# The Contributions of School Desegregation to Housing Integration:

# Case Studies in Two Large Urban Areas

Douglas E. Mitchell

Michael Batie

University of California, Riverside

March, 2006

This paper was prepared for presentation in Session #47.039 at the Annual Meeting of the American Educational Research Association, San Francisco, California, April 7-11, 2006

## Introduction

For more than a quarter of a century scholars have been examining the relationship between school segregation and urban housing patterns. Work on this issue has been hampered by three important factors: 1) technical uncertainty regarding the most appropriate units of analysis and the appropriate statistical procedures for measuring the degree of sub-population segregation, 2) the difficulty of securing and linking long term data sets that permit truly longitudinal analysis of the problem, and 3) formulation of reasonable theoretical models that can be tested using available data. This study addresses these problems by assembling a half-century long data set covering school and housing populations, identifying the most appropriate statistical procedures, and testing the theoretical proposition that school desegregation is a leading indicator, predicting and probably causing housing integration to follow. The study combines ethnicity data from the last five decennial census reports with school enrollment data to track housing and school desegregation histories in two large metropolitan school districts in California. The study shows that school desegregation is a leading indicator of housing integration, demonstrates that census *block group* areas are the appropriate size units of analysis, and affirms that an information theory index (Theil's H, which the SPSS statistical package calls the Uncertainty Coefficient) is the proper statistical measure for this kind of analysis. Moreover, since school desegregation in one of the two cities under study was implemented early and voluntarily (relying on bussing minority students to previously white schools) and the other city school system was desegregated more slowly through a contested court order (relying on magnet school programs to attract white family volunteers), the study contrasts the history of desegregation in the two cities to determine whether these school desegregation strategies might be differentially effective in changing residential patterns.

***Theoretical Framework***

After the constitutional issue of *de jure* segregation had been settled in the *Brown* decisions, civil rights advocates, particularly in the North and West urged school desegregation upon urban school systems as a strategy for overcoming persistent differences in the academic success rates of majority and minority racial and ethnic groups. Always controversial, desegregation was expected to work by providing minority students with access to higher quality school services and by overcoming debilitating social stigmas associated with extended exposure to racially isolated educational settings. While the inter-racial achievement gap has been reduced significantly, it is still quite severe. Moreover, it is not clear how much of the reduction is in any way related to desegregation (Douglas, 1997, Kersten, 1995). Substantial racial, ethnic, and particularly social class segregation, continues to characterize most urban schools systems, and by some measures is getting worse. With a national shift toward political conservatism, many have come to question whether the substantial economic and political costs incurred during school desegregation are producing social benefits commensurate with the price being paid.

***The Limited Achievement Effects***

Our interest in the impact of desegregation on housing springs from an awareness that desegregation of America's schools has resulted in, at most, very modest student achievement gains for minority students. Indeed, the evidence for even modest gains is far from clear. Given the more than fifty years that have past since the *Brown v. Topeka Board of Education* supreme court decision found "separate but equal" schools inherently unequal, one would expect more evidence verifying the benefits of school segregation.

Alas such research does not exist. What does exist is a large body of work that reaches no consensus on the proposition of whether integration resulted in increased student

achievement. Crain and Mahard (1978) authored one of the most widely cited reviews of research on desegregation and black achievement. At the time this work was published there were "over a hundred studies of achievement test performance following desegregation" (p. 17). Crain and Mahard take pains to emphasize that the investigation of achievement that focuses on standardized test results is embarrassing when contrasted with the number of studies that investigate the population movement aspects of desegregation (p.17).

They state that researchers and writers find it difficult to agree on the effect of desegregation on black student achievement. In analyzing seventy-three research studies they found that the forty studies had yielded a positive effect on black achievement, but twelve showed negative effects and a substantial number were inconclusive. In light of these results Crain and Mahard (p.24) state;

> "No comprehensive statement can be made about the magnitude of these effects of desegregation, since many of the studies do not provide sufficient information to permit the effect to be converted into either standard score differences or grade equivalents"

Their review called attention to significant problems in the experimental designs used to study desegregation effects (p. 25-30), and other factors that could affect judgments about the success or failure of school desegregation leading them to conclude that, "sometimes works and sometimes it doesn't" (p. 47)

During the 1980s, the confused state of affairs regarding the effect of desegregation on student achievement continued and, by some criteria, could be said to have worsened. Nowhere is this more evident than in the contrast between a later study by Crain and Mahard (1983) and another one published the same year by Irvine and Irvine (1983). On page 83 of the Crain and

Mahard article it is reported that Krol (1978) had concluded, based on his metaanalysis, "that desegregation was beneficial". But an opposite conclusion is reached in the Irvine and Irvine article which states on page 421 that Krol (1980) found "that there was no statistically significant research from 1955-77 which showed that desegregation influenced black student achievement positively"

. In the early 1990s, Rumberger and Wilms (1992) focused anew on the question of student achievement did find some positive effects after adjusting for differences in the background of students (p. 378). Though their findings were tempered by their assertion that "segregation can, but does not always, lead to achievement difference across schools and among ethnic groups". By the mid-90s, however, the focus of research and scholarly argument shiftd from achievement to the effect of desegregation on what Wells (1995) described as the "educational aspirations and attainment of African-American students". Trent (1998), for example, found a "positive statistically significant benefit for Black students' later earnings and occupational attainment". At the start of the current decade, Rivkin (2000) had used multivariate techniques to form an empirical framework for examining the effects of individual student outcomes, individual and family characteristics, community characteristics, and school characteristics on the future earnings of black students. His, unsurprising, findings that blacks perform better in higher quality schools (p. 339), and that "there is little or no evidence that black students benefit if a higher proportion of their schoolmates are white" (p. 341), lead directly to the conclusion that there is "little support for the belief that mandatory desegregation programs are likely to increase significantly the future earnings of black men and women."

Given the shifting focus of research attention and lack of consensus across the multiple studies undertaken to date, it is fair to say that there exists no irrefutable evidence that school

desegregation has resulted in increased student achievement for any group of students. Two widely read recent books summarize the evidence as follows:

> Studies that have sought to determine the effect of desegregation on the achievement of blacks have come up with a decidedly mixed set of results. In general, the research suggests no effect on mathematics achievement for blacks and some positive effect on reading for blacks. The achievement of whites does not appear to be harmed. Clotfelter, 2004, p. 187

While Hochschild and Scovronick conclude:

> Because so much else was changing at the same time, scholars do not agree on the extent of the impact on achievement of desegregation alone, although almost all agree that it did not hurt {Hochschild, 2003 #407}, p. 39.

***The Evidence on Housing: Cause or Effect?***

Housing segregation – created by a combination of social class and racial biases in the housing market – remains the most potent cause of school segregation. And through its influence on school segregation, housing segregation plays a determining role in shaping educational opportunities and outcomes. If housing can be effectively desegregated, urban school systems could provide schools that are both integrated and neighborhood based. Hence, if it can be shown that residential housing patterns are substantially influenced by school desegregation, it might be argued that the benefits of school desegregation, though delayed, are substantial because they are producing more integrated neighborhoods which will eventually produce more homogeneous educational opportunities and outcomes. In early research studies, this issue was discussed as "white flight" – the discovery that at least some white residents were sufficiently opposed to desegregation of their schools that they were willing to move away from districts that undertook desegregation of their schools. As early as 1979, however, some researchers became interested in the question of whether school desegregation would encourage housing desegregation. Though conducted within limited time frames, evidence from early

studies was encouraging. Pearce (1979), for example, provides some evidence that the existence of metropolitan desegregation policies significantly alters the behaviors of home buyers and real estate agents, and alters public consciousness of the social, cultural and economic character of the metropolitan area in ways that lead to racial integration (though probably not much socio-economic class integration).

The central hypothesis of the present study is that at least in cities with diverse populations, school desegregation has substantial and sustained impact on housing integration and that this effect is most pronounced in the neighborhoods immediately surrounding schools that have undergone significant changes in racial/ethnic student composition. Additionally it is hypothesized that the nature of the desegregation policy adopted by a metropolitan school district has a significant impact. Voluntary and comprehensive plans being more effective in inducing housing integration than piecemeal and court ordered ones.

***Data and Methods***

Measuring the extent of racial and ethnic segregation, particularly when trying to identify longitudinal changes, continues to pose significant problems. The census bureau has made significant changes in the way race data are categorized making confident classification across decennial tabulations difficult. Moreover, there are clear technical flaws in the earliest and most popular statistical analysis procedures (the Gini Coffficient and the Dissimilarity Index). Finally, changing the size of the study areas chosen for analysis substantially affects the measured level of segregation (and it is therefore uncertain whether one should use census blocks, block groups, tracts, postal zip codes, school attendance boundaries or some other size of study area). If the study area is too small then racial isolation will be nearly perfect (as would happen if individual households were studied). If the areas are too large, highly segregated neighborhoods will

appear segregated because they are combined with adjoining neighborhoods with different population profiles.

Once racial identity and appropriate study areas have been identified, it is necessary to consider what statistical procedures to use for analyzing the desegregation changes. Historically, the "Gini Coefficient" and the "Dissimilarity Index" have been most widely used to measure the extent of educational segregation. These indices are appropriate when only two different groups are being compared and when there is no need to calculate standard errors. They do not, however, generalize to fit studies covering multiple ethnic groups or to test hypotheses regarding changes (Duncan & Duncan, 1955; James & Taeuber, 1997). This study relies on the calculation of "Uncertainty Coefficients," following the methodology originally developed by Theil (1972) (For application see Reardon, Yun & Eitle, 2000). This coefficient is generalizeable across multiple ethnic groups and has two additionally important properties: 1) it can be partitioned to empirically determine which of various geographic units or ethnic groups are most characterized by the segregation that exists, and 2) it is accompanied by a measurable standard error that can be used to estimate the probability that any identified segregation patterns are the result of sampling bias rather than true segregation within the populations under study. Theil's Uncertainty Coefficient is thus used to statistically trace longitudinal changes in the segregation levels found in both school and housing populations.

***Data Sources:*** Data for this study come from two sources, the California Department of Education's reports on school enrollment in all of the elementary schools within the two urban southern California school systems under study, and decennial census reports generated by the

U. S. Census Bureau for 1970 through 2000. The school data are collected for each of the years aligned with the federal census data and for alternate years during the interval between census periods. Data for the years up to the 1970s are less detailed in two ways: census tract data for the 1960 and 1970 census periods are broken up to match the 2000 census block groups using ArcView© GIS software, and the school data for these early years do not distinguish Hispanic students as a unique ethnic group and, instead, lump them in with all "other" students who are neither Caucasian ("White") or African American ("Black") students.

***Results:*** Conclusions are presented in the three areas corresponding to the study objectives described above. First, the data demonstrate that prior to school desegregation in each of the school districts under study, both school and housing segregation was very high, far beyond any pattern that might arise through a random settlement and/or school assignment process. While school catchment areas do not come very close to matching census block group boundaries, they displayed racial isolation patterns that were, in some cases higher than the very substantial segregation in many housing blocks. Over the four decades following school desegregation, both school and housing patterns displayed substantially increased racial integration. Integration improvements came most rapidly during the 1970s and 80s. While one of the two cities in the study has been persistently more segregated than the other (the one that waited for court ordered desegregation), both cities have substantially more integrated housing and school systems than they did in 1970.

Teasing out the extent to which school desegregation is a leading indicator for housing integration is a more difficult task when we have only two cities and housing data collected only

once a decade. The data demonstrate, however, that school desegregation policies were dramatically effective (reducing segregation to less than 20 percent of the pre-integration levels and maintaining effective school integration for more than thirty years). The housing data show that residential desegregation took more than two decades, but eventually settled to a level approximately twice that of the schools in both school districts. School desegregation is thus shown to be an important factor and a reliable indicator of changing city residential patterns.

The relative effectiveness of voluntary bussing and court ordered magnet school programs is even more difficult to assess reliably with only two cases, one of which began with substantially higher levels of racial isolation than the other. The data indicate, however, that the comprehensive desegregation district generate more rapid housing integration.

***Scientific Importance:*** This study makes three important contributions to our knowledge about the measurement and analysis of school desegregation effects. First, a detailed review of how to measure and assess the reliability of changes in racial and ethnic segregation advances the field by demonstrating that techniques developed over the past 25 years are ready to support unequivocal and reliable judgments regarding the meaning of school composition data. Second, this study demonstrates that, while school integration may have only a modest impact on students' educational opportunities and gaps in student achievement, there is good reason to believe that the desegregation effort has, over an extended period, paid off handsomely in the promotion of residentially integrated neighborhoods which can be expected to subsequently yield social, political and possibly educational benefits. Third, this study demonstrates how to array

school and census data in ways that can document the relative effectiveness of alternative desegregation strategies in producing the expected housing integration.

While this paper was not meant to become a treatise on the viability any of the numerous methodologies used to measure segregation, it is necessary to add some context with respect to segregation indices. An understanding of the many ways that segregation can be measured does much to explain the measurement tools used in this paper.

Prior to 1955 there was a lively debate around the measurement of residential segregation (Massey & Denton, 1988). Duncan and Duncan (1955) by proving that the existing measures were all basically subsets of the index of dissimilarity ushered in what Massey and Denton called the *Pax Duncana,* an era marked by the dissimilarity index becoming the standard method for quantifying segregation (p.281).

This peace was ended by a critical appraisal of the dissimilarity index authored by Cortese, Falk, and Cohen (1976). Massey and Denton go on to present the segregation index wars in detail with the result being their analysis of the multidimensional nature of the measurement of residential segregation. The result of this work was the identification of twenty different indexes of segregation. These indices were classified into five key dimensions of segregation (U.S. Census Report, 2000). Those dimensions of evenness, exposure, concentration, centralization, and clustering are explained as:

> "..evenness involves the differential distribution of the subject population, exposure measures potential contact, concentration refers to the relative amount of physical space occupied, centralization indicates the degree to which a group is located near the center of an urban area, and clustering

measures the degree to which minority group members live disproportionately in contiguous areas."

Blau (1977) defines evenness as the differential distribution of two social groups among areal units in a city. A minority group is said to be segregated if it is unevenly distributed over areal units. Since our study is concerned with how students and residents are distributed within a school district we began our exploration using the Gini Coefficient, on of the more widely used evenness measures. However as stated in Massey and Denton (p.311) there are applications where the dissimilarity indices like the Gini Coefficient are not the best choice. Applications where segregation is measured across a variety of groups is best accomplished using an entropy index. An entropy index generalizes readily to the multi-group case, and can be decomposed into portions corresponding to different groups (Pielou 1972; White 1986).

Theil's Information/Entropy index (also called the Uncertainty Coefficient) handles multiple groups, has a straightforward meaning, and is decomposable to separate the effects of different sources of segregation.

Theil's index is mathematically simple and utilizes two basic ideas. The first idea is that of Entropy – a measure of the disorder in a set given by:

$$Entropy = \sum_{groups} p_g \times Log\left(\frac{1}{p_g}\right)$$

Where pg is the proportion of the total population in group g. (if pg = 0 the Log term is set to zero).

The minimum value of E is 0 (where all groups are proportionally represented) in each sample area and its maximum value is the Log of the number of groups (when all groups are segregated).

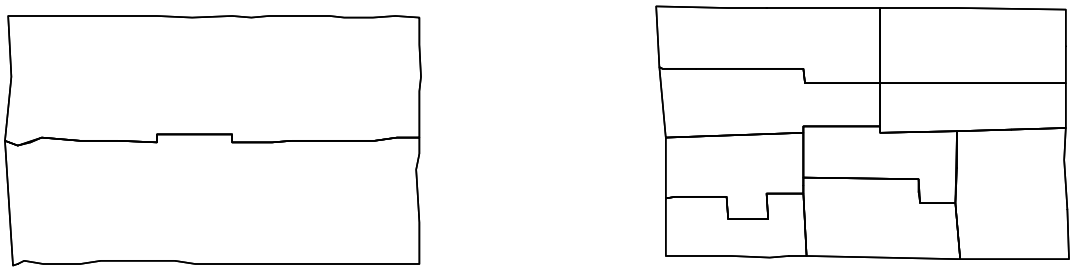
The second idea is Information – the extent to which know a subject's classification on one dimension of a cross-classification table enables you to predict their membership in particular group on the on the dimension. The weighted sum across all observation areas of the extent to which the observed entropy of the area differs from the total entropy for all observation areas is;

$$Information(H) = \sum_{areas} p_a \times \left( \frac{E_{ttl} - E_a}{E_{ttl}} \right)$$

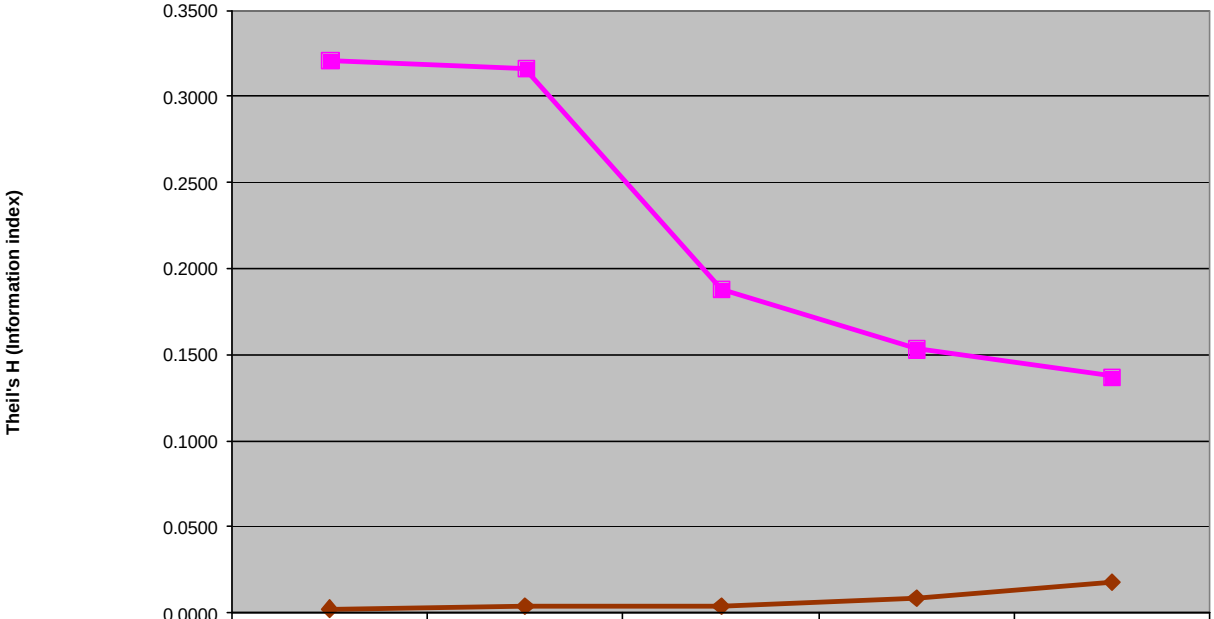
Where $E_{ttl}$ is the Total Entropy and $E_a$ the Entropy of each Area

The value of H can vary from 0 to 1. It has a value of 0 when the group representation in each observational area has the same proportions as for the whole population. It has a value of 1 when each observation area is occupied by a single group. Thus H is the proportional improvement in our knowledge of an individual's group membership if we know which observational area they reside in.

**Fig. ##. Sample Overlay of Block Group on Track Boundaries**
(2000 Census: Average Block Group Population: #####, Track: ####)

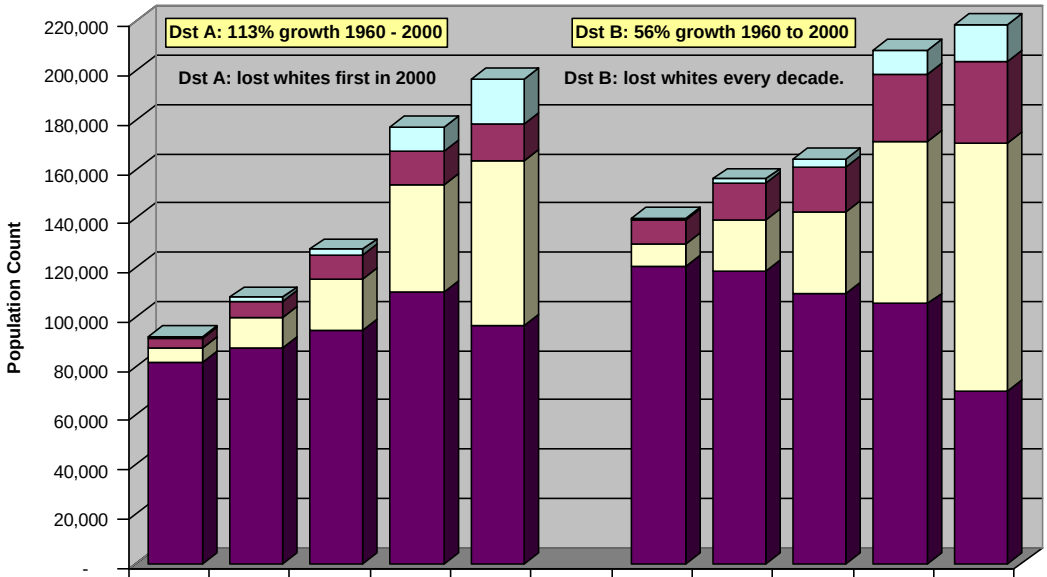


**Overall Residential Segregation and Between Districts Segregation by Census Years**



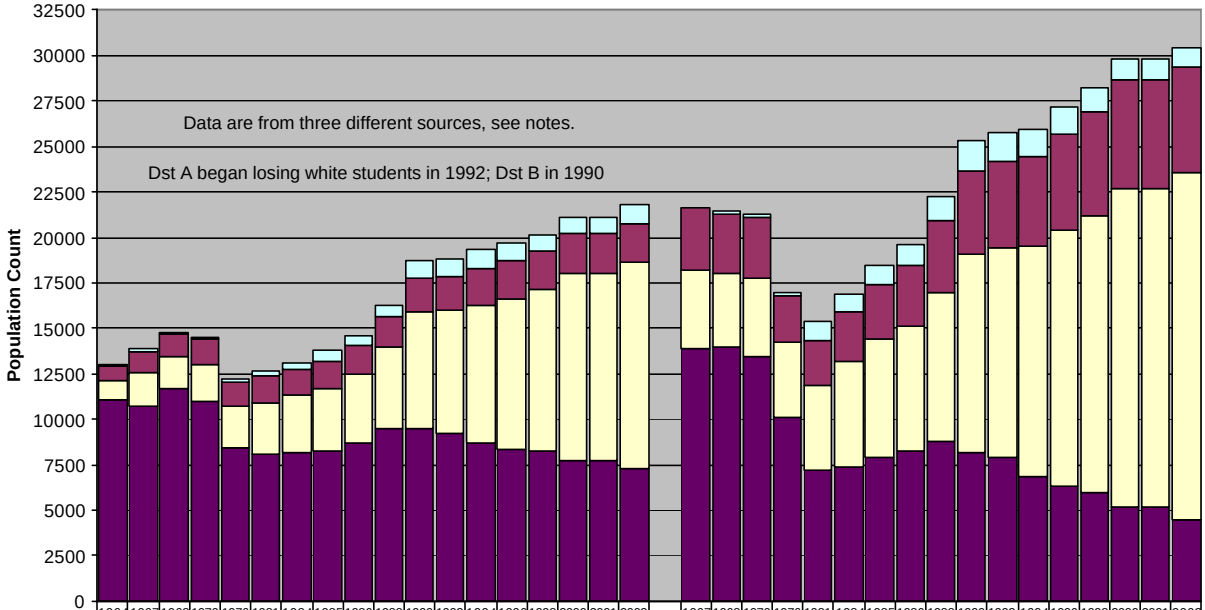

| | 1960 | 1970 | 1980 | 1990 | 2000 |
|---|---|---|---|---|---|
| Inter Dst Seg | 0.0024 | 0.0037 | 0.0042 | 0.0085 | 0.0178 |
| BG Seg Both Dsts | 0.3212 | 0.3164 | 0.1882 | 0.1533 | 0.1374 |

**Census Population History in the Two Districts**

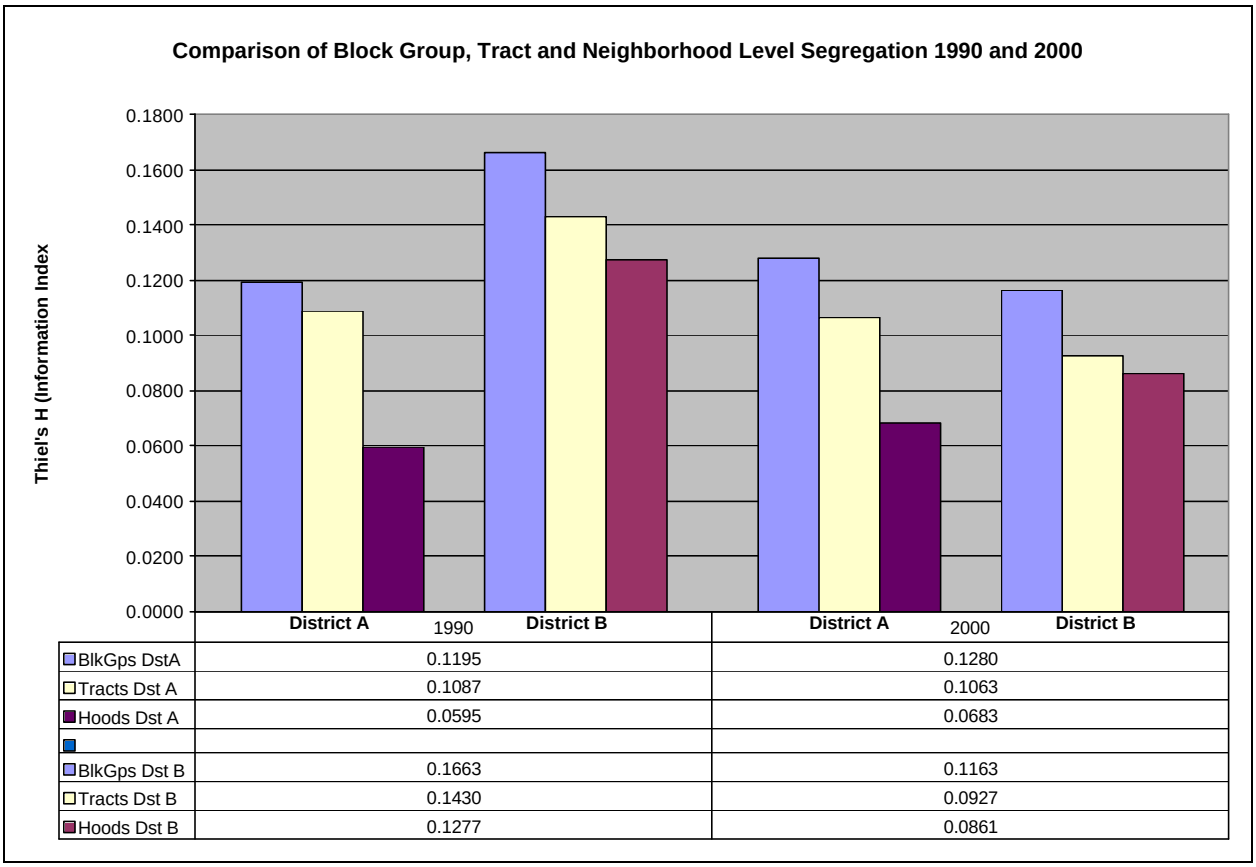



| | RUSD | | | | | | SBCS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1960 | 1970 | 1980 | 1990 | 2000 | | 1960 | 1970 | 1980 | 1990 | 2000 |
| Other | 622 | 1,553 | 2,288 | 9,816 | 18,375 | | 834 | 1,683 | 3,451 | 9,223 | 14,846 |
| Black | 4,191 | 6,827 | 9,873 | 13,741 | 15,158 | | 9,512 | 15,131 | 17,696 | 27,663 | 33,122 |
| Hisp | 5,844 | 12,098 | 20,503 | 43,417 | 66,480 | | 9,339 | 20,649 | 33,597 | 65,789 | 100,716 |
| White | 81,661 | 87,559 | 94,854 | 110,229 | 96,872 | | 120,434 | 118,631 | 109,397 | 105,425 | 69,913 |

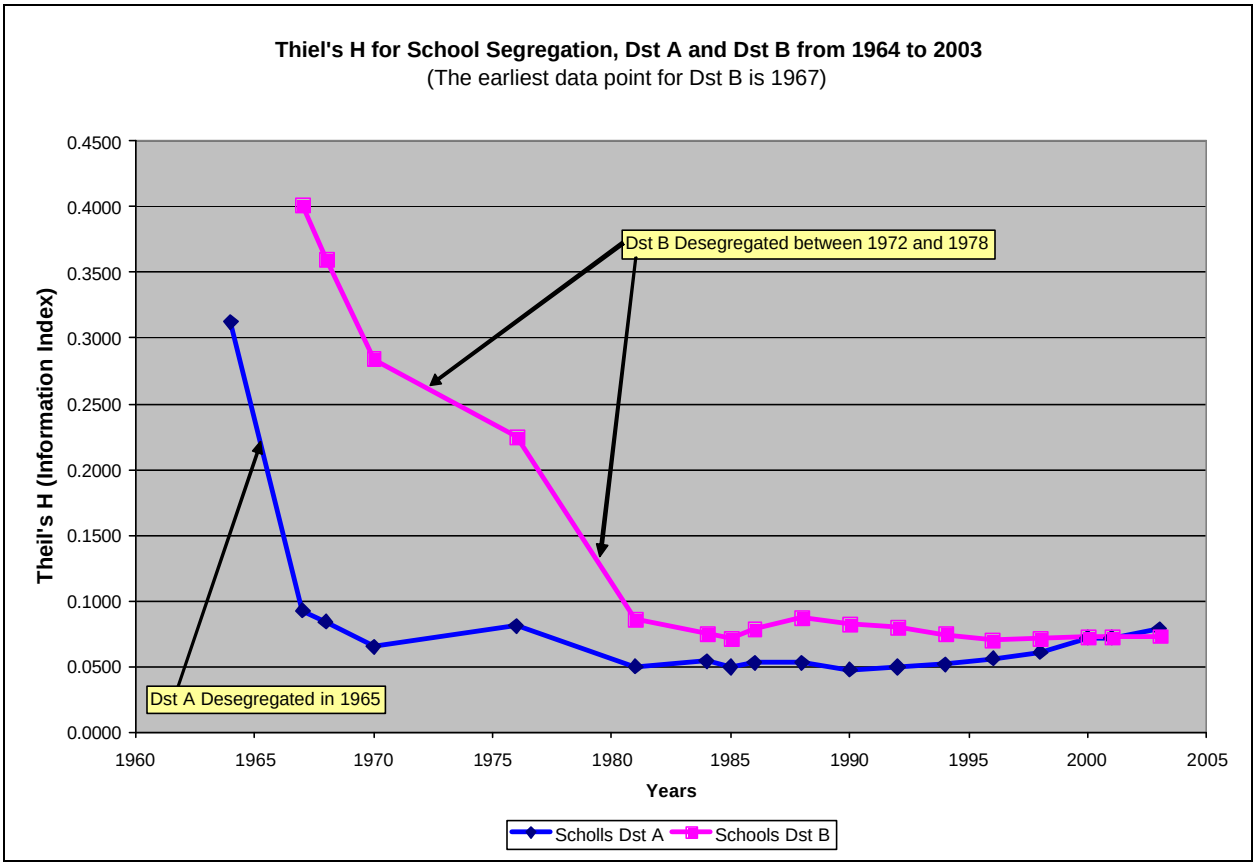
## School Population History by Ethnicity




| | RUSD | | | | | | | | | | | | | | | | | | SBCS | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1964 | 1967 | 1968 | 1970 | 1976 | 1981 | 1984 | 1985 | 1986 | 1988 | 1990 | 1992 | 1994 | 1996 | 1998 | 2000 | 2001 | 2003 | 1967 | 1968 | 1970 | 1976 | 1981 | 1984 | 1985 | 1986 | 1988 | 1990 | 1992 | 1994 | 1996 | 1998 | 2000 | 2001 | 2003 |
| Other | 129 | 185 | 130 | 141 | 185 | 318 | 299 | 584 | 581 | 628 | 947 | 977 | 1026 | 985 | 954 | 939 | 939 | 1062 | na | 132 | 186 | 246 | 1064 | 1001 | 1042 | 1109 | 1346 | 1594 | 1591 | 1523 | 1445 | 1312 | 1153 | 1153 | 1065 |
| Black | 798 | 1170 | 1170 | 1392 | 1360 | 1462 | 1449 | 1524 | 1547 | 1651 | 1836 | 1811 | 2042 | 2072 | 2103 | 2159 | 2159 | 2092 | 3406 | 3293 | 3399 | 2503 | 2458 | 2770 | 2987 | 3324 | 3964 | 4624 | 4746 | 4886 | 5338 | 5657 | 5948 | 5948 | 5767 |
| Hisp | 1035 | 1826 | 1824 | 2043 | 2213 | 2815 | 3117 | 3397 | 3758 | 4528 | 6441 | 6757 | 7583 | 8351 | 8884 | 1029 | 1029 | 1136 | 4301 | 3996 | 4299 | 4122 | 4629 | 5786 | 6500 | 6929 | 8162 | 1087 | 1151 | 1262 | 1402 | 1524 | 1752 | 1752 | 1910 |
| White | 1107 | 1074 | 1164 | 1095 | 8473 | 8096 | 8203 | 8286 | 8721 | 9479 | 9505 | 9242 | 8678 | 8307 | 8220 | 7757 | 7757 | 7258 | 1389 | 1399 | 1342 | 1013 | 7207 | 7357 | 7894 | 8232 | 8799 | 8197 | 7880 | 6894 | 6341 | 5983 | 5192 | 5192 | 4497 |




| | 1990 | 2000 |
|---|---|---|
| BlkGps DstA | 0.1195 | 0.1280 |
| Tracts Dst A | 0.1087 | 0.1063 |
| Hoods Dst A | 0.0595 | 0.0683 |
| | | |
| BlkGps Dst B | 0.1663 | 0.1163 |
| Tracts Dst B | 0.1430 | 0.0927 |
| Hoods Dst B | 0.1277 | 0.0861 |


Thiel's H for School Segregation, Dst A and Dst B from 1964 to 2003
(The earliest data point for Dst B is 1967)
Theil's H (Information Index)
0.4500
0.4000
0.3500
0.3000
0.2500
0.2000
0.1500
0.1000
0.0500
0.0000
1960
1965
1970
1975
1980
1985
1990
1995
2000
2005
Years
Dst B Desegregated between 1972 and 1978
Dst A Desegregated in 1965
Scholls Dst A
Schools Dst B

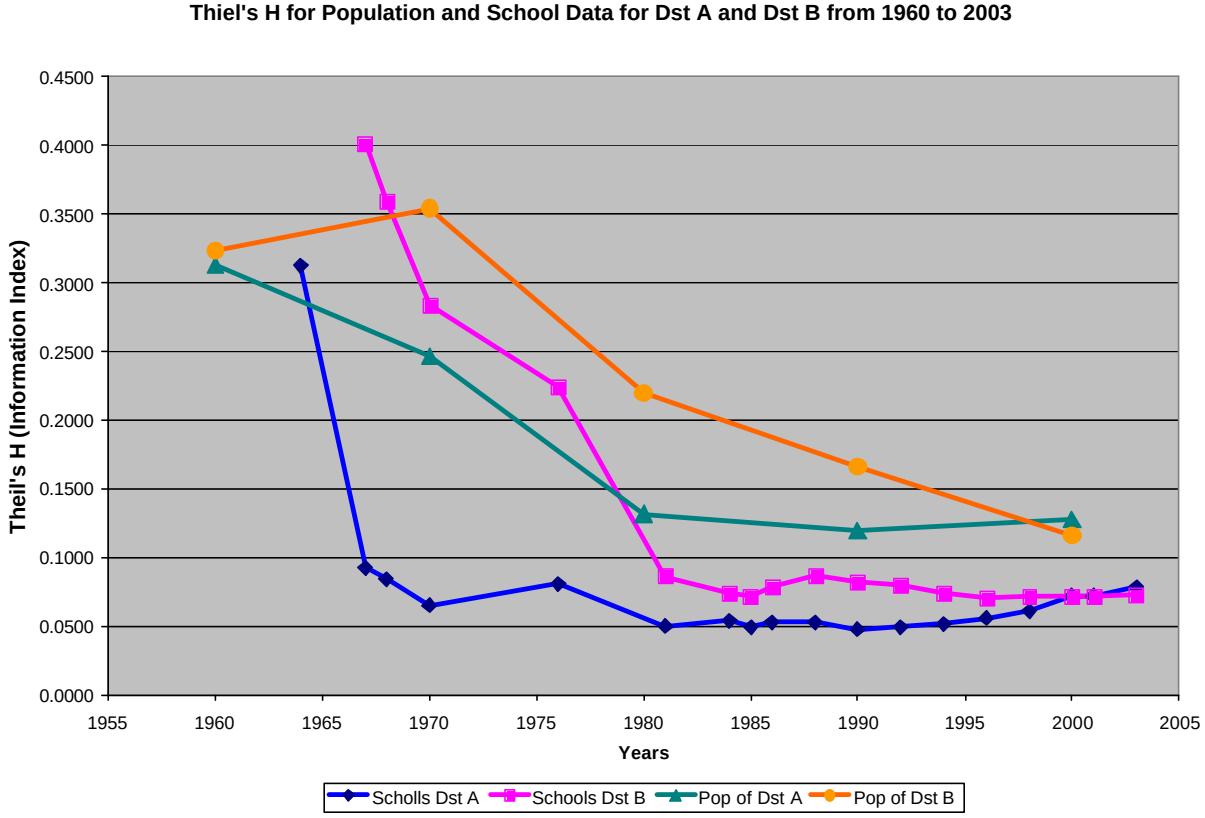
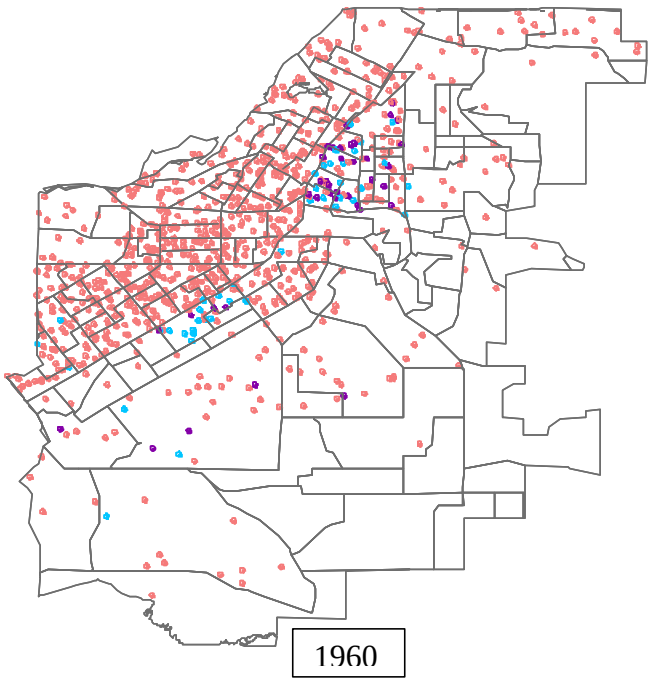
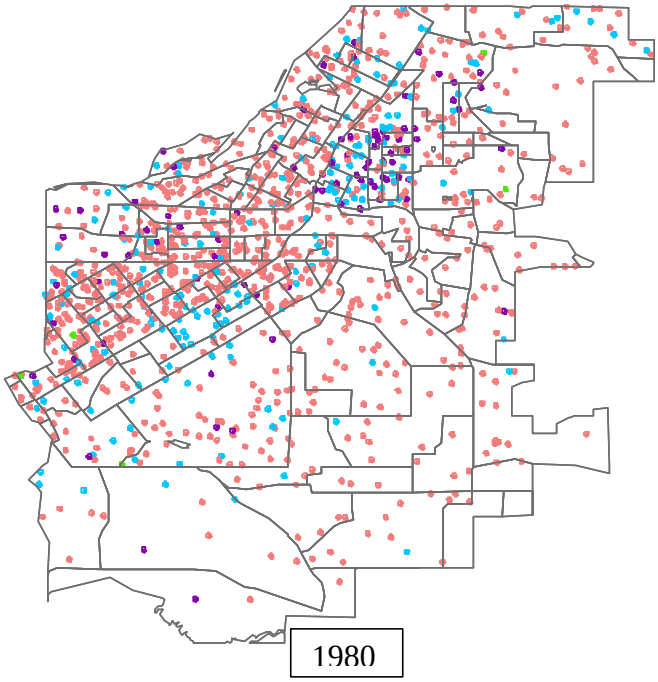
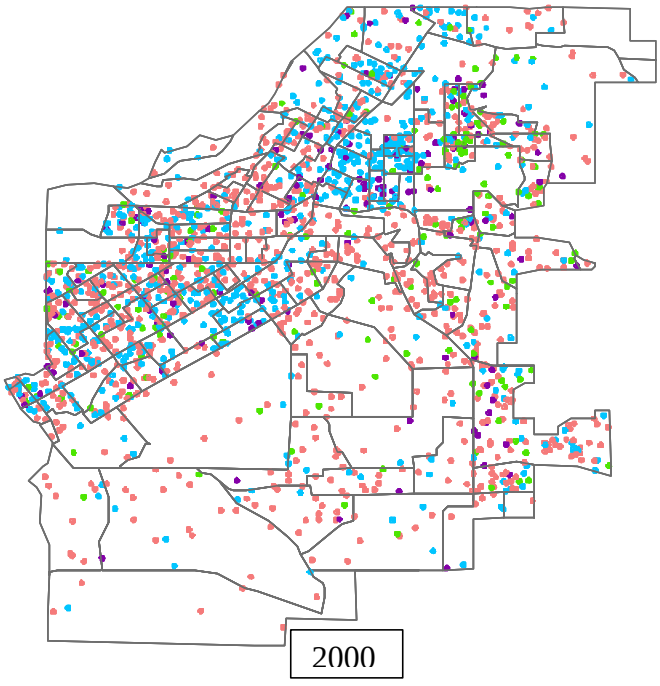
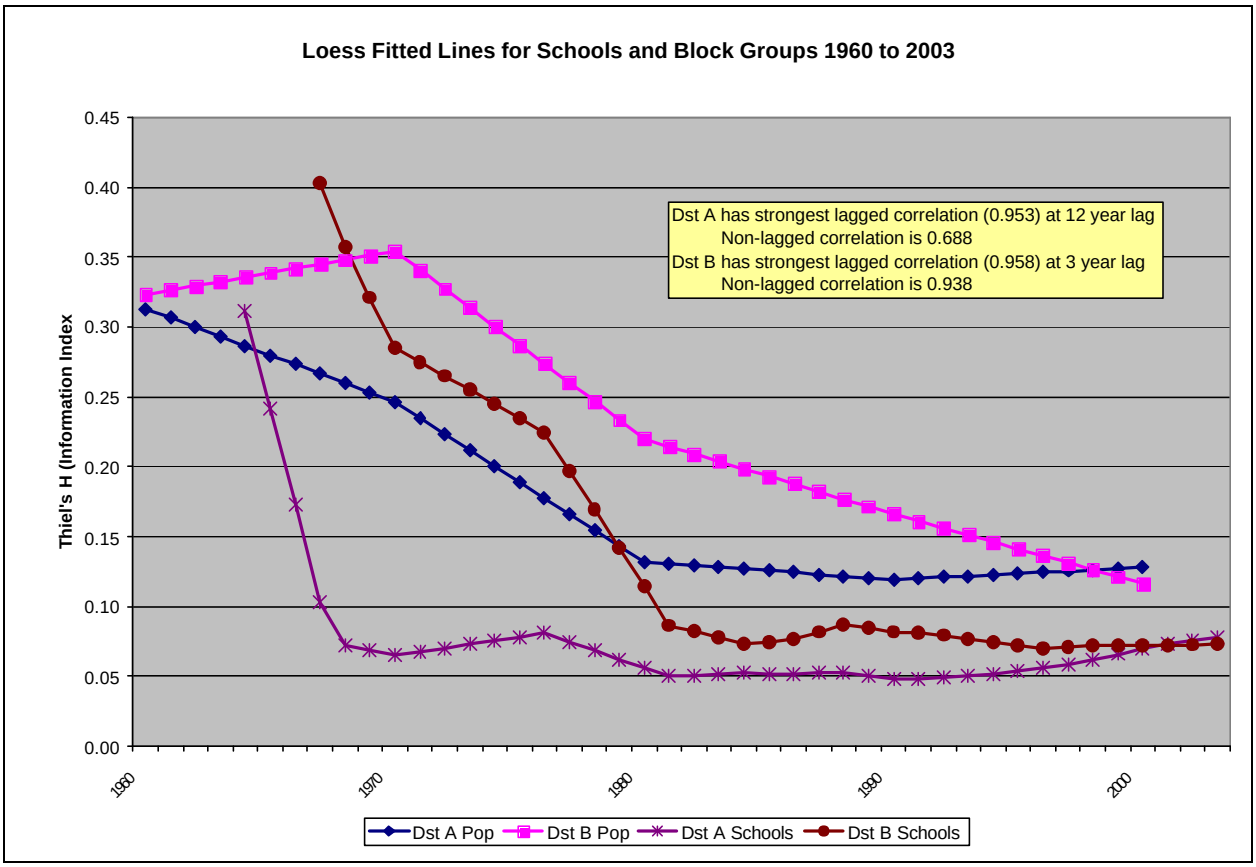

Thiel's H for Population and School Data for Dst A and Dst B from 1960 to 2003
Theil's H (Information Index)
0.4500
0.4000
0.3500
0.3000
0.2500
0.2000
0.1500
0.1000
0.0500
0.0000
1955
1960
1965
1970
1975
1980
1985
1990
1995
2000
2005
Years
Scholls Dst A
Schools Dst B
Pop of Dst A
Pop of Dst B

Fig. ##. Dot Density Maps Showing Population Changes in One District from 1960-2000




Loess Fitted Lines for Schools and Block Groups 1960 to 2003
Thiel's H (Information Index
0.45
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
1960
1970
1980
1990
2000
Dst A has strongest lagged correlation (0.953) at 12 year lag
Non-lagged correlation is 0.688
Dst B has strongest lagged correlation (0.958) at 3 year lag
Non-lagged correlation is 0.938
Dst A Pop
Dst B Pop
Dst A Schools
Dst B Schools

References

Douglas, D. M. (1997). The End of Busing? *Michigan Law Review, Vol 95,No 6, pp 1715-1737.*

Duncan, O. D. and Duncan, B. (1955). A Methodological Analysis of Segregation Indexes. *American Sociological Review* Vol 20, No. 2, pp 210-217

Kersten, K. A. (1995). *Good Intentions are Not Enough The Peril Posed by Minnesota's New Desegregation Plan.* Center of the American Experiment. Internet distributed document at: *http://ww.amexp.org/Publications/Archives/Kersten/kersten030195*.

Pearce, D. (1980). *Breaking Down Barriers: New Evidence on the Impact of Metropolitan School Desegregation on Housing Patterns*. Washington, DC: National Institute of Education NIE-G-78-0125.

Reardon, S. F., Yun, J. T. and Eitle, T. M. (2000). The Changing Structure of School Segregation: Measurement and Evidence of Multiracial Metropolitan-Area School Segregation, 1989-1995. *Demography,* Vol 37, No 3, pp 351-364