2A excludes regular schools in all five MSAs from the analysis; and (5) sub-sample 2B excludes charter and magnet schools in all five MSAs from the analysis. To see whether schools in the Los Angeles-Long Beach MSA are driving the results we separate out these schools in sub-sample 1. Similarly, we separate out regular public schools in sub-sample 2 to see whether the effects on magnet and charter schools are muted by the large number of regular public schools.

The regression results confirm the findings from the simple comparison of means above. Everything else equal, charter schools are less integrated and magnet schools are more integrated than regular schools, relative to levels of integration in the SAA. Charter schools reduce the level of racial integration by 0.08 points, which loosely means an additional eight percent of students, relative to the neighborhood, would have to be relocated to achieve perfect integration. Magnet schools increase the level of racial integration by 0.03 points, which means three percent fewer students, relative to the neighborhood, would have to be relocated to achieve perfect integration. The statistically significant effect of charter and magnet schools persists when the model is run on the sub-samples.

Table 5. Factors Associated with the Integration Index Difference

Independent Variable	Full Model Marginal Effect (Std. Err.)	Sub-Sample 1A Marginal Effect (Std. Err.)	Sub-Sample 1B Marginal Effect (Std. Err.)	Sub-Sample 2A Marginal Effect (Std. Err.)	Sub-Sample 2B Marginal Effect (Std. Err.)
Intercept	0.2984 **	-0.0307	0.5330 **	-0.1303	0.3642 **
	(0.0932)	(0.1573)	(0.1163)	(0.4141)	(0.0928)
Metropolitan Factors					
San Diego (1/0)	-0.0129 *	NA	NA	-0.0179	-0.0096
	(0.0059)			(0.0237)	(0.0060)
San Jose (1/0)	-0.0084	0.0114	NA	-0.1065 *	-0.0051
	(0.0069)	(0.0098)		(0.0428)	(0.0068)
Vallejo-Fairfield-Napa (1/0)	-0.0333 **	-0.0039	NA	-0.1955 **	-0.0279 **
	(0.0106)	(0.0109)		(0.0681)	(0.0103)
Yuba City (1/0)	-0.0386 *	0.0099	NA	NA	-0.0334
	(0.0186)	(0.0193)			(0.0178)
District Factors					
Total District Enrollment (log)	0.0047 **	0.0150 **	0.0013	-0.0151	0.0054 **
	(0.0014)	(0.0035)	(0.0016)	(0.0092)	(0.0014)
Inter-District Students (%)	-0.0367	0.0736	0.0061	0.1588	-0.0281
	(0.0380)	(0.0800)	(0.0438)	(0.3713)	(0.0366)
School Factors					
Charter School (1/0)	-0.0841 **	-0.1143 **	-0.0537 **	-0.0649 **	NA
	(0.0145)	(0.0242)	(0.0176)	(0.0235)	
Magnet School (1/0)	0.0294 **	0.0287 *	0.0385 **	NA	NA
	(0.0081)	(0.0138)	(0.0098)		
Total School Enrollment (log)	-0.0120 *	0.0148	-0.0297 **	0.0879 **	-0.0210 **
	(0.0057)	(0.0097)	(0.0069)	(0.0241)	(0.0057)
API Statewide Rank in 2000	-0.0098 **	-0.0011	-0.0162 **	-0.0157 **	-0.0089 **
	(0.0011)	(0.0019)	(0.0015)	(0.0048)	(0.0012)
Neighborhood Factors					
Non-Hispanic Whites age 5-9 (%)	0.1156 **	0.0796 **	0.1449 **	0.3474 **	0.0922 **
	(0.0139)	(0.0220)	(0.0179)	(0.0577)	(0.0139)
Neighborhood Integration Index	-0.1379 **	-0.1616 **	-0.1492 **	-0.1624 **	-0.1368 **
	(0.0153)	(0.0287)	(0.0192)	(0.0608)	(0.0154)
Per Capita Income (log)	-0.0182 *	-0.0156	-0.0244 *	-0.0162	-0.0198 *
	(0.0084)	(0.0142)	(0.0104)	(0.0366)	(0.0084)
Private School Enrollment (%)	0.0023 **	0.0015 **	0.0026 **	0.0011	0.0023 **
	(0.0002)	(0.0004)	(0.0003)	(0.0010)	(0.0002)
Sample Size	1781	670	1111	151	1630
Adjusted R-square	0.27	0.16	0.34	0.46	0.25

Notes: Results based on OLS regression with the integration index difference as the dependent variable. The full model includes all schools with available data in all five study MSAs.
Sub-sample 1A excludes schools in the Los Angeles-Long Beach MSA.
Sub-sample 1B excludes schools not in the Los Angeles-Long Beach MSA.
Sub-sample 2A excludes regular schools.
Sub-sample 2B excludes magnet and charter schools.
* statistically different from MSA's regular school average at $p < 0.05$ level.
** statistically different from MSA's regular school average at $p < 0.01$ level.
Sources: Authors' tabulations from California Department of Education school demographic files for the 1999/00 school year, and Census 2000, SF1, U.S. Bureau of the Census.

Forces at the district level may influence the integrating (or segregating) potential of a school, because most policies regarding local school assignment and school integration programs are made by the district. Everything else equal, one would expect schools in more populous school districts to be more integrated because there is a broader (and presumably more diverse) population base to work with. Similarly, there are more potentially segregated neighborhoods for schools to integrate. Including total district enrollment in the regression models confirms this hypothesis—schools in larger districts are more integrated than their local neighborhood. Although the significant effect does not hold when the sample is restricted to the Los Angeles-Long Beach MSA (sub-sample 1B) or regular schools are excluded (sub-sample 2A). A district's acceptance of inter-district transfer students should also help integrate schools for similar reasons. However, the regression results suggest that a district's use of inter-district transfers does not significantly affect a school's level of integration.[**] We also ran a model with district fixed effects included, but the magnet and charter school results were not significantly different from those reported in Table 4.

Previous research on metropolitan-level school segregation found that MSAs with higher average school enrollment have lower segregation, everything else equal (Ong and Rickles, 2001). The implication of that finding—larger schools reduce segregation—does not hold-up in this school-level analysis. In fact, results from the full-model indicate that schools with higher enrollment are less integrated relative to the SAA, everything else equal. A comparison of the sub-sample 2 results suggests that regular schools are driving the negative effect of school size.

[**] The available data from CDE only reports inter-district transfers down to the district level. Our inability to measure the use of inter-district transfers at the school-level may be why no statistically significant relationship results. Another reason for the insignificance of inter-district transfers may be the Supreme Court's 1974 decision in *Milliken v. Bradley*, which greatly restricts the use of inter-city transfers.

When the analysis is restricted to charter and magnet schools (sub-sample 2A), school size actually has a statistically significant positive effect on the integration difference.

In addition to a school's type (regular, magnet, or charter) and size, the quality of the school could affect the integration index difference. School quality is hypothesized to have two conflicting effects on integration levels. First, enrollment slots in high quality schools are more desirable to families from outsize the local school attendance than enrollment slots in low quality schools. Everything else equal, this should help schools integrated segregated neighborhoods. However, families residing in attendance areas of high quality public schools are less likely to seek schooling elsewhere—thus limiting the number of enrollment slots available to students from outside the attendance area and limiting the ability of schools to integrated segregated neighborhoods. Data limitations preclude us from separating these two effects in our analysis, but our results suggest that the latter effect is stronger than the former.[††] The results indicate that higher (perceived) quality schools have a lower integration index difference.

Integration levels can also be influenced by factors associated with the school's local neighborhood. Desegregation efforts based on school busing generally integrate schools by driving minority students from inner-city neighborhoods to schools located in predominately white neighborhoods. Furthermore, districts may bus students from inner-city schools to suburban schools to temporarily overcome problems with overcrowding. As a result, one would expect schools located in white neighborhoods to be more integrated than other schools. Our analysis confirms this hypothesis. We also include the neighborhood integration index in model.

[††] To measure school quality we use the school's statewide Academic Performance Index (API) rank in 2000. The API ranks schools on a scale of one to ten, with ten indicating the highest rank of academic performance, primarily based on the school's Stanford-9 test score results for that year. While the API is a debatable measure of actual school quality, it is consistently measured across schools and, more importantly, a publicly visible indicator of quality. The visibility of school quality is important because it is a major mechanism in which parents perceive school quality.

Schools located in more integrated neighborhoods have, on average, lower integration index differences, everything else equal. This finding may simply be due to a "ceiling effect"—i.e., schools in a highly integrated neighborhood cannot have a level of integration significantly greater than already exists in the neighborhood—or students in integrated neighborhoods systematically attending school outside their neighborhood. The latter explanation could have implications for housing integration policies.

In addition to the racial composition of the local neighborhood, the economic capacity of the residents may also impact integration levels. The ability of a student to "escape" his/her local public school assignment is partially related to financial ability to afford a private school or to afford the additional costs associated with attending a school further from home. We include the neighborhood's per capita income in the regression models to control for these selection processes. The results indicated that schools in higher income neighborhoods are less integrated relative to the neighborhood. The relationship is most-likely driven by regular schools in the Los Angeles-Long Beach MSA because the effect is not statistically significant for sub-samples 1A and 2A.

The per capita income of a neighborhood is one indicator of potential "white flight" from the neighborhood public school, but the aggregated measure clouds some of the selection processes. By including the percent of elementary school-aged children in the neighborhood attending private school, we can estimate (and control for) the effect of private school attendance on integration levels. The immediate reaction to private school attendance is that it will result in lower levels of integration because white students will opt out of minority schools to attend a private school. Our findings are counter-intuitive to this hypothesis, however. One explanation for the positive effect of private school enrollment on the integration difference is that children

residing in suburban areas (likely less integrated neighborhoods) choose to attend a private school which frees up space in the suburban schools for students residing outside the school attendance area, and thus results in the integration of segregated neighborhoods.

Unfortunately, data limitations—coupled with complex selection processes—restrict our ability to test, or control for, all the factors necessary to specify a full model of the integration index difference. In particular, we were not able to obtain student- or school-level data on student transfers/busing and did not identify districts with relatively liberal/flexible school attendance area boundaries. Since magnet schools are likely to be located in large, central-city districts that are more likely to utilize student busing, the exclusion of such a measure will likely over-estimate the effect of magnet schools. The inclusion of school district size and the use of inter-district transfers in the model should partially minimize the bias however.

Despite these limitations, the specified model provides some useful insights into the dynamics associated with racial integration at the school level, and the charter and magnet school effects are fairly robust. The segregating effect of charter schools and the integrating effect of magnet schools remain statistically significant, even after excluding different variables from the full model.[‡‡] One notable exception exists. When the school quality measure is excluded from the model, the effect of magnet schools is no longer statistically significant (although still positive). This is not an unexpected result, given that magnet schools on average enroll higher performing students.

[‡‡] The following variables were included/excluded from the full regression model in various combinations: the district integration index, neighborhood per capita income, the API rank, and the neighborhood integration index.

DISCUSSION

For most children the racial composition of their neighborhood determines the racial composition of their school. Segregated housing patterns translate into a highly segregated educational system, which can then result in disparities in educational opportunities and an institutionalized mechanism for the reproduction of racial inequality. The analysis of elementary schools in California metropolitan areas presented above examines the extent that the racial composition of schools deviates from neighborhood compositions, and their potential to promote racial integration. Two types of schools—magnet and charter schools—have a potential to sever the nexus between residential and school segregation.

We used geographic information system (GIS) techniques to estimate the racial composition of elementary school neighborhoods.[§§] Using this approach, we were able to measure the degree of racial integration for each school in our five study areas and compare that level to the amount of racial integration for the school's local neighborhood. We did not take into account the degree of segregation *within* schools and neighborhoods, but our intra-metropolitan approach provides a more localized investigation of racial dynamics than general research at state, metropolitan, and district levels.

Overall, our findings suggest that residential and school segregation are closely related to each other but individual schools can expose children to a more racially integrated environment than their local neighborhood. Magnet schools, on average, provide students with a more integrated environment than the local neighborhood. The addition of a magnet school would result in approximately three percent fewer students, relative to the neighborhood, needing

[§§] Since actual school attendance boundaries are not readily available to researchers, such a methodology is necessary for an examination of the relationship between neighborhood conditions and school characteristics. Future research should look to expand on this methodology and test the biases it introduces when approximating

relocation to achieve perfect integration. Charter schools, however, cause a more segregated student population. The addition of a charter school would require relocation of about an additional eight percent of students, relative to the neighborhood, to achieve perfect integration.

Our analysis also identifies a potentially intriguing connection between schools size, school type, and integration. This relationship should be examined in further detail, but one potential implication of the results is that while charter schools may have a negative effect on integration, larger charter schools may have less of an effect. If true, policies regarding charter schools should seek to encourage larger charter schools, with less restrictive enrollment, rather than smaller charter schools.

One should not overlook the potential role of regular schools to integrate segregated neighborhoods. While on average the level of integration at a regular school mirrors that of the local neighborhood, our findings hint at ways in which regular schools do provide a more integrated environment. Schools located in non-Hispanic white communities are likely to be more integrated than the local neighborhood. School busing programs could be driving this outcome, but additional research is necessary to truly understand the role of busing on the level of racial integration at particular schools. School attendance boundaries can also be draw (or loosened) to incorporate students from diverse neighborhoods into particular schools.

Future research needs to examine the underlying causes, and selection processes, that drive these factors—such as why charter schools tend to be less integrated than the surrounding neighborhood and how private school enrollment can increase public school integration. Efforts to understand and expand the integrating mechanisms of schools, and minimize the segregating forces, are necessary to improve racial equity in the educational system.

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school attendance areas. We are currently investigating ways to test our approximation technique based on the actual school attendance boundaries for Los Angeles County schools.

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