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Academic Achievement in American Cities: Comparison of Public Comprehensive, Public Magnet, Catholic, and Non-Religious Private High Schools

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Abstract

Problems with our public urban high schools are intensifying, and many see magnet schools and private schools as the answer. But are those schools really better at increasing the academic skills of students? Using the National Educational Longitudinal Survey, the author estimates the effect of attending a magnet school, Catholic school, or secular private school on the achievement of urban students in math, reading, science, and social studies; he compares these estimates to the achievement of students who attend comprehensive public high schools. He finds that magnet schools are more effective than regular schools at raising the proficiency of students in science, reading, and social studies; Catholic schools have a positive impact on math skills, while secular private schools do not offer any advantage, net of preexisting differences among students. Further analyses test the sensitivity of the results to assumptions about independence and selectivity; these show support for the magnet school advantages in reading and social studies, but raise doubts about the Catholic school effects in math and the magnet school effects in science.

Academic Achievement in American Cities: Comparison of Public Comprehensive, Public Magnet, Catholic, and Non-Religious Private High Schools

Parents and politicians alike are becoming increasingly concerned about the troubled state of public education in American cities. High failure and dropout rates, low scores on standardized tests, and the rapid spread of crime and drug abuse among students have compelled many to urge that school systems be radically restructured (Quality Education for Minorities Project, 1990; Dentzer and Wheelock, 1990). Cities have responded by establishing specialized public schools, such as magnet schools, which many see as a way of improving the quality of urban education (Metz, 1986). More recently, some officials have considered making private schools more accessible, usually through school "choice" programs, whereby public funds are used to subsidize private-school tuition for low-income students (Chubb and Moe, 1990).

Do magnet schools and private schools provide better opportunities and outcomes for students? In this study I compare achievement growth of students in magnet schools, Catholic schools, and secular private schools to that of students in public comprehensive schools, during the first two years of high school. I also consider conditions that may account for achievement differences among schools, such as a school's academic climate, the types of courses students take, and the bond students feel toward their school. I focus on students and schools in the central cities of metropolitan statistical areas, which include many of our most troubled school systems, and where most of our specialized public schools are located.

SCHOOLS, FAMILIES, AND COMMUNITIES IN CRISIS

Most high school students today attend what are known as public comprehensive schools. Established in the early twentieth century, comprehensive schools became preeminent in the 1950s and 1960s, as reflected in the influential writings of James B. Conant (1959, 1961, 1967). In Conant's view, comprehensive schools could promote unity and meet diverse needs at the same time: inclusion of students from all backgrounds fostered social integration, while the differentiation of school programs (academic, general, and vocational) was said to allow each student to develop to his or her fullest potential (see especially Conant, 1967).

Despite these ideals, it is clear that many comprehensive schools are failing to meet the needs of the contemporary urban population. Residential segregation and high concentrations of poverty have made racial and economic integration impossible in neighborhood schools (Wilson, 1987). Comprehensive high schools typically lack specific programs of study and offer little academic counseling; as a result, students often choose their courses haphazardly and see no connection between their schoolwork and their lives outside of the classroom (Powell, Farrar, and Cohen, 1985; Newmann, 1992). Students' lack of engagement with schoolwork is often accompanied by weak academic performance and discipline problems, resulting in a poor and sometimes unsafe climate for learning.

School and Community Decline in the Cities

The shortcomings of comprehensive schools are most salient in large cities, because the problems of urban education are compounded by the problems of urban families and communities. City neighborhoods have lost important institutions, such as churches, social clubs, and business firms, that formerly served as social and economic anchors (Wilson, 1987). Declining economic opportunities have resulted in fewer positive adult role models for urban youth, especially among minority teenagers (Anderson, 1990). In the vacuum caused by the decline of legitimate employment opportunities, illicit trade has flourished, particularly the drug trade (Anderson, 1990). The decline in stable family structures has been most severe in urban minority communities, with rates of teenage pregnancy and female-headed households at all-time highs. Deterioration in these social institutions over the past generation has imperiled educational efforts in American cities.

Coleman (1990) describes this process as the decline of social capital in urban communities (see also Coleman and Hoffer, 1987). Social capital consists of norms, obligations, and trust generated by relations among persons in a community. When such relations are flourishing, social capital can serve as a resource supporting the cognitive and social development of young people. For example, social capital helps students benefit from educational opportunities by clarifying norms and expectations for engaging in academic work, and by legitimating educational rewards and sanctions. Students who can draw on social capital in a community are likely to find more meaning in school and to view schooling as potentially beneficial over the long term (Coleman and Hoffer, 1987).

Social capital can be present even when economic capital is scarce, as depictions of urban slums from a generation ago suggest (Suttles, 1964). Today the picture is quite different, as evidenced by Anderson's (1990) urban ethnography and by statistics describing the breakdown of social relations cited above. The instability of social structure in contemporary urban communities undermines the development of social capital, and urban youth cannot draw on social capital in their families and neighborhoods to sustain their commitment to education.

Are Specialized Schools a Solution?

What kind of school, if any, can fill this void? Several writers claim that specialized schools, such as Catholic schools and public magnet schools, may help restore effective education to American cities. Organizational research from other spheres has shown that new forms of organization tend to proliferate in turbulent environments (e.g., Carroll and Huo, 1986), and the current expansion of specialized schooling in cities seems consistent with this process. Although specialized schools have important historical roots, they have become especially common in large urban sites in recent years (Metz, 1986; Moore and Davenport, 1988; Blank, 1989). One study reported that of public high schools in Boston, Chicago, New York, and Philadelphia in 1984–85, about 12 percent were academic, specialized schools (Moore and Davenport, 1988). Another study found that by 1987–88, eight of eighteen Boston public high schools were specialized (Dentzer and Wheelock, 1990). These figures constitute increases over the recent past. Anecdotal accounts further indicate that specialized schools are more often found in urban communities than elsewhere.

Specialized schools may provide access to social capital for students who cannot find it in their homes and neighborhoods. Hill, Foster, and Gendler (1990) showed that in contrast to public comprehensive schools, Catholic schools often have well-defined missions, or "themes," around which they are socially and academically organized. Coleman and Hoffer (1987) suggested that one more often finds "closure" in social relations among families whose children attend Catholic schools; that is, parents tend to know the parents of their children's friends, and parents tend to know their children's teachers. Greater sense of purpose and a more tightly bound community stimulate the development of social capital—i.e., norms, obligations, and trust in social relations—in support of students' academic progress.

Other authors indicate that specialized public schools may also be characterized by a strong sense of community and a unifying purpose. Wehlage and Smith (1992) studied programs for at-risk students in "schools-of choice" and "school-within-a-school" magnets. Effective programs promoted students' sense of membership in the school's community, and several were organized around a particular academic or vocational theme. At the Media Academy in Oakland, for example, academic work was oriented towards the production of school publications—electronic or print—and all students participated. According to Wehlage and Smith (1992, p. 97), "Within this socially supportive and academically focused setting, students who might be overlooked and neglected in conventional classrooms become willing to step forward to assert themselves and share their talents in ways that encourage further involvement and engagement."

Crain, Heebner, and Si's (1992) study of career magnet schools in New York City also gives reason to anticipate greater levels of social capital in specialized public schools. Reviewing the claims of proponents, the authors note "the school's 'theme'. . . creates an identity for the school which gives faculty a meaningful purpose in education, motivates them to hold students to higher standards, and helps the school develop an integrated and coherent educational philosophy" (p. 3). Even when magnet programs combine academic and career goals, as in New York's career magnets, they are believed to foster academic progress. According to proponents, students in career magnets see course material as more relevant and thus tend to take more classes, work harder, and learn more.

The more intensive academic climate typically found in private schools and public specialized schools may be a source of higher achievement. In such an atmosphere, students tend to pursue academic interests into more advanced levels within subjects. For example, in math, students may be more likely to enter algebra instead of general math, and more students may follow algebra with geometry and more advanced topics. High expectations for academic work are the norm even when the school has a career-oriented mission (Crain, Heebner, and Si, 1992). These expectations are translated into more academic coursework and, presumably, higher achievement.

Higher achievement may also result from students' greater sense of membership, or social bonding, in private and specialized schools (Wehlage et al., 1989; Hill, 1990). A sense of membership, reflecting the trust, norms, and obligations that constitute social capital, increases students' commitment to and engagement with school work, and is thus likely to promote achievement.

Are Specialized Schools More Effective?

Little research exists to support or disconfirm the claims of proponents of specialized public schools (Blank, 1989). How effective are magnet schools for students' academic success? Do they offer an environment that is socially integrated and academically focused? Do they expand educational opportunity by offering a higher quality of education to urban youth, or do they restrict opportunity by catering to a limited subsample of the population? Metz (1986) showed in case studies that some magnet schools do generate cohesive communities, in which students and teachers share a common purpose toward which they work together. Only one study has compared the achievement growth of students in magnet schools with that of similar students in comprehensive schools. Crain, Heebner, and Si (1992) reported that students with average reading scores who entered magnet schools by lottery tended to improve their reading achievement more than otherwise similar students who, because they were unsuccessful in the magnet-school lottery, attended comprehensive schools. The magnet-school "lottery winners" also earned more credit towards graduation and were less likely to drop out prior to high school.

More research has been conducted on the effects of Catholic schools, with some concluding that Catholic high schools produce higher achievement and a more equitable distribution of achievement than their public-school counterparts (Coleman and Hoffer, 1987; Lee and Bryk, 1988). Skepticism remains, however, as to whether the Catholic-school advantage is attributable to the schools themselves, or to differences in the student bodies of Catholic and public schools (Alexander and Pallas, 1985; Willms, 1985). Moreover, no study has considered whether the purported effects of Catholic schools hold up when those schools are located in troubled neighborhoods. Finally, Witte, Bailey, and Thorn's (1992) assessment of the Milwaukee private-school voucher program found that low-income students who attended non-religious private schools had no achievement advantage over a matched sample of low-income students in public schools.

In this paper I examine the achievement of students in public magnet schools, Catholic schools, and non-religious private schools in central cities. I compare these results to achievement obtained by similar students in public comprehensive schools. One limitation to the analysis is that it leaves unexamined the many differences among specialized public and private schools. In establishing the average impact of three types of specialized schools, one may miss effects that appear, for example, for some types of magnet schools but not others. Despite this limitation, the present study is a useful first step.

The analyses do not leave schools entirely as "black boxes." Rather, I explore three possible mechanisms that may contribute to achievement differences among schools. One is a school characteristic: the academic climate of the school, which, for the reasons explained, may provide more support for teaching and learning in specialized schools than in public comprehensive schools. The others are conditions that vary within schools, but which, on average, may favor students in specialized schools: academic coursetaking and students' social bonding to schools.

DATA AND METHODS

To explore the distribution of achievement in city schools, I used data from the National Educational Longitudinal Survey (NELS), which began by surveying over 24,000 students in eighth grade in 1988, and followed up with another survey in 1990, when most respondents were in the sophomore year of high school. Follow-up participation rates were over 90 percent among those selected; students who entered high schools attended by at least 10 students from the base-year sample were all selected for the follow-up, and students who entered high schools with fewer students from the base-year sample were subsampled for the follow-up. Dropouts were also followed up with certainty, resulting in a follow-up sample of over 18,000. For this analysis I eliminated the dropouts (under 5 percent of the unweighted sample), because information on their high schools was not available. Most of my analyses were restricted to around 4000 students who attended city high schools. I used data from student tests and questionnaires obtained in both survey waves. I also used data collected from students' parents in 1988, and data provided by high school administrators in 1990. Ingels et al. (1992) present more information about the NELS survey and data sets.

Although the students constitute a random sample of eighth graders who entered high school, the schools are not a random sample of high schools. They are the schools attended by a random sample of students, but that does not mean they fully reflect the national population of high schools. Nonetheless, if my models are properly specified, the lack of randomness at the school level does not bias the results. To the extent that all schools of a given type exert similar effects—an assumption of my models—then the school-level effects estimated here generalize to the population of students. To the extent this assumption is unwarranted, the analyses are weakened, not by the non-random sample of schools, but by the failure to incorporate variation within school types into the models.

Defining Urbanicity

The NELS data offer three ways of defining urbanicity, which are not entirely consistent with one another. First, school administrators were asked whether their schools were located in a city of more than 50,000 people, a smaller city, a suburb, or a rural area. I could have used this indicator to designate urban schools. Unfortunately, I found it to be inconsistent with a second, more detailed question which followed it in NELS. Administrators were asked whether their schools were located in medium sized, large, or very large cities, and within those categories in inner-city, residential, suburban, or other areas. Many respondents said their schools were located in cities of over 50,000 persons, but then categorized them as suburban in the more detailed item. This may not be an error—it could fit a suburb that is also a city of more than 50,000 residents—but it shows the ambiguity inherent in trying to distinguish between cities and suburbs using population size as a criterion. Another problem with these items is that over 20 percent of the schools that were classified as urban on the first item failed to respond to the second.

The third indicator involved classifications from the Quality Education Data (QED), which uses census definitions to identify the central city of a standard metropolitan area (SMA). According to the QED, central cities have at least 50,000 residents; at least 40 percent of resident workers are employed locally; and at least 75 jobs exist in the central city for every 100 residents who work. The QED also classifies areas as central cities if their population is at least 250,000 or if they contain 100,000 or more workers. In addition, the QED counts an area as a central city of an SMA if it contains 15,000 residents and is the largest city in an urbanized area and persons commute in rather than out for work. These procedures are described by the Federal Committee on Standard Metropolitan Statistical Areas (1981).

I relied mainly on the QED designation of central cities to select schools for my analyses. The QED designations were most likely to be applied in a consistent way on a national basis; the QED did not define large suburbs as urban, focusing instead on the largest city within a metropolis. Moreover, missing data was not a big problem; only 5 of the 1296 schools were unclassified in the QED. The only drawback to using the QED designations was that a few very small cities, which did not contain the type of urban environment I was looking for, were classified as central cities. Consequently, I excluded 29 schools located in a "small city or town with fewer than 50,000 people. . ." and 3 schools located in a "rural or farming community" as reported by school principals. In all, I selected 431 city high schools for my sample.

Defining Specialized Schools

A NELS composite variable identifies high schools as public, Catholic, other religious private, non-religious private, and private with religiosity not ascertained. For my analyses, I included the 57 Catholic schools containing 431 students who participated in the survey, and the 39 non-religious private schools with 546 surveyed students. However, I omitted other religious private schools and private schools whose religiosity was not ascertained, a loss of 19 schools and 158 students, because they were too few and too diverse for reliable estimates.

I divided public schools into comprehensive and magnet schools, and included the 213 comprehensive schools and their 2240 surveyed students in my analyses. I further divided magnet schools into stand-alone magnets (i.e., the entire school is a magnet school) and school-within-school magnets.[1] I made this distinction primarily because in school-within-school magnets, the data do not distinguish between students who are in the magnet program and students in the same school who are not involved in the magnet program. In most of my analyses I included the 48 stand-alone magnets attended by 323 NELS students, but not the 35 school-within-school magnets and their 251 surveyed students. I further excluded 21 public schools whose status—magnet or comprehensive—was unreported or which were neither comprehensive nor magnet, resulting in a loss of 151 students. In total, my sample for analyzing achievement differences among types of schools includes 356 of the 431 city schools, and 3540 of the 4100 city students who participated in both survey waves.

Achievement and Background Variables

Achievement was measured in grades eight and ten with multiple-choice tests of mathematics, science, reading, and social studies, administered as part of the NELS. The tests shared common items, but were not identical in the two years: students who performed better in grade eight took harder versions in grade ten, and students who performed poorly in grade eight took easier versions in grade ten. This procedure helped remove ceiling and floor effects from the tests, but it meant that raw scores could not be used for the analyses; instead, scores were scaled with item response theory (IRT) methods (see Ingels et al., 1992). The eighth- and tenth-grade scores could not be compared directly, because their scales were computed separately. However, the eighth-grade scores were able to serve as statistical controls for estimating differences in tenth-grade achievement. My analyses controlled for all four eighth-grade tests, because previous research has shown that taking account of multiple test scores helps reduce bias resulting from unmeasured preexisting differences among students (Jencks, 1985; Gamoran and Mare, 1989).

Student family background was indicated by data from student and parent questionnaires. Sex and race/ethnicity (African-American and Latina/o) were reported by students. Socioeconomic status (SES) is a composite indicator based on standardized values for mother's and father's occupation, mother's and father's education, and family income. The composite was constructed as the mean of non-missing items from parent questionnaires, but if no parent data were available, student data were used. Family structure (two-parent, single-parent) was identified from student questionnaires; students who did not report such information or who lived in other arrangements (e.g., with grandparents) were included and indicated with a dummy variable. Means and standard deviations for all variables are listed in the appendix.

School Composition Variables

Because students were sampled in eighth grade and then followed to high school, the compositions of high schools cannot be accurately assessed by aggregating student data. Hence, indicators of school composition come from school data: percent African-American, percent Latina/Latino, percent in single-parent families, and percent receiving free or reduced-price lunches were reported by school administrators. Where school data were missing, I estimated these variables with regressions based on the student-level counterparts. (I used student SES to estimate percent free lunch.)

School-level and Student-level Mechanisms

To assess possible sources of achievement differences, I constructed scales for school academic climate, student social bonding to school, and student coursetaking. The academic climate scale derives from the school principal's responses to questions about whether students and teachers emphasize learning, achievement, and academic classes, whether morale is high, whether teachers have negative attitudes or difficulty motivating students, and whether there is conflict between teachers and administrators. This scale has an alpha-reliability of .76 (at the school level). The student social bonding scale is constructed from student perceptions of whether teachers are interested in and get along with students, whether there is school spirit, whether discipline is fair, whether students receive praise and attention for hard work, whether students feel "put down" by other students or teachers, and whether students feel safe at school. The alpha-reliability for this scale is .72.

Coursetaking is indicated by the number of academic courses taken in grades nine and ten. Algebra 1 and 2, geometry, trigonometry, pre-calculus, and calculus are counted as academic math courses. Biology, chemistry, and physics are counted as academic science courses. Gamoran (1987) showed that academic courses are more closely linked to achievement than simply the number of courses in a subject. For regression analyses, cases that were missing data for academic climate, bonding, and coursetaking were assigned the urban subsample means (school means in the case of climate) and were indicated by dummy variables.

RESULTS

How prevalent are specialized schools? The data do not answer this question directly, because high schools were not the sampling frame. However, the data do show how common it is for students to attend specialized schools.[2] As indicated in Table 1, whereas 78.8 percent of tenth-graders nationwide attended public comprehensive high schools in 1990, the comparable figure in central cities was only 59.5 percent. Compared to the national average, city students were almost three times more likely to attend public magnet schools, whether stand-alone or school-within-school. City students also attended Catholic and non-Catholic private schools in much greater proportions than the national norm. By and large, opportunities to attend specialized schools were substantially greater for city students.

TABLE 1

Percentages of Students Attending Different Types of High Schools: Nationwide and Central Cities

	Public				Private				
	Compre-hensive	Stand-alone Magnet	School-within-school Magnet[a]	Other[b]	Catholic	Non-Catholic Religious	Non-Religious	Relig. Not Ascertained	Total
Nationwide	78.8	3.8	2.8	5.8	5.5	1.9	1.4	0.0	100%
Central cities	59.5	9.9	7.8	6.2	10.6	3.1	2.8	0.1	100%

Source: National Educational Longitudinal Survey (NELS).

Note: Observations are weighted using NELS design weights for 10th graders in 1990. Sample includes "freshening" to represent the population of 10th graders (see Ingels et al., 1992).

[a]Percentage in school-within-school magnets includes all students within these schools. The data do not distinguish students who are in the magnet programs from those who are in the same schools but not in the magnet programs.

[b] Other public schools include schools-of-choice with non-specialized curricula, technical schools that were not termed magnet schools, Indian reservation schools, public schools marked "other" and not otherwise defined, and public schools missing data on further description.

Descriptive Results

Do different types of students attend different types of city schools? From this point, I concentrate on the four types of schools for which data are sufficient in central cities: public comprehensive schools, public stand-alone magnet schools, Catholic schools, and non-religious private schools. Table 2 depicts the results of a multinomial logit regression in which school type is predicted by sex, race/ethnicity, and SES. The coefficients in Table 2 indicate the net associations of these background characteristics with attending each type of specialized school, in comparison to public comprehensive schools. This analysis shows that the relative odds of low-income and minority students' attending magnet schools are greater than those of higher income and white students, respectively, but for both types of private schools, the relative odds of attending are lower for low-income and minority students than for their economically advantaged and non-minority counterparts. Thus, when central-city residents opt for specialized schools, white students and those from wealthy backgrounds tend to enroll in private schools, while minority and disadvantaged students find their way to public magnet schools.

Are specialized schools more supportive? Do they offer better academic climates and promote more social bonding and academic coursetaking among students? Table 3 shows, first, that principals in stand-alone magnet schools attended by NELS students reported slightly more positive academic climates, on average, than principals in comprehensive schools. This may be especially noteworthy in that magnet schools contain greater concentrations of disadvantaged students; apparently, expectations in magnet schools are raised at least to the level found in comprehensive schools serving less disadvantaged populations. At the same time, the academic climates of Catholic and non-religious private schools were reported to be more intensive than those of public comprehensive schools. Similarly, students in comprehensive and magnet schools reported comparable levels of social bonding to schools, but students in both types of private schools reported greater attachment.

TABLE 2

Propensities of Students of Varying Gender, Race/Ethnicity, and Socioeconomic Status to Attend Different Types of City High Schools

	School Type (compared to public comprehensive)		
Student Characteristic	Public Magnet	Catholic	Non-Religious Private
Female	-.15	.10	-.24
	(.11)	(.10)	(.20)
African-American	.51**	-.58**	-2.04*
	(.13)	(.15)	(.78)
Latina/Latino	.71**	-.22	-.65
	(.15)	(.17)	(.49)
Socioeconomic status	-.22*	.38**	2.11**
	(.08)	(.07)	(.18)
Constant	-2.22**	-1.48**	-3.99**
	(.10)	(.08)	(.22)

Source: Author’s calculations based on the National Educational Longitudinal Survey.

Notes: Coefficients are from multinomial logit regressions. The reference category is public comprehensive schools. Magnet schools include only stand-alone magnets; school-within-school magnets are excluded because the data do not permit one to distinguish students who are in the magnet programs from students in the same schools but who are not in the magnet programs. Standard errors are in parentheses.

*Coefficient is twice its standard error.
**Coefficient is three times its standard error.

TABLE 3

Academic Climate, Social Bonding, and Academic Coursetaking in Comprehensive, Magnet, Catholic, and Non-Religious Private Schools

	Public Comprehensive	Public Magnet[a]	Catholic	Non-Religious Private
Academic climate[b]	3.90	4.01	4.27	4.58
Social bonding[c]	2.87	2.91	3.05	3.09
Academic coursetaking[d]				
Mathematics	1.49	1.65	1.97	2.35
Science	1.06	1.25	1.01	1.54
English	1.72	1.71	1.84	1.87
Social studies	1.53	1.33	1.54	1.66

[a]Magnet schools include only stand-alone magnets; school-within-school magnets are excluded because the data do not permit one to distinguish students who are in the magnet programs from students in the same schools but who are not in the magnet programs.
[b]Reported by school principals; scale of 1–5 with 5 as high (see text for description). Calculations based on unweighted school-level data. F-test for overall differences among school types is significant at $p < .01$.
[c]Reported by students; scale of 1–5 with 5 as high (see text for description). Calculations based on weighted student-level data including "freshening" to represent the population of 10th-grade students. F-test for overall differences among school types is significant at $p < .01$.
[d]Reported by students. Scales are number of courses during grades 9 and 10. Calculations based on weighted student-level data including "freshening" to represent the population of 10th-grade students. F-tests for overall differences among school types are all significant at $p < .01$.

What of coursetaking? Compared to students in comprehensive schools, students in stand-alone magnets averaged slightly more coursework in math and science, but the same amount in English and less in social studies. However, these differences are small compared to the advantages of both types of private schools in math coursework, and of non-religious private schools in science. Overall, differences among school types tended to be greater in math and science than in English and social studies.

Analytic Results

The main analyses consist of OLS regression equations that estimate achievement differences among the four types of schools. In Table 4, I first present the raw differences, and then I adjust these figures to account for a variety of differences among students and schools. These adjustments reveal the sources of the raw differences that appear at first.

The first panel of Table 4 presents the average achievement of students in public magnet, Catholic, and non-religious private schools, expressed as the difference compared to the achievement of students in public comprehensive schools. Despite their economic disadvantages, students in magnet schools scored no lower in math and science, and significantly higher in English and social studies, than did students in comprehensive schools. Students in Catholic and non-religious private schools scored higher on all four tests, consistent with their sociodemographic advantages. When the raw scores are adjusted for family circumstances and achievement prior to high school (panel 2), three-quarters or more of the private-school advantages fade away, but this does not occur for magnet schools.

The results in the third panel are adjusted for "contextual effects": percent African-American, percent Latina/o, percent receiving free lunch, and percent living in single-parent families. These coefficients may be taken as the "effects" of the different types of schools, insofar as the adjustments have adequately controlled for preexisting differences among students attending different types of

TABLE 4
Grade 10 Achievement in Magnet, Catholic, and Non-Religious Private Schools in Central Cities, Expressed as the Difference Compared to Achievement in Public Comprehensive Schools

	Math	Science	Reading	Social Studies
(1) Raw differences:				
Public magnet	.84	.34	1.62**	1.01**
	(.70)	(.30)	(.45)	(.32)
Catholic	3.52**	1.28**	2.75**	1.79**
	(.62)	(.26)	(.40)	(.28)
Non-religious private	11.20**	4.82**	5.66**	4.10**
	(1.18)	(.50)	(.75)	(.54)
(2) Differences adjusted for student characteristics:				
Public magnet	.71	.44*	1.23**	.89**
	(.35)	(.17)	(.26)	(.20)
Catholic	.95**	.11	.44*	.28
	(.31)	(.15)	(.23)	(.17)
Non-religious private	.04	.35	-.72	-.56
	(.60)	(.30)	(.44)	(.34)
(3) Differences adjusted for school context:				
Public magnet	.57	.48*	1.02**	.82**
	(.36)	(.18)	(.27)	(.20)
Catholic	.67*	.07	.19	.19
	(.33)	(.16)	(.24)	(.18)
Non-religious private	.03	.31	-.78	-.67
	(.61)	(.30)	(.45)	(.34)
(4) Differences adjusted for school academic climate:				
Public magnet	.59	.47*	.95**	.77**
	(.37)	(.18)	(.27)	(.21)
Catholic	.60	.16	.11	.20
	(.33)	(.17)	(.25)	(.19)
Non-religious private	-.04	.41	-.92	-.70*
	(.62)	(.31)	(.46)	(.35)
(5) Differences adjusted for bonding and coursetaking:				
Public magnet	.42	.41*	.84*	.80**
	(.37)	(.18)	(.27)	(.21)
Catholic	-.05	.05	-.09	.06
	(.34)	(.17)	(.25)	(.19)
Non-religious private	-.84	.17	-1.17*	-.85*
	(.61)	(.31)	(.45)	(.35)

Source: Author's calculations based on the National Educational Longitudinal Survey and survey of school principals.
Notes: Estimates are OLS regression coefficients for the difference in achievement compared to that of students in public comprehensive schools. Standard errors are in parentheses. Observations are weighted with NELS design weights, and unweighted number of students is 3020. Adjustments in panels (2) - (5) are (2) Student characteristics: sex, race/ethnicity, family composition, grade 8 achievement; (3) School context: racial/ethnic composition, percent free/reduced lunch, percent single-parent; (4) School academic climate: scale (see text); (5) Student social bonding and coursetaking: see text for scales.
*Coefficient is twice its standard error.
**Coefficient is three times its standard error.

schools, and for differences in the contexts in which the schools are located. The coefficients are small compared to the original raw differences, but four are at least twice their standard errors: Catholic schools exhibit higher achievement in math, as do magnet schools in science, reading, and social studies.

Are the differences between school types meaningful? One way of answering is to compare them to the difference between the average student in the NELS who was attending school in grade 10, to the achievement of the typical tenth-grade dropout. This may be thought of as a baseline school effect, since it represents the effects of going to school versus not going to school (controlling for other differences among students).[3] In math, dropouts scored more than three points lower than similar students who remained in school, and the Catholic-school effect of .67 seems small by comparison, at less than one quarter of the baseline school effect. However, the magnet-school effect of .48 in science is almost as great as the dropouts' loss, which I estimated at .53. In reading, dropouts averaged about one point below those in school, comparable to the magnet-school effect of 1.02 points. Finally, the magnet-school effect in social studies, at .82, was over half the dropouts' loss of just under one and a half points. Based on these comparisons, the estimated positive effects of magnet schools need to be taken seriously.

Do achievement advantages of Catholic and magnet schools result from varied academic climates? This appears true to a slight extent for the Catholic-school advantage in math: the coefficient declines from .67 in Panel 3 to .60 in Panel 4. Adjusting for academic climate matters less for the magnet-school coefficients, which is not surprising in light of our earlier finding that magnet schools have only a slightly more positive academic climate than comprehensive schools on average. The last panel of Table 4 shows that adjusting for student social bonding and coursetaking removes any remaining Catholic-school advantage in math, but does little to account for magnet-school effects on achievement in science, reading, and social studies.

Sensitivity of Results to Model Specifications

The OLS results reported thus far may be questioned on at least two points. First, because students are clustered within schools, their responses are not truly independent from one another. This can lead one to overestimate the precision of school-level effects; that is, standard errors for the effects of school type may be too low (e.g., Goldberger and Cain, 1982). Second, although I used an extensive set of controls for preexisting differences among students, there may be unmeasured aspects of students that are correlated with both selection into specialized schools and with achievement (e.g., Noell, 1982). This could inflate the estimates of school-type effects.

Multilevel analyses. To address the clustering problem, I reanalyzed the data using a multilevel model, which partitions error variance into within-school and between-school components. This procedure removes any distortion of the between-school error variance caused by non-independence of responses within schools. The multilevel analysis essentially estimates separate equations for within-school and between-school effects. In this case, the within-school equation consists of student achievement predicted by the student-level variables used in panels 2 and 3 of Table 4 (eighth-grade achievement, sex, race/ethnicity, SES, and family structure). The intercept from this equation is the mean achievement for each school, adjusted for the student-level conditions. These means serve as the dependent variable for the school-level equation, which predicts adjusted school achievement as a function of school type, controlling for the school context variables (racial/ethnic composition, percent free/reduced lunch, and percent single-parent). I used the HLM program to carry out the multilevel analyses (Bryk et al., 1988).

There are two problems with using HLM in this case. Most important, the number of cases within schools is small (averaging fewer than ten students per school), so estimates of school means may be unstable. For this reason I did not use HLM for the main analyses. A second problem is that HLM does not allow weighting at the student-level, and NELS offers no school-level weights for the high schools. If the criteria associated with the NELS stratified sampling (private schools, Asian students, and number of NELS students in a high school) do not interact with the effects I estimated, the lack of weighting will not make a difference. For comparative purposes, however, I present the results of an unweighted OLS analysis alongside the HLM results.

Table 5 shows that the magnet-school effects in reading and social studies are supported in the multilevel model, but the Catholic-school effect in math and the magnet-school effect in science are not sustained. The most important aspect of this comparison is the relation between the coefficients and their standard errors. The HLM analysis confirms that the standard errors were underestimated by OLS, but the magnet-school coefficients for reading and social studies are still more than twice their standard errors as given by HLM. Since the HLM math and science coefficients appear to have been affected by the lack of weighting, it is worth comparing the HLM standard errors with the regression coefficients produced in the original, weighted OLS analysis. Even in that comparison, the Catholic-school effects in math and the magnet-school effects in science are less than twice their standard errors.

Correction for unmeasured selection. Because students were not randomly assigned to schools, there is always a danger that what appear to be effects of school types actually reflect differences among students. In this study, the main strategy for coping with such selection bias has been to include a rich set of controls for preexisting differences among students. These include background data from parents as well as from students, and student test scores as well as questionnaire responses. Presumably, most variables that were not explicitly measured (e.g., motivation) would be reflected in achievement prior to high school, so their effects would be eliminated by the test-score controls. The tests are not perfectly reliable, but using multiple tests instead of just the eighth-grade version of the dependent variable helps compensate for test unreliability (Jencks, 1985). Gamoran and Mare (1989) found that a similar set of controls (but

TABLE 5

HLM Analysis of Effects of Specialized Schools, with Comparison to Unweighted OLS Results

Subject	School Type	OLS Estimates[a]		HLM Estimates[b]	
Math	Public magnet	.05	(.40)	.16	(.53)
	Catholic	.32	(.34)	.34	(.47)
	Non-relig. private	.05	(.36)	-.08	(.52)
Science	Public magnet	.29	(.20)	.36	(.27)
	Catholic	-.30	(.17)	-.18	(.24)
	Non-relig. private	.48*	(.18)	.39	(.26)
Reading	Public magnet	.66*	(.30)	.84*	(.38)
	Catholic	-.09	(.26)	.12	(.34)
	Non-relig. private	.07	(.27)	-.00	(.37)
Soc. studies	Public magnet	.69**	(.23)	.76*	(.31)
	Catholic	-.18	(.19)	-.11	(.28)
	Non-relig. private	.03	(.21)	-.04	(.31)

Source: Author's calculations based on the National Educational Longitudinal Survey.

Note: Standard deviations are in parentheses.

[a]Unweighted version of OLS analyses in Table 4, panel 3.
[b]Estimates from unweighted HLM analysis using the same data as that used in Table 4, panel 3.

*Coefficient is twice its standard error.
**Coefficient is three times its standard error.

without information from parents) largely eliminated selection effects from the relation between high school tracking and achievement.

Still, one can never be sure that selectivity has been fully addressed by the statistical controls. To consider this problem further, I estimated a model of the selection process, and incorporated the expected errors from the selection model into the analysis of school-type effects on achievement. To the extent that the selection model is adequate, this procedure removes bias due to unmeasured selection factors from the estimates of school-type effects.

This procedure requires knowledge about selection into specialized schools. Ideally, one should predict enrollment in the different types of schools on the basis of variables which differ at least in part from those used in the outcome equations. I estimated selection into the four types of schools using the individual-level predictors from the outcome equations (eighth-grade achievement, sex, race/ethnicity, SES, and family composition), plus a number of items drawn from parent questionnaires that tap conditions that may be associated with selecting specialized schools, but not with higher achievement (aside from that which may occur through attendance at specialized schools). These included region of the country, whether the parent respondent was Catholic, and whether the student had attended nursery school, day care, and/or Head Start programs. Previous research has shown little or no direct effects on high school achievement of these variables (Gamoran, 1987; Noell, 1982). I also took into account the extent to which students said they discussed their high school plans with parents, teachers, counselors, and/or other adults when they were in eighth grade. Again, previous work indicates little direct impact on test scores for these variables (Berends, 1992), and it is reasonable to assume that any associations with achievement may occur through their influence on which school a student attends.

A multinomial logit analysis with these variables predicted the types of schools attended by NELS students reasonably well, in the sense that for over two-thirds of the students, their highest predicted probability was for the type of school they actually attended. However, this figure reflects in part the fact that a large majority of students in the sample attended comprehensive schools, and most of these students were accurately predicted to attend this type of school. The adequacy of the model mainly rests on a logical argument that the enrollment predictors are appropriate, and that decisions about excluding some predictors from the outcome equations are reasonable.

Based on the multinomial logit equations, I computed each students' probability of attending each type of school. I transformed these probabilities into corrections for selectivity by relating them to the standard normal density function and the cumulative distribution function.[4] Then, I included the selectivity corrections along with the dummy variables for school type into the OLS analysis of the effects of school type on achievement. In the results, the coefficients for the selectivity corrections represent the covariance between unmeasured predictors of school type and achievement outcomes. This two-step procedure yields consistent regression coefficients, but the standard errors are biased. Hence, I report only the coefficients for the effects of school types, which are the substantive focus for this alternative specification.

In Table 6, the original OLS results are listed alongside the results from a similar model with selection bias taken into account, and the coefficients for selectivity corrections are presented next to the corresponding school-type effects. The results suggest that the effects of Catholic schools in math, and of magnet schools in social studies, were not inflated by selection bias. On the contrary, these coefficients appear larger in the selection-bias model. In addition, the coefficients for magnet schools in math and for Catholic schools in social studies are noticeably larger than the OLS estimates. The selectivity corrections associated with these coefficients are negative, suggesting that unmeasured aspects of selection into magnet schools and Catholic schools are negatively correlated with math and social studies achievement.

TABLE 6

Estimates of School-Type Effects with Corrections for Selection Bias

Subject	School Type	OLS Uncorrected[a]	Corrected for Unmeasured Selection Factors[b]	
Math	Public magnet	.57	1.40	
	Selectivity correction			*-.59*
	Catholic	.67	1.06	
	Selectivity correction			*-.38*
	Non-religious private	.03	-1.02	
	Selectivity correction			*.75*
Science	Public magnet	.48	.05	
	Selectivity correction			*.31*
	Catholic	.07	-.22	
	Selectivity correction			*.28*
	Non-religious private	.31	.04	
	Selectivity correction			*.20*
Reading	Public magnet	1.02	.64	
	Selectivity correction			*.27*
	Catholic	.19	-.02	
	Selectivity correction			*.20*
	Non-religious private	-.78	-.75	
	Selectivity correction			*-.03*
Soc. studies	Public magnet	.82	1.17	
	Selectivity correction			*-.25*
	Catholic	.19	.72	
	Selectivity correction			*-.50*
	Non-religious private	-.67	-2.23	
	Selectivity correction			*1.13*

Source: Author's calculations based on the National Educational Longitudinal Survey.
[a]From Table 4, panel 3.
[b]Corrected by controlling for association of unmeasured determinants of school type with achievement outcomes.

In reading, the selectivity corrections for magnet and Catholic schools are positive, and the magnet-school effect is smaller than it was in the OLS results, though it still appears important on substantive grounds (i.e., it is still about half the size of the gap between students in school and dropouts). By contrast, magnet schools appear to have no impact on science achievement, once unmeasured selectivity has been taken into account. Finally, the selectivity corrections for non-religious private schools are generally positive (about zero in reading), indicating that unmeasured selection factors leading to secular private-school attendance are positively associated with achievement, and the effects of these schools adjusted for selection bias range from close to zero in science to substantially negative in social studies.

DISCUSSION

The NELS data indicate that, as expected, attending specialized schools is more common among city students than among students in the nation as a whole. This pattern probably reflects the great diversity among city students, as well as the current turmoil in urban communities which helps stimulate new ways of organizing schooling. Within central cities, among students who attend specialized schools, minority and disadvantaged students are more likely to attend magnet schools and less likely to attend private schools, while non-minority and well-off students exhibit the opposite pattern, but most students of all types attend public comprehensive schools.

Despite the demographic differences, academic climates reported by principals and social attachment reported by students were similar in magnet and comprehensive schools. Coursetaking rates were similar in English, slightly higher in magnet schools in math and science, and slightly lower in magnet schools in social studies. Both types of private schools revealed more intensive academic climates and more coursetaking in math. Science coursetaking was also higher in non-religious private schools than in public comprehensive schools. Raw differences in achievement favored the specialized schools, but adjusting for composition and context mostly eliminated the large gaps. OLS regression results showed evidence of "value-added" effects of Catholic schools in math and of magnet schools in science, reading, and social studies, compared to comprehensive schools. Although the Catholic-school effect in math could be attributed to differences in academic climate, coursetaking, and students' social attachment to school, this was not the case for any of the magnet-school effects. The OLS magnet-school effects in reading and social studies held up when assumptions of independence and uncorrelated errors were relaxed (although the size of the coefficient was smaller in reading). However, the Catholic-school effect in math was unsupported in the HLM model, and the magnet-school effects in science were challenged by both the HLM analysis and the selection-bias model.

The results of the study suggest that current theories about specialized schools may suffice to explain how private schools work, but they come up short for explaining the functioning of public magnet schools. Mechanisms hypothesized to account for effects of specialized schools—academic climate, social bonding to school, and coursetaking—did little to explain the magnet-school effects, even though they did account for Catholic-school effects in math. These results do not disconfirm the notion that magnet schools are a source of social capital that promotes success in schooling, but they show that the theory of social capital cannot be tested without more direct measures. In addition, measures of attachment to particular programs or teachers, instead of a general measure of school bonding, might be more revealing for magnet schools. Yet another possibility is that magnet schools have greater resources than comprehensive schools. Whereas early studies showed that average resources made little difference for variation among students in achievement, if resources are allocated at higher levels and used effectively in magnet schools, this may be a factor in their observed achievement advantages.

Through alternative model specifications, I considered the possibility that school-type effects were overstated in OLS analyses. For other reasons, however, all the models may have underestimated the effects of magnet schools. If students enter magnet schools who would otherwise drop out, as observed by Crain, Heebner, and Si (1992) in New York City, then the actual effects of magnet schools may be greater than those reported in the regressions, as would-be dropouts depress test scores in magnet schools.

Another limitation of the study is that it fails to address diversity within the category of magnet schools. If the average impact of magnet schools is modest, this probably means some have substantial effects while others have zero or even opposite effects. It is difficult to test this possibility with national data, because there are too few schools in the sample of any given type (e.g., math/science schools, fine arts schools, etc.) to subdivide the magnet schools. Rather, the national results should be taken as provocative (and encouraging to supporters of magnet schools), and should stimulate studies of particular types of magnet-school initiatives.

One of the most consistent findings of the study was the absence of any net achievement benefits to those who attended non-religious private schools. Despite substantial advantages in raw scores, analyses using OLS, HLM, and selection-bias methods all showed no effects or even negative effects after controlling for preexisting differences among students and school contexts. This finding is consistent with Witte, Bailey, and Thorn's (1992) results for the Milwaukee private-school choice experiment. As with the magnet-school category, however, it is important to remember that non-religious private schools constitute a diverse lot, and the absence of effects on average may conceal meaningful effects in some schools.

If these results stand up to further scrutiny, what implications for policy do they hold? They are not favorable for promoters of private-school choice in cities. The results showed no advantage of secular private schools, and a Catholic-school advantage only in math at best. If public schools could take on a more focused academic climate and promote more coursetaking in math, this difference, too, would disappear.

The results are more encouraging for advocates of specialized public schools and public-school choice programs. Magnet schools are more likely to serve disadvantaged students than comprehensive schools, yet they rate at least as well in academic climate, social attachment, and coursetaking. For the average student, magnet schools appear to produce higher achievement, at least in reading and social studies. Despite this encouragement, however, the results reported here are too preliminary for conclusive policy recommendations. The national data need to be monitored for a longer period, and more research is required on particular programs, so that policies can address specific types of magnet schools instead of describing the average of this diverse lot.

APPENDIX

Means and Standard Deviations of Variables in the Analysis: NELS 1988 and 1990

Variable	Mean	Standard Deviation
Achievement and background variables		
Math IRT score, 1990	37.83	12.14
Science IRT score, 1990	14.07	5.13
Reading IRT score, 1990	22.16	7.74
Social studies IRT score, 1990	19.65	5.56
Math IRT score, 1988	23.36	8.73
Science IRT score, 1988	13.82	4.46
Reading IRT score, 1988	13.39	4.70
Social studies IRT score, 1988	19.75	5.19
Female	.52	.50
African-American	.19	.39
Latina/Latino	.14	.35
Socioeconomic status (SES)	-.01	.78
Single-parent family	.17	.37
Other/missing family structure	.23	.42
School types		
Public comprehensive	.70	.47
Public stand-alone magnet	.11	.32
Catholic	.15	.36
Non-religious private	.04	.19
School context variables		
Percent African-American	22.33	28.49
Percent Latina/Latino	13.25	21.12
Percent free/reduced-price lunch	19.27	19.95
Percent in single-parent family	30.43	17.35
Mechanisms		
School academic climate	4.02	.45
Student social bonding to school	2.92	.36
Academic math courses taken	1.67	1.03
Academic science courses taken	1.10	.63
Academic English courses taken	1.78	.43
Academic social studies courses taken	1.49	.89
Missing climate data	.14	.35
Missing bonding data	.00	.05
Missing math courses data	.02	.14
Missing science courses data	.02	.14
Missing English courses data	.02	.12

Missing social studies courses data	.01	.11

Note: Observations are weighted using NELS design weights for students who participated in the base–year and first follow-up surveys. Unweighted n = 3020 students.

Endnotes

[1]School-within-school magnets were identified by affirmative responses from principals to two items: F1C4B ["Public magnet school (including schools with magnet programs, schools within a school)"] and F1C73Q3 ["Currently using schools-within-a-school with their own administrative staffs such as alternative or magnet school programs."]

[2]These figures include students who were added to the sample in 1990 to make it represent the population of tenth graders. (This procedure is known as sample "freshening.")

[3]To make this comparison, I examined all NELS students, not just those in cities, because dropouts obviously lacked data on the urbanicity of their high schools. I conducted a regression analysis of the effects of dropping out, controlling for eighth-grade achievement, sex, race/ethnicity, SES, and family structure. This analysis yielded the following estimates of losses due to dropping out:

SUBJECT	ACHIEVEMENT LOSS DUE TO DROPPING OUT
Mathematics	3.11
Science	0.53
Reading	1.02
Social studies	1.49

[4]I derived the selectivity corrections by (1) taking each student's estimated probability of attending each type of school, (2) converting the probabilities to normal probability scores, (3) transforming the normalized scores to areas under the normal probability density function [if z is the normal probability score, the formula is (1/2pi)(exp(-(z^2/2))], and (4) dividing these quantities by the corresponding probabilities (Maddala, 1983, chapter 9). Before entering these correction factors into the analyses of achievement outcomes, I multiplied them by the corresponding school-type dummies, so that each student would have a non-zero correction factor only for the type of school he or she actually attended.

References

Alexander, K. L., and Pallas, A. 1985. "School Sector and Cognitive Performance: When Is a Little a Little?" Sociology of Education, 58, 115–27.

Anderson, E. 1990. Streetwise. Chicago: University of Chicago Press.

Berends, M. 1992. Effects on School Orientations and Achievement in the Transition from Middle to High School. Unpublished Ph.D. dissertation, University of Wisconsin–Madison.

Blank, R. 1989. Educational Effects of Magnet High Schools. Madison, Wis.: National Center on Effective Secondary Schools.

Bryk, A. S., Raudenbush, S. W., Seltzer, M., and Congdon, R. T. 1988. An Introduction to HLM: Computer Program and User's Guide. Version 2.2. Chicago: Department of Education, University of Chicago.

Carroll, G. R., and Huo, Y. P. 1986. "Organizational Task Environments in Ecological Perspective: Findings from the Local Newspaper Industry." American Journal of Sociology, 91, 838–73.

Chubb, J. E., and Moe, T. M. 1990. Politics, Markets, and America's Schools. Washington, D.C.: Brookings.

Coleman, J. 1990. Foundations of Social Theory. Cambridge, Mass.: Harvard University Press.

Coleman, J. S., and Hoffer, T. 1987. Public and Private High Schools: The Impact of Communities. New York: Basic Books.

Conant, J. B. 1959. The American High School Today. New York: McGraw-Hill.

Conant, J. B. 1961. Slums and Suburbs. New York: McGraw-Hill.

Conant, J. B. 1967. The Comprehensive High School. New York: McGraw-Hill.

Crain, R. L., Heebner, A. L., and Si, Y-P. 1992. The Effectiveness of New York City's Career Magnet Schools: An Evaluation of Ninth-Grade Performance Using an Experimental Design. Berkeley, Calif.: National Center for Research in Vocational Education.

Dentzer, E., and Wheelock, A. 1990. Locked In/Locked Out: Tracking and Placement Practices in Boston Public Schools. Boston: Massachusetts Advocacy Center.

Federal Committee on Standard Metropolitan Statistical Areas. 1981. The Metropolitan Statistical Area Classification. Washington, D.C.: Office of Information and Regulatory Affairs, Office of Management and Budget.

Gamoran, A. 1987. "The Stratification of High School Learning Opportunities." Sociology of Education, 60, 135–55.

Gamoran, A., and Mare, R. D. 1989. "Secondary School Stratification and Educational Inequality: Compensation, Reinforcement, or Neutrality?" American Journal of Sociology, 94, 1146–83.

Goldberger, A. S., and Cain, G. G. 1982. "The Causal Analysis of Cognitive Outcomes in the Coleman, Hoffer, and Kilgore Report." Sociology of Education, 55, 103–22.

Hill, P., Foster, G. E., and Gendler, T. 1990. High Schools with Character. Santa Monica: RAND.

Ingels, S. J., Scott, L. A., Lindmark, J. T., Frankel, M. R., and Myers, S. L. 1992. National Educational Longitudinal Study of 1988 First Follow-Up: Student Component Data File User's Manual. Washington, D.C.: National Center for Education Statistics.

Jencks, Christopher L. 1985. "How Much Do High School Students Learn?" Sociology of Education 58, 128–35.

Lee, V. E., and Bryk, A. S. (1988). "Curriculum Tracking as Mediating the Social Distribution of High School Achievement." Sociology of Education, 62, 78–94.

Maddala, G. S. 1983. Limited-Dependent and Qualitative Variables in Econometrics. Cambridge, England: Cambridge University Press.

Metz, M. H. 1986. Different by Design: The Context and Character of Three Magnet Schools. New York: Routledge and Keegan Paul.

Moore, D. R., and Davenport, S. 1988. The New Improved Sorting Machine. Madison, Wis.: National Center on Effective Secondary Schools.

Newmann, F. M. (ed.). 1992. Student Engagement and Achievement in American Secondary Schools. New York: Teachers College Press.

Noell, J. 1982. "Public and Catholic Schools: A Reanalysis of 'Public and Private Schools'." Sociology of Education, 55, 123–32.

Powell, A., Farrar, E., and Cohen, D. K. 1985. The Shopping-Mall High School. Boston: Houghton-Mifflin.

Quality Education for Minorities Project. 1990. Education that Works: An Action Plan for the Education of Minorities. Cambridge, Mass.: Massachusetts Institute of Technology.

Suttles, G. 1964. The Social Order of the Slum. Chicago: University of Chicago Press.

Wehlage, G. G., Rutter, R. A., Smith, G. A., Lesko, N., and Fernandez, R. R. 1989. Reducing the Risk: Schools as Communities of Support. London: Falmer.

Wehlage, G. G., and Smith, G. A. 1992. "Building New Programs for Students at Risk." Pp. 92–118 in F. M. Newmann (ed.), Student Engagement and Achievement in American Secondary Schools. New York: Teachers College Press.

Willms, D. 1985. "Catholic-School Effects on Academic Achievement: New Evidence from the High School and Beyond Follow-Up Study." Sociology of Education, 58, 98–114.

Wilson, W. J. 1987. The Truly Disadvantaged. Chicago: University of Chicago Press.

Witte, J. F., Bailey, A. B., and Thorn, C. A. 1992. Second Year Report: Milwaukee Parental Choice Program. Madison, Wis.: University of Wisconsin–Madison.