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ABSTRACT
        This study found that schooltype does not have a
significant effect on reading achievement gain. The study analyzed
achievement differences over a 3-year period  among White, Black and
Hispanic students who attended three different types of elementary
schools  in the Chicago Public Schools system  that have racially mixed
student  enrollments  desegregated schools, integrated schools, and
magnet  schools. Findings suggest no real difference among schooltype
on reading achievement gain. Race appears to  be significantly related
to achievement gain  only in the fourth grade  cohort. Hispanic
students gained at about the same rate as white students in all three
cohorts. On the whole, minority students had  lower gains in the
desegregated schools. Group differences that  are established early in
school  or before school diminish as students  progress through school.
Although groups of students who have initial  advantages retain them,
no one  schooltype gives any one group of students a special advantage
or disadvantage. Learning opportunities appear to be equal in the
schooltypes and for  all students. The report  includes charts and
tables with statistical results and a list of  references. (PS)

The Influences of Schooltype, Race, and Economic Background

on Reading Achievement Gains

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Chicago Public Schools

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The authors would like to thank Thomas B. Hoffer of Northern Illinois University for his critical advice with data analysis and interpretation. Jackie Harvey of the Department of Res-.earch and Evaluation, Chicago Public Schools. performed the statistical analyses. Diana Foster, also from Research and Evaluation, created the t-est score file.

The purpose of this paper is to determine the effects of race and schooltype on student achievement gains controlling for student economic background. The study analyzes achievement differences among white, black and Hispanic students who attend three different racially integrated schooltypes: desegregated schools, integrated schools, and magnet schools. In addition to studying race and schooltype differences, this paper looks for the interaction between schooltype and race.

The study addresses the following three research questions:

1. What effect does schooltype have on student achievement gains?

2. What is the effect of race on achievement gain?

3. Do race and schooltype interact to produce differential achievement gains for different races in different schooltypes?

The effect that a desegregated school environment may have on student achievement is the subject of on-going concern. An additional concern is the part that the race and economic background of the student may play in student achievement. Although there seems to be consensus regarding the worth of pursuing this line of inquiry, consensus is missing regarding the effects associated with a desegregated learning environment.

In a review of an NIE study in which seven scholars investigated the effect of desegregation on black student achievement, Ascik (1984) concluded:

> Desegregation has small positive effects on black student
> achievement in reading and no effects on black achievement in
> mathematics. (p. 19 )

A contradictory conclusion was reached by a group of educators at Vanderbilt University who found that public school desegregation seemed to improve the work of minority students without hurting white students' performance

(American Teacher, 1981). Felice and Richardson (1980) argued that providing black student with a desegregated learning experience was not enough to produce increases in student achievement, but that a high quality educational program was needed.

Those who have looked at magnet schools as a way of achieving school desegregation report more consistently positive findings. A study conducted by the Department of Education found that magnet school improve the quality of education while promoting desegregation in urban school districts (Phi Delta Kappan, 1984). Blank (1984) concluded that:

1. Magnet schools can and do provide high-quality education in urban school districts.

2. High quality education in magnet schools does not stem from highly selective methods of admitting students.

3. District and school leadership, community involvement and small additional expenditures are important factors that produce high-quality education in magnet schools.

In addition to looking at desegregated or magnet school settings, researchers are emphasizing the need to consider issues of race, sex, and social status because of the interactions that may occur among these variables (Grant and Sleeter, 1986; Scott-James and Clark, 1986). In a major review of the effects of desegregation on black students, Bradley amd Bradley (1977) noted the importance of student background on the success of desegregation. More recently, Rumberger (1983) studied the effects of several variables in students dropping our of high school and concluded that variables operate differently for different groups of students.

This paper addresses these issues directly by examining how race and schooltype, with economic background controlled, influence achievement gains.

Schools

This study is focused on student achievement gain scores in three different types of elementary schools in the Chicago Public Schools system that have racially mixed student enrollments: integrated schools, desegregated schools, and magnet schools. The factors responsible for integration in these three types of schools are very different, and provide an interesting test of schooltype differences.

The mixed racial composition of integrated schools is due primarily to integrated residential patterns; these schools are between 30 and 65 percent white and between 35 and 70 percent minority. Most (but not all) of the students who attend integrated schools live in their school's neighborhood attendance area. Desegregated schools, also between 30 and 65 percent white and between 35 and 70 percent minority, have mixed racial compositions because of the voluntary transfer of minority students to schools in predominantly white neighborhoods. Most of the white students who attend these schools live in the neighborhood attendance area and most of the minority students do not. Magnet schools do not have attendance areas, and draw their racial compositions of 15 to 35 percent white and 65 to 85 percent minority from all areas of the city. All the students in the magnet schools attend by voluntary choice. These schooltype definitions describe the aggregate characteristics of the schools, although not all students in each of the schools meet the criteria listed above. For example, not all minority students in integrated schools are residential, and some students in magnet schools live in what was once the school's attendance area.

The sample in this study (drawn from a much larger number of integrated, desegregated, and magnet schools) contains six integrated schools, six desegregated schools, and five magnet schools. In order to be included in this sample, the total enrollment of a school needed to be

tri-ethnic, that is, comprised of at least 15 percent each white, black, and
Hispanic students. These schools are not a random sample of integrated,
desegregated, and magnet schools, but as a group they are probably
representative of these schooltypes that have a tri-ethnic student
composition.

Table 1 below contains demographic background data for the seventeen
schools included in this study, including total enrollment, racial
composition, and the average percent of students who were eligible for free
or reduced cost lunches in the schools. The free lunch count is provided as
a rough indication of the economic level of the students. These are
aggregated figures as of October 31, 1986 for total enrollment and racial
composition, and June 1985 for free and reduced lunch eligibility. These
statistics are presented for the purpose of providing contextual information
about the types of schools being compared in this study.

TABLE 1

Selected Characteristics of Schools in the Sample

| Schooltype | Average Enrollment | Average % Free Lunch | % White | % Black | % Hispanic |
|---|---|---|---|---|---|
| Magnet (n=5) | 635 | 54.5 | 30.8 | 29.9 | 36.8 |
| Integrated (n=6) | 602 | 43.5 | 41.0 | 24.4 | 26.3 |
| Desegregated (n=6) | 580 | 45.3 | 47.7 | 24.0 | 24.9 |

The Students

This study selected three cohorts of students who had been enrolled
continuously in the same school for at least three years. They were black,
white, or Hispanic students from integrated, desegregated, or magnet
schools. The first cohort contains students who were eighth graders in the

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spring of 1986 (the Eighth Grade Cohort); the second cohort contains

students who were sixth graders in spring 1986 (the Sixth Grade Cohort); and

the third cohort contains students who were fourth graders in spring 1986

(the Fourth Grade Cohort). The Eighth Grade Cohort were fifth graders in

the spring of 1983; the Sixth Grade Cohort were third graders in the spring

of 1983; and the Fourth Grade Cohort were first graders in the spring of

1983. Student race codes which were originally recorded on student

enrollment forms were obtained from the Chicago Public Schools student

masterfile.

A researcher visited each of the 17 schools with a roster names of

students who had complete longitudinal test data and reviewed all free lunch

applications for the school year 1985-86. All students were coded as

eligible for free lunch, eligible for reduced cost lunch, or neither. The

Chicago Public Schools provide free or reduced cost lunch in accordance with

the eligibility guidelines established by the Federal Government.

Table 2 below contains the numbers of students with complete

longitudinal test score data from the spring testing in 1983, 1984, 1985,

and 1986, displayed by race, schooltype and cohort. In addition, the table

presents the proportion of each subgroup that was eligible for free or

reduced cost lunch in 1986. In this sample (including all three cohorts),

25.4% of the students in the integrated schools received free or reduced

cost lunch, 19.3% of the students in the desegregated schools received free

or reduced cost lunch, and 54.5% of the students in magnet schools received

free or reduced cost lunch. Students from lower income families are

underrepresented in the integrated and desegrated schools in this sample,

yet lower income students are fairly represented in the magnet schools.

This is one indication that the selection criteria used in this study

resulted in a sample that does not reflect the entire student population of

the school system.   (Test scores provide a second indication.  In 1986   the

Fourth Grade Cohort had an average Grade Equivalent reading score of 5 .1

compared to the citywide average of 4.1; the Sixth Grade Cohort scored   7.1

compared to the citywide average of 6.1; the Eighth Grade Cohort scored

9.2 compared to 8.2.  The scores of the students in this sample correspond

to citywide scores for the highest quartile.)

TABLE 2

Number of Students Included in this Study

By Race, Schooltype, and Cohort with Percent of

Students Eligible for Free or Reduced Cost Lunch (in Parentheses)

| School Type | Fourth Grade | | | Sixth Grade | | | Eighth Grade | | |
|---|---|---|---|---|---|---|---|---|---|
| | Black | Hisp. | White | Black | Hisp. | White | Black | Hisp. | White |
| Integrated | 16 | 25 | 90 | 23 | 38 | 69 | 26 | 21 | 74 |
| | (38) | (42) | (27) | (50) | (53) | (20) | (19) | (29) | (11) |
| Desegregated | 21 | 24 | 68 | 34 | 26 | 94 | 48 | 30 | 136 |
| | (53) | (67) | (22) | (50) | (38) | (18) | (29) | (32) | (7) |
| Magnet | 47 | 47 | 76 | 38 | 46 | 58 | 34 | 57 | 58 |
| | (48) | (51) | (27) | (62) | (84) | (47) | (59) | (77) | (35) |

The Test Scores

This study analyzes reading comprehension subtest scores from Form 7 of

the Iowa Tests of Basic Skills.  The test scores, in grade equivalent units,

(GEs) were obtained from the Chicago Public Schools Citywide Testing Program,

from a matched, longitudinal computer file.  The citywide testing program

occurs annually in April.  Table 3 below contains the intercorrelations   among

test scores for 1983, 1984, 1985, and 1986 for the three cohorts in the   study.

The correlations display the expected pattern for test scores over time —

that is, temporally closer test scores are more highly correlated than test

scores further separated by time.

TABLE 3

Longitudinal Intercorrelations Among Reading Test Scores

For Fourth, Sixth, and Eighth Grade Cohorts

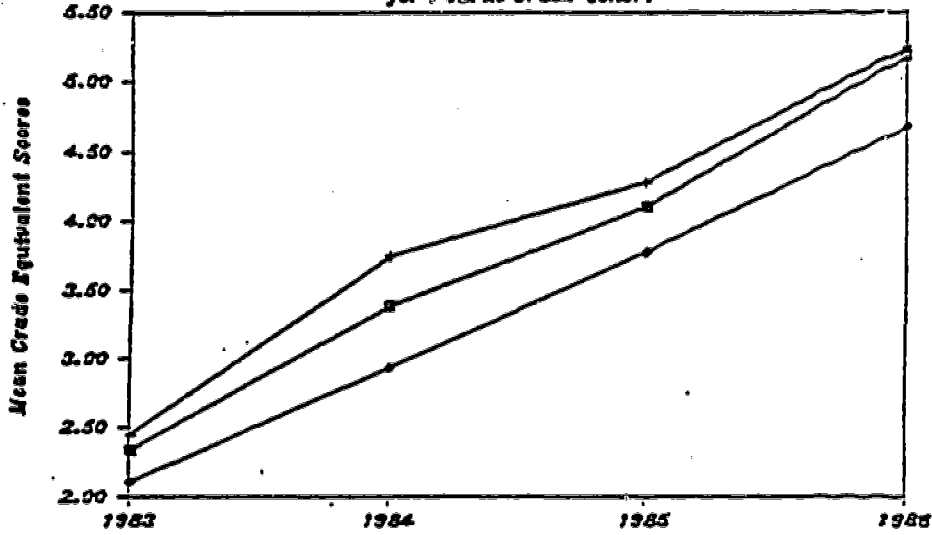|              | Fourth Grade | Sixth Grade | Eighth Grade |
|--------------|--------------|-------------|--------------|
| 1983 to 1986 | 0.65         | 0.72        | 0.70         |
| 1984 to 1986 | 0.74         | 0.78        | 0.74         |
| 1985 to 1986 | 0.84         | 0.85        | 0.81         |
| 1983 to 1985 | 0.69         | 0.76        | 0.76         |
| 1984 to 1985 | 0.74         | 0.82        | 0.81         |
| 1983 to 1984 | 0.74         | 0.73        | 0.78         |

RESULTS

Effects of Schooltype·

Average reading comprehension grade equivalent scores for all students
in the integrated, desegregated, and magnet schools in the sample are
graphed in Figure 1 on the following page. The graphs indicate that for all
three Cohorts the highest scoring students for all four years of testing
attend the integrated schools. In the Fourth and Sixth Grade Cohorts,
magnet school students have the next highest scores for all four years, and
students in the desegregated schools have the lowest scores. In the Eighth
Grade Cohort, students in the magnet schools have higher scores than
students in desegregated schools for two years and students in the
desegregated schools have higher scores than students in the magnet schools
for the other two years. The actual mean values and standard deviations for
these groups are contained in Tables 7, 8, and 9 in the Appendix.

The higher scores in the integrated schools do not necessarily indicate
that those schools are more effective than either the magnet schools or the
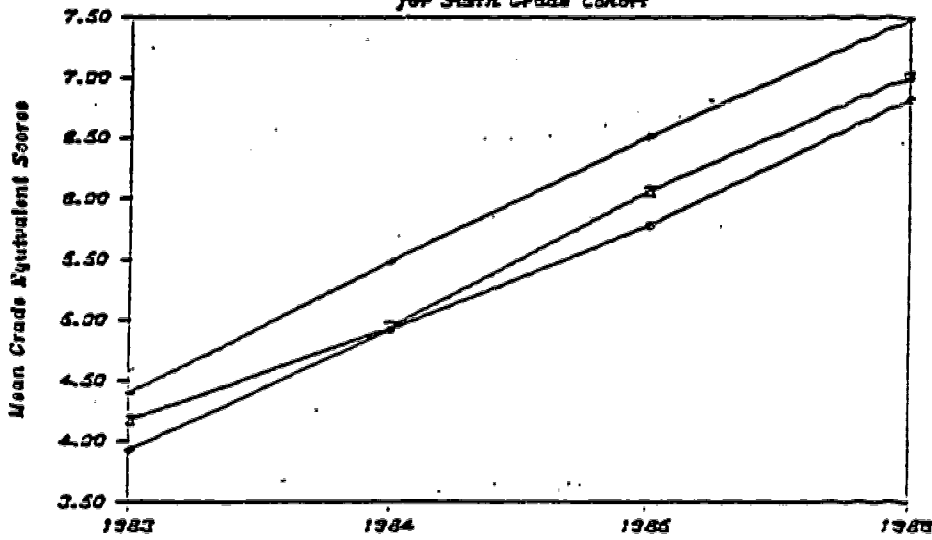desegregated schools. They may be explained by the fact that students in

FIGURE 1

# Longitudinal Reading Test Scores

### for Fourth Grade Cohort



*a Magnet Schools*          *Year of Spring ITBS Testing*          *Desegregated*
                            *Integrated Schools*

### for Sixth Grade Cohort



*a Magnet Schools*          *Year of Spring ITBS Testing*          *Desegregated*
                            *Integrated Schools*

### for Eighth Grade Cohort
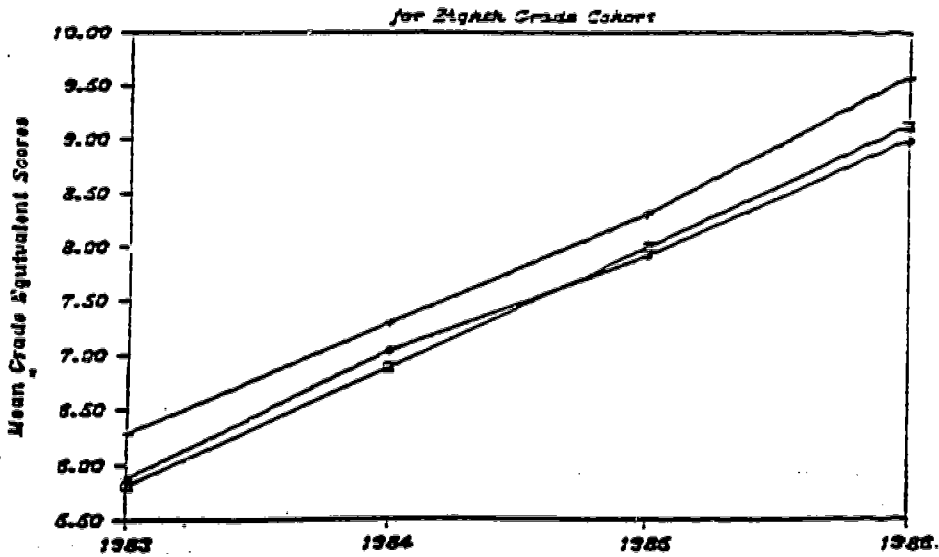


*a Magnet Schools*          *Year of Spring ITBS Testing*  11      *Desegregated*
                            *Integrated Schools*

the integrated schools had the highest scores in 1983, the first year included in this study. A more revealing analysis would determine whether the amount of achievement gain differed from one schooltype to another. In order to study this relationship between schooltype and achievement gain between 1983 and 1986 we used a general linear model procedure (SAS, 1985) with schooltype as independent variable, 1986 reading achievement as dependent variable, and 1983 reading score as covariate, conducting separate analyses for each Cohort. The analysis of covariance revealed non-significant effects of schooltype for all three Cohorts ($F[2,412]=2.73$ for Fourth Grade; $F[2,423]=2.09$ for Sixth Grade; and $F[2,480]=2.16$ for Eighth Grade) indicating that there are no overall simple relationships between schooltype and reading achievement gain.

Table 4 below compares reading gains in desegregated and integrated schools to gains in magnet schools for the Fourth, Sixth, and Eighth Grade Cohorts. In the Fourth Grade Cohort, students in desegregated schools gained 0.279 fewer GEs than students in magnet schools between Spring 1983 and spring 1986. In the Sixth Grade Cohort, students in desegregated schools gained 0.245 GEs more than students in magnet schools. In the Eighth Grade Cohort, students in desegregated schools gained 0.192 GEs less than students in magnet schools. The other comparisons (Fourth Grade Cohort, integrated to magnet; Sixth Grade Cohort, desegregated to magnet; and Eighth Grade Cohort, integrated to magnet) all involved less than one month difference (0.10 GE) in reading achievement gain. In summary, achievement test scores are highest in the integrated schools for all three cohorts; gains are also greatest in the integrated schools for the Sixth and Eighth Grade cohorts. Achievement and achievement gain are most often next highest in the magnet schools. However, none of the differences in achievement gain among schooltypes are statistically significant.

TABLE 4

Effect of Schooltype on Reading Gain

Comparing Desegregated and Integrated to Magnet Schools

| Cohort | Schooltype | Mean difference | t |
|--------|------------|-----------------|------|
| 4 | Desegregated | -0.279 | -2.28 |
| 4 | Integrated | -0.057 | -0.48 |
| 6 | Desegregated | 0.041 | 0.34 |
| 6 | Integrated | 0.245 | 1.93 |
| 8 | Desegregated | -0.192 | -1.54 |
| 8 | Integrated | 0.060 | 0.41 |

Because of the effect of economic status on school achievement, and the confounding of economic background and race, we attempted to control these factors with the statistical model by adding the free lunch measure as a second covariate. A general linear model with schooltype as the single independent variable, 1986 achievement scores as the dependent variable, and 1983 achievement and free lunch status as covariates, showed a significant effect of free lunch status on achievement gain in the Fourth Grade Cohort $(F[1,381]=5.09)$, but not in the Sixth Grade Cohort $(F[1,407]=0.96)$, or in the Eighth Grade Cohort $(F[1,473]=0.04)$. Students eligible for free or reduced cost lunch in the Fourth Grade Cohort gained an average of 0.25 GEs less than students who did not apply for free or reduced cost lunch. Controlling for free lunch status in the Fourth Grade Cohort resulted in increasing slightly the difference in achievement gain between desegregated and magnet schools from -0.279 to -0.307 GEs and between integrated and magnet schools from -0.057 to -0.062. Although the free lunch variable significantly predicted achievement gain in the Fourth Grade Cohort, the differences in gain among schooltypes remains relatively unchanged and not statistically significant.

## Effects of Race

Figure 2 on the following page presents graphs of achievement scores from 1983 through 1986 for white, black, and Hispanic students in the Fourth, Sixth, and Eighth grade Cohorts. The means and standard deviations of these groups of students are contained in Tables 7, 8, and 9 in the Appendix. The graphs indicate that white students have consistently higher scores than either black or Hispanic students in all three cohorts. The difference between black and Hispanic students are minimal in all three cohorts. In the Fourth Grade Cohort black students scored higher than the Hispanic students in 1983 and 1984 but not in 1985 and 1986. The Sixth Grade Cohort black students scored slightly higher than the Hispanic students in all four years. The pattern of scores in the Eighth Grade Cohort is similar to the Fourth Grade: black students scored the same as or higher than Hispanic students in 1983 and 1984, but not in 1985 and 1986.

In order to control for initial differences in 1983 scores, we analyzed the relationship between race and achievement gain from 1983 to 1986 with the general linear model procedure on SAS with race as the independent variable, 1986 reading score as the dependent variable, and 1983 reading score as the covariate. The results of the analysis indicated a statistically significant difference among races for the Fourth Grade Cohort ($F[2,412]= 7.25$); no significant difference among races in achievement gain in the Sixth Grade Cohort ($F[2,423]= 1.88$); and no significant difference among races in the Eighth Grade Cohort ($[F2,480]= 2.83$).

FIGURE 2
# Longitudinal Reading Test Scores
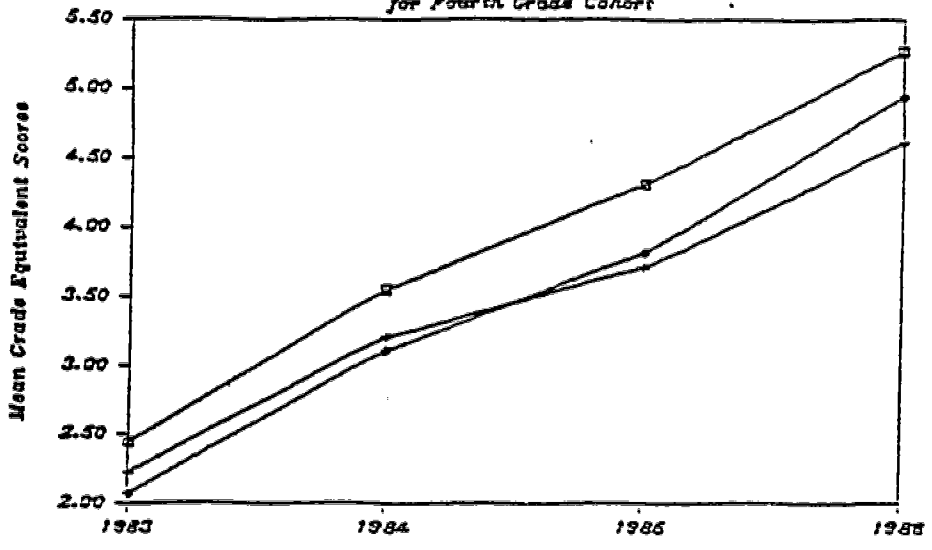


for Fourth Grade Cohort

□ White Students    + Black Students    ● Hispanic Students

Year of Spring ITBS Testing



for Sixth Grade Cohort
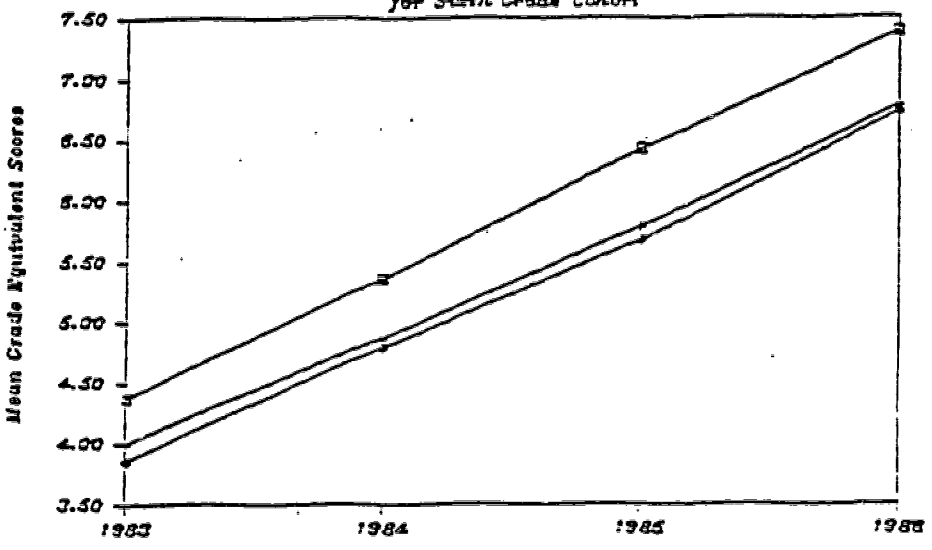
□ White Students    + Black Students    ● Hispanic Students

Year of Spring ITBS Testing



for Eighth Grade Cohort
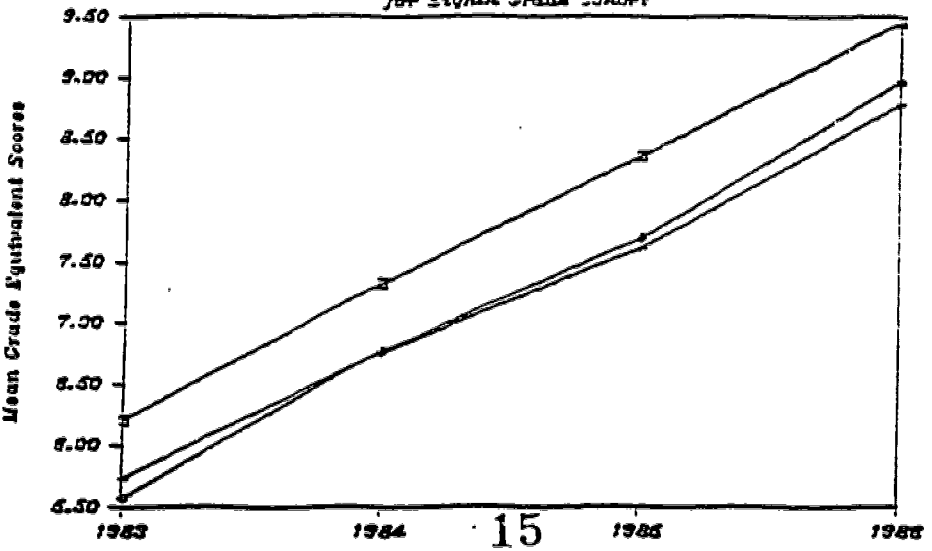
□ White Students    + Black Students    ● Hispanic Students

Year of Spring ITBS Testing

TABLE 5

Effect of Race on Reading Gain

Comparing Black and Hispanic to White Students

| Cohort | Race | Mean difference | t |
|--------|----------|-----------------|-------|
| 4 | Black | -0.440 | -3.48 |
| 4 | Hispanic | -0.057 | -0.47 |
| 6 | Black | -0.239 | -1.85 |
| 6 | Hispanic | -0.146 | -1.17 |
| 8 | Black | -0.296 | -1.85 |
| 8 | Hispanic | 0.027 | 0.20 |

Table 5 above contains the mean differences in achievement gain between 1983 and 1986 in GEs between black and white students and between Hispanic and white students for the three cohorts. The table shows that the greatest difference among groups occured in the Fourth Grade Cohort where white students gained 0.440 GEs more than black students. (This difference accounts for the statistical significance of the ANOVA.) Black students in the Sixth Grade Cohort gained 0.239 GEs less than white students and black students in the Eighth Grade Cohort gained 0.296 GEs less than the white students. The Hispanic students in this sample gained 0.057 GEs less than the white students in the Fourth Grade Cohort; 0.146 GEs less than the white students in the Sixth Grade Cohort; and 0.027 GEs more than the white students in the Eighth Grade Cohort.

The achievement gain differences among races were controlled for free lunch status with a model similar to that used to study the effects of schooltype. The analysis showed a significant effect of free lunch status in the Fourth Grade Cohort ($F[1,381] = 3.81$), but not in the Sixth Grade Cohort ($F[1,407] = 0.36$), or in the Eighth Grade Cohort ($F[1,473] = 0.52$). Controlling

for free lunch status resulted in reducing the differences in achievement
gains between black and white students in the Fourth Grade Cohort from -0.440
GEs to -0.364 GEs. The difference between Hispanic and white students
increased slightly from -0.056 to 0.076 GEs.

Combined Effects of Race and Schooltype

One of the major objectives of this study was to determine whether
schooltype and race interacted in their effects on student achievement and
achievement gain. The presence of a statistical interaction would indicate
that students of different races had differing degrees of achievement or
achievement gain in different schooltypes. The interaction is detected by a
statistical model that tests for difference among cell means and is also shown
in graphical representations of the cell means. Figures 3, 4, and 5 contain
1983 through 1986 mean scores for each race by schooltype. (See Tables 7, 8,
and 9 for means and standard deviations.)

Figure 3 contains the graph of GE means for the Fourth Grade Cohort by
race and schooltype. The graphs indicate a consistent order of schooltype for
white and black students. For these students, scores are highest in the
integrated school, next highest in the magnet schools, and lowest in the
desegregated schools. For the Hispanic students, with one exception, the
highest scores are in the magnet schools, the next highest scores in the
integrated schools, and the lowest scores in the desegregated schools.

The Sixth Grade Cohort in Figure 4 shows similar differences among
schooltype for white and black students: scores are highest in the integrated
schools, next highest in the magnet schools, and lowest in the desegregated
schools. Among Hispanic students the scores are also highest in the
integrated school, but lowest in the magnet schools.

In Figure 5, the Eighth Grade Cohort graph shows that the integrated,
magnet, desegregated order holds only for the white students. For black
students, the scores are highest in the integrated schools in 1983, but then

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FIGURE 3

# Longitudinal Reading Test Scores

*White Fourth Grade Cohort*



Year of Spring ITBS Testing

□ Magnet Schools    + Integrated Schools    ● Desegregated

*Black Fourth Grade Cohort*



Year of Spring ITBS Testing

□ Magnet Schools    + Integrated Schools    ● Desegregated

*Hispanic 4th Grade Cohort*



Year of Spring ITBS Testing

□ Magnet Schools    + Integrated Schools    ● Desegregated

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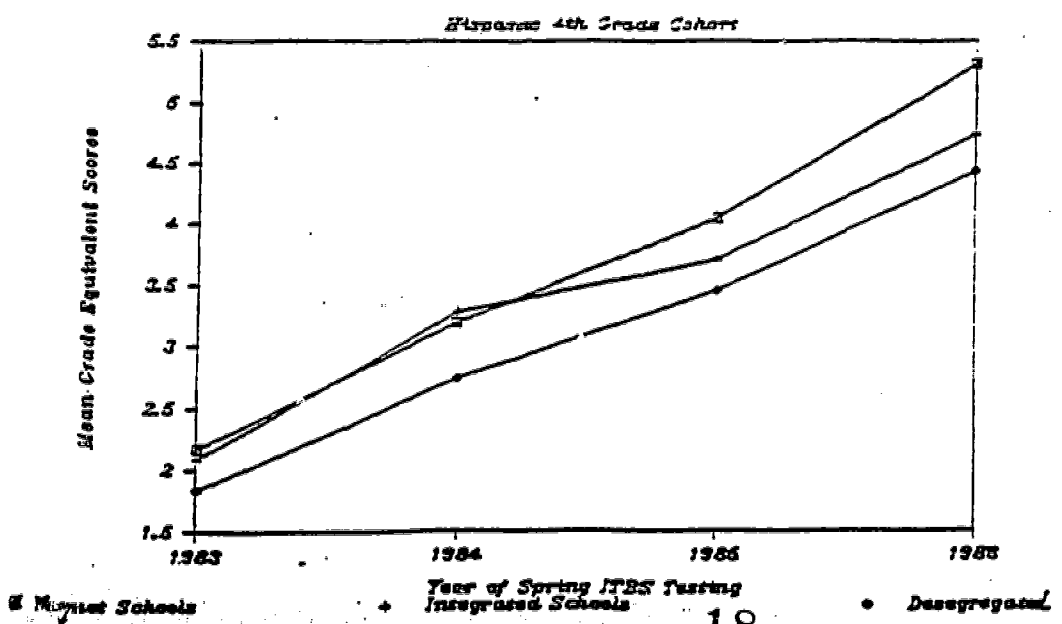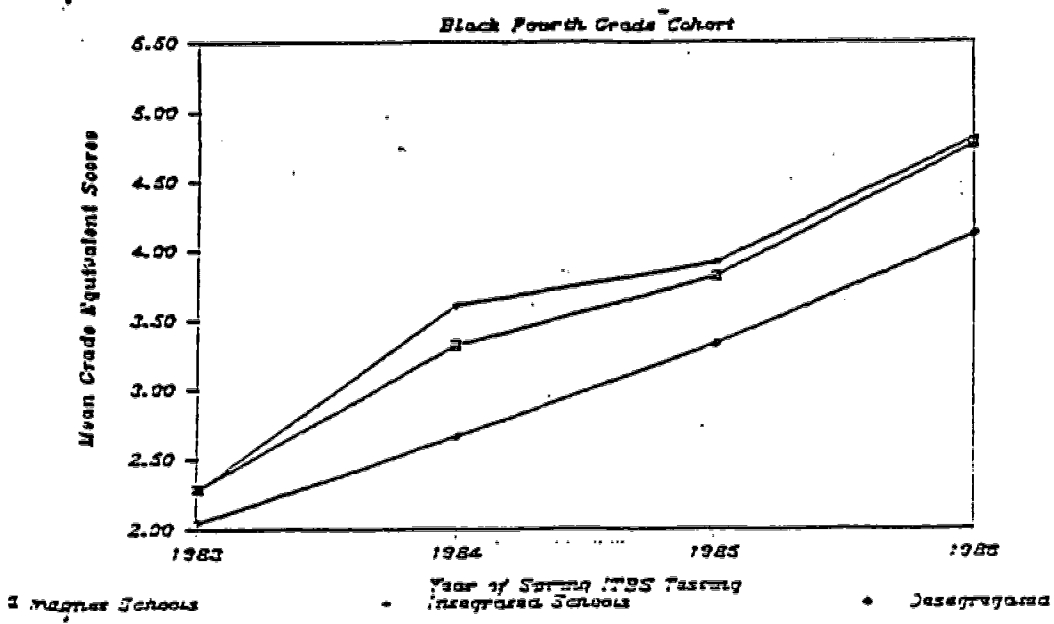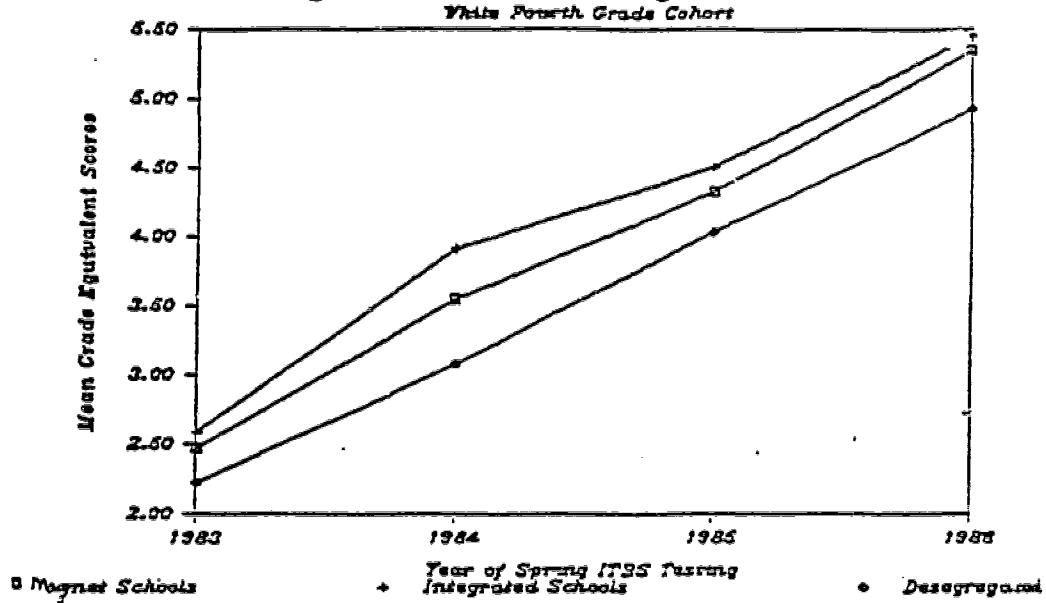
FIGURE 4
# Longitudinal Reading Test Scores
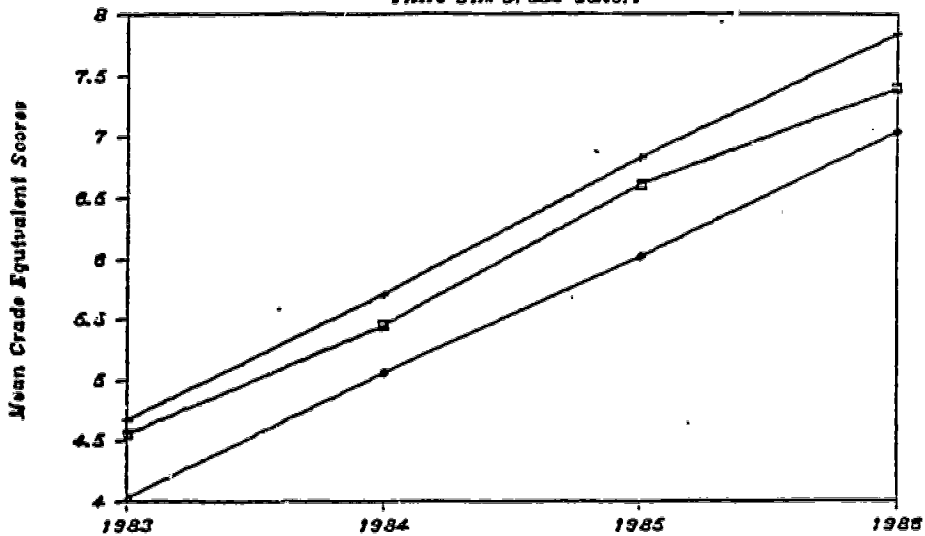
White 8th Grade Cohort



Year of Spring ITBS Testing

☐ magnet Schools    + Integrated Schools    ● Desegregated

Black 8th Grade Cohort



Year of Spring ITBS Testing

☐ magnet Schools    + Integrated Schools    ● Desegregated

Hispanic 8th Grade Cohort



Year of Spring ITBS Testing

☐ magnet Schools    + Integrated Schools    ● Desegregated

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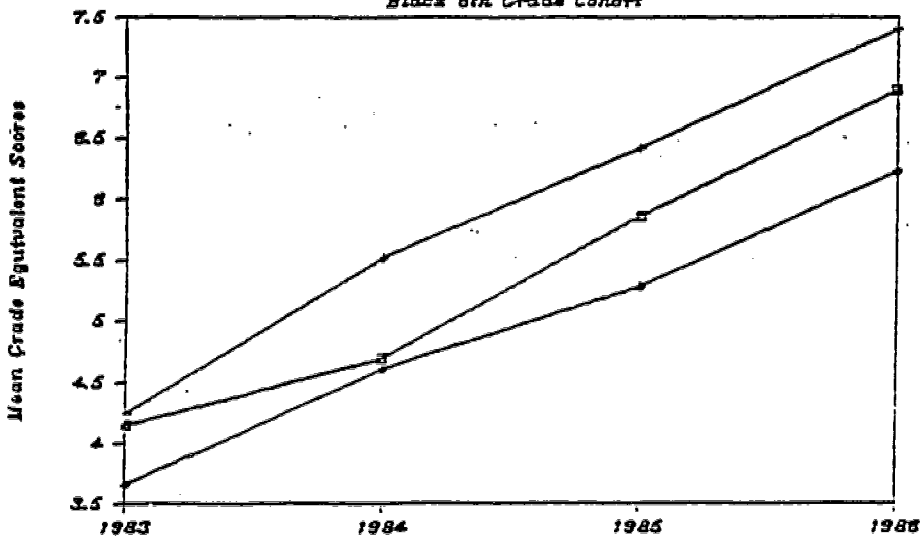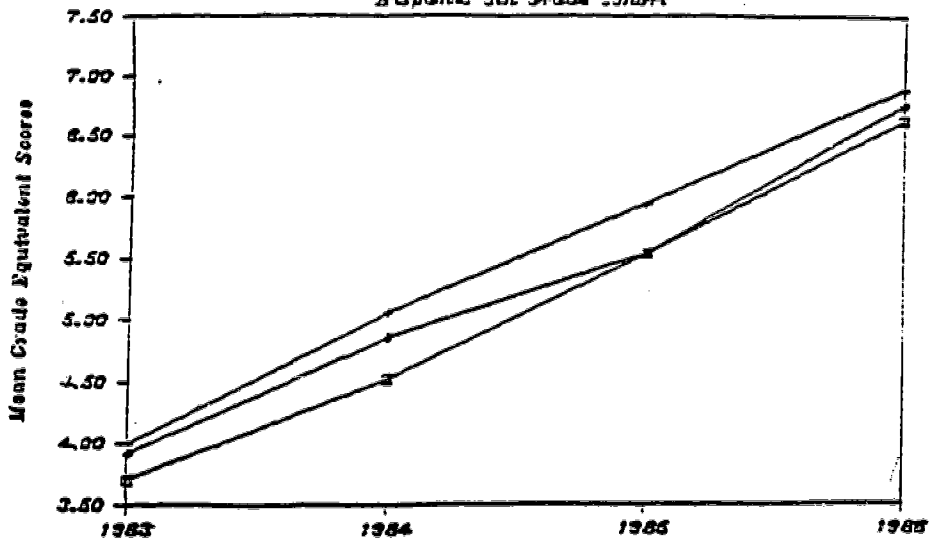
# FIGURE 5
## Longitudinal Reading Test Scores

### White 8th Grade Cohort

Mean Grade Equivalent Scores

10
9.5
9
8.5
8
7.5
7
6.5
6
5.5

1983    1984    1985    1986

Year of Spring ITBS Testing

■ Magnet Schools          + Integrated Schools          ● Desegregated

### Black 8th Grade Cohort

Mean Grade Equivalent Scores

9.5
9
8.5
8
7.5
7
6.5
6
5.5
5

1983    1984    1985    1986

Year of Spring ITBS Testing

■ Magnet Schools          + Integrated Schools          ● Desegregated

### Hispanic 8th Grade Cohort

Mean Grade Equivalent Scores

9.5
9
8.5
8
7.5
7
6.5
6
5.5

1983    1984    1985    1986

Year of Spring ITBS Testing

■ Magnet Schools          + Integrated Schools          ● Desegregated

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change order. The scores in magnet schools were highest in 1986 but were second highest in 1983. The scores were lowest in the desegregated schools. The pattern is different for Hispanic students, who have highest scores in the integrated schools, next highest in the desegregated schools, and lowest in the magnet schools.

A general linear model procedure with three independent variables (schooltype, race, and schooltype by race) was used to test for the interaction between schooltype and race on achievement gain. In this model, 1986 achievement was the dependent variable and 1983 achievement the covariate. The analysis indicated no statistically significant interactions ($F[2,406]=1.06$ for the Fourth Grade Cohort; $F[2,417]=0.98$ for the Sixth Grade Cohort; and $F[4,474]=1.75$ for the Eighth Grade Cohort). Students of different races do not make differential reading achievement gains in the three schooltypes studied here.

Table 6 below contains mean differences in reading achievement gains (in GEs) between white students at magnet schools compared to other races by schooltype. Although the overall interaction effect was not significant in any of the three Cohorts, some differences should be noted. The table shows that in the Fourth Grade Cohort black students are most different from the comparison students (whites at magnets) in the desegregated schools and least different in the magnet schools. Hispanic students show lower gains than the comparison students in desegregated and integrated schools, but not in magnet schools, where they have the greatest gains.

In the Sixth Grade Cohort, black students again showed the least gain in the desegregated schools. Hispanic students have the least gain in the integrated schools and the greatest gain in the magnet schools.

TABLE 6

Effect of Race and Schooltype on Reading Gain

Comparing All Groups to Whites at Magnet Schools

| Cohort | Race | Schooltype | Mean difference | t |
|--------|------|------------|-----------------|---|
| 4 | Black | Desegregated | -0.641 | -1.81 |
| 4 | Black | Integrated | -0.460 | -1.23 |
| 4 | Black | Magnet | -0.400 | -2.18 |
| 4 | Hispanic | Desegregated | -0.149 | -0.43 |
| 4 | Hispanic | Integrated | -0.231 | -0.69 |
| 4 | Hispanic | Magnet | 0.265 | 1.44 |
| 4 | White | Desegregated | -0.173 | -1.04 |
| 4 | White | Integrated | -0.005 | -0.03 |
| 4 | White | Magnet | 0.000 | 0.00 |
| 6 | Black | Desegregated | -0.460 | -1.23 |
| 6 | Black | Integrated | -0.020 | -0.05 |
| 6 | Black | Magnet | -0.112 | -0.51 |
| 6 | Hispanic | Desegregated | -0.193 | -0.51 |
| 6 | Hispanic | Integrated | -0.307 | -0.85 |
| 6 | Hispanic | Magnet | 0.042 | 0.20 |
| 6 | White | Desegregated | 0.155 | 0.88 |
| 6 | White | Integrated | 0.325 | 1.75 |
| 6 | White | Magnet | 0.000 | 0.00 |
| 8 | Black | Desegregated | -0.462 | -1.14 |
| 8 | Black | Integrated | -0.607 | -1.48 |
| 8 | Black | Magnet | 0.196 | 0.78 |
| 8 | Hispanic | Desegregated | -0.104 | -0.34 |
| 8 | Hispanic | Integrated | 0.161 | 0.38 |
| 8 | Hispanic | Magnet | 0.079 | 0.36 |
| 8 | White | Desegregated | 0.001 | 0.01 |
| 8 | White | Integrated | 0.239 | 1.17 |
| 8 | White | Magnet | 0.000 | 0.00 |

In the Eighth Grade Cohort, black students have the lowest gains in the integrated schools and the greatest gain in the magnet schools, where their gains are greater than the comparison group. Hispanic students in this cohort have lower gains than the comparison group in desegregated schools and greater gain in the magnet and integrated schools.

The achievement gain differences among races, among schooltypes, and races by schooltypes were controlled for free lunch status with a general linear model procedure using schooltype, race, and their interaction as

independent variables, 1986 achievement as dependent variable, and 1983 achievement and free lunch status as covariates. Free lunch status had a significant effect on achievement gain differences in the Fourth Grade Cohort ($F[1,375]= 4.65$), but not in the Sixth Grade Cohort ($F[1,401]= 0.260$, or in the Eighth Grade Cohort ($F[1,467]= 0.23$).

Controlling for free lunch status resulted in diminishing many of the differences among races by schooltypes. However, the interaction between race and schooltype itself is not significant (either with or without controlling for free lunch). The difference in achievement gain between black students at desegregated schools and white students at magnet schools changed from -0.641 to -0.514 GEs when free lunch status is controlled. The difference between black students at integrated schools and white stduents at magnet schools changed from -0.460 to -0.329 GEs; and the differences between black students at magnet schools and white students at magnet schools changed from -0.400 to -0.346 GEs.

## SUMMARY AND DISCUSSION

The results of this study indicate that schooltype does not have a significant effect on reading achievement gain over a three year period for three different cohorts of students. The three schooltypes differ widely (on the average) on how they came to be racially integrated. These results suggest that these differences are not related to student achievement gain scores. Although not statistically significant, gain scores were somewhat higher in the magnet schools for the Fourth Grade Cohort, and higher in the integrated schools for the Sixth and Eighth Grade Cohorts. The differences among the cohorts also suggest no real difference among schooltype on student achievement gain.

Race appears to be significantly related to achievement gain only in the Fourth Grade Cohort, where black students gain about four months (0.44

GEs) less than white students. The difference between black and white students in this Cohort remains statistically significant when free lunch status is controlled, but is reduced to about three and a half months in gain. Differences between races in achievement gain are not statistically significant in the Sixth and Eighth Grade Cohorts, although black students continue to have about three months less gain than white students. Hispanic students gained at about the same rate as white students in all three cohorts.

The interaction between race and schooltype was not significant in any of the three cohorts. However, some relatively large differences appeared between some groups of students by schooltype. Controlling for free lunch status tended to diminish these differences. Although the overall interaction was not significant, minority students, especially black students, had lower gains in the desegregated schools.

Free lunch status did not predict achievement gain in the Sixth and Eighth Grade Cohort, but was significantly related to gain in the Fourth Grade Cohort. The presence of the significant race effect in the Fourth Grade Cohort but not in the others and the attentuation of group differences (both schooltype and race) from Fourth Grade Cohort to the Sixth and Eighth, suggest that group differences that are established early in school (or before school) diminish as students progress through school. Although groups of students who have initial advantages retain them, no one schooltype gives any one group of students a special advantage or disadvantage.

The results that all three schooltypes reduce any differences among students in rate of gain suggests that learning opportunities are equal in the schooltypes. Also, the results suggest that learning opportunities are equal for all students. Although students may start differently, their learning rates are equalizing over time.

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## TABLE 7

Mean Grade Equivalent Scores and Standard Deviations (in Parentheses)

For ITBS Reading Comprehension

Fourth Grade Cohort

| Race | Schooltype | n | 1983 | 1984 | 1985 | 1986 |
|------|-----------|-----|------|------|------|------|
| White | Magnet | 76 | 2.47 (0.76) | 3.55 (1.21) | 4.33 (1.27) | 5.35 (1.39) |
|  | Integrated | 90 | 2.59 (1.00) | 3.92 (1.61) | 4.51 (1.26) | 5.46 (1.41) |
|  | Deseg. | 68 | 2.22 (0.79) | 3.08 (0.86) | 4.04 (1.13) | 4.93 (1.25) |
|  | All | 234 | 2.45 (0.88) | 3.55 (1.33) | 4.31 (1.24) | 5.27 (1.37) |
| Black | Magnet | 47 | 2.29 (0.83) | 3.32 (0.92) | 3.81 (1.10) | 4.77 (1.12) |
|  | Integrated | 16 | 2.28 (0.83) | 3.61 (1.75) | 3.91 (1.00) | 4.81 (1.14) |
|  | Deseg. | 21 | 2.05 (0.80) | 2.67 (0.68) | 3.32 (0.86) | 4.11 (1.06) |
|  | All | 84 | 2.23 (0.82) | 3.21 (1.12) | 3.70 (1.04) | 4.61 (1.13) |
| Hispanic | Magnet | 47 | 2.17 (0.68) | 3.20 (0.77) | 4.05 (1.00) | 5.31 (1.25) |
|  | Integrated | 25 | 2.09 (0.85) | 3.29 (1.96) | 3.71 (1.18) | 4.73 (1.58) |
|  | Deseg. | 24 | 1.84 (0.59) | 2.75 (0.79) | 3.46 (0.96) | 4.43 (0.71) |
|  | All | 96 | 2.07 (0.71) | 3.11 (1.21) | 3.81 (1.05) | 4.94 (1.29) |
| All | Magnet | 170 | 2.34 (0.77) | 3.39 (1.03) | 4.11 (1.17) | 5.18 (1.30) |
| All | Integrated | 131 | 2.45 (0.97) | 3.75 (1.71) | 4.28 (1.26) | 5.24 (1.44) |
| All | Deseg. | 114 | 2.11 (0.76) | 2.93 (0.83) | 3.78 (1.09) | 4.67 (1.16) |

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TABLE 8

Mean Grade Equivalent Scores and Standard Deviations (in Parentheses)

For ITBS Reading Comprehension

Sixth Grade Cohort

| Race | Schooltype | n | 1983 | 1984 | 1985 | 1986 |
|------|-----------|-----|-------------|-------------|-------------|-------------|
| White | Magnet | 58 | 4.56 (1.19) | 5.45 (1.55) | 6.61 (1.46) | 7.40 (1.72) |
| | Integrated | 69 | 4.68 (1.09) | 5.71 (1.52) | 6.83 (1.35) | 7.84 (1.67) |
| | Deseg. | 94 | 4.03 (1.09) | 5.06 (1.31) | 6.02 (1.46) | 7.04 (1.50) |
| | All | 221 | 4.37 (1.15) | 5.36 (1.46) | 6.42 (1.47) | 7.38 (1.65) |
| Black | Magnet | 38 | 4.15 (0.93) | 4.69 (1.21) | 5.85 (1.05) | 6.89 (1.06) |
| | Integrated | 23 | 4.25 (1.04) | 5.52 (1.82) | 6.42 (1.44) | 7.40 (1.55) |
| | Deseg. | 34 | 3.66 (0.88) | 4.61 (0.92) | 5.28 (1.17) | 6.22 (1.26) |
| | All | 96 | 4.00 (0.96) | 4.87 (1.35) | 5.79 (1.26) | 6.78 (1.34) |
| Hispanic | Magnet | 46 | 3.70 (0.89) | 4.52 (0.88) | 5.54 (0.96) | 6.61 (1.19) |
| | Integrated | 38 | 4.00 (0.97) | 5.06 (1.28) | 5.95 (1.11) | 6.87 (1.44) |
| | Deseg. | 26 | 3.92 (1.26) | 4.87 (1.25) | 5.54 (1.45) | 6.74 (1.21) |
| | All | 110 | 3.85 (1.02) | 4.79 (1.14) | 5.68 (1.15) | 6.73 (1.28) |
| All | Magnet | 142 | 4.17 (1.09) | 4.95 (1.33) | 6.06 (1.29) | 7.00 (1.44) |
| All | Integrated | 131 | 4.40 (1.08) | 5.49 (1.53) | 6.51 (1.35) | 7.48 (1.63) |
| All | Deseg. | 154 | 3.93 (1.08) | 4.93 (1.23) | 5.77 (1.43) | 6.81 (1.44) |

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TABLE 9

Mean Grade Equivalent Scores and Standard Deviations (in Parentheses)

For ITBS Reading Comprehension

Eighth Grade Cohort

| Race | Schooltype | n | 1983 | 1984 | 1985 | 1986 |
|------|-----------|-----|------------|------------|------------|------------|
| White | Magnet | 58 | 6.33 (1.06) | 7.34 (1.32) | 8.51 (1.37) | 9.49 (1.40) |
| | Integrated | 74 | 6.52 (1.35) | 7.49 (1.56) | 8.68 (1.57) | 9.89 (1.57) |
| | Deseg. | 136 | 5.99 (1.40) | 7.21 (1.33) | 8.11 (1.44) | 9.21 (1.64) |
| | All | 268 | 6.21 (1.33) | 7.31 (1.40) | 8.35 (1.48) | 9.46 (1.61) |
| Black | Magnet | 34 | 5.73 (1.22) | 6.80 (1.41) | 7.83 (1.43) | 9.19 (1.69) |
| | Integrated | 26 | 6.25 (1.44) | 7.07 (1.44) | 7.70 (1.93) | 9.06 (1.70) |
| | Deseg. | 48 | 5.47 (1.22) | 6.56 (1.21) | 7.40 (1.20) | 8.32 (1.51) |
| | All | 108 | 5.74 (1.30) | 6.76 (1.34) | 7.61 (1.47) | 8.77 (1.65) |
| Hispanic | Magnet | 57 | 5.33 (1.45) | 6.51 (1.69) | 7.58 (1.55) | 8.75 (1.55) |
| | Integrated | 21 | 5.52 (1.57) | 6.96 (1.65) | 7.75 (1.72) | 9.23 (1.89) |
| | Deseg. | 30 | 6.06 (1.00) | 7.14 (1.23) | 7.84 (1.03) | 9.17 (1.34) |
| | All | 108 | 5.57 (1.39) | 6.77 (1.58) | 7.69 (1.46) | 8.96 (1.57) |
| All | Magnet | 149 | 5.81 (1.33) | 6.90 (1.53) | 8.00 (1.51) | 9.14 (1.59) |
| All | Integrated | 121 | 6.29 (1.44) | 7.31 (1.55) | 8.31 (1.73) | 9.59 (1.68) |
| All | Deseg. | 214 | 5.88 (1.33) | 7.06 (1.31) | 7.92 (1.37) | 9.01 (1.61) |

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