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Effects of An Inter-District Magnet Program
On Inter-Racial Attitudes At School

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In 1996, the Connecticut Supreme Court ruled that racial and economic isolation of students in Hartford Public Schools violated articles of the State Constitution affording equal educational opportunity (Sheff v. O'Neill, 1996). One remedy to reduce this racial and economic isolation has been the creation of inter-district magnet schools in the Hartford region. The primary goal of this research has been to test the hypothesis that participation in such a racially-integrated inter-district magnet school would promote positive and reduce negative inter-racial attitudes among students. The key mechanisms underlying these hypothesized effects include contact conditions at school (Allport, 1954; Pettigrew, 1998): equal status among students, common goals in the academic setting, individualized contact, and institutional support for positive contact.

Contact conditions at school

Some theorists have argued that mere contact among different racial groups will reduce prejudice (Bullock, 1978; Jackman & Crane, 1986). By comparison, others have argued that several conditions must be present in the contact situation in order for reductions in prejudice to occur (Amir, 1969; Schofield, 1989; Slavin, 1985; Stephan, 1999). One such central condition is equal status. Even though students may differ on status characteristics that are external to a classroom (such as family affluence), equal status among students within the classroom or school setting is essential for positive inter-group attitudes. Cooperative learning practices that provide equal opportunities for students of different ability levels to contribute to a team fulfill the condition of equal status in the classroom (Slavin, 1985); these practices would be expected to promote positive inter-group attitudes and relations. A second critical condition is the presence of common goals in the academic setting. Students who volunteer to attend a magnet school inherently share important academic goals. High schools that separate students into college-preparatory and vocational tracks make common goals less salient (Eckert, 1989). Opportunities for individualized contact, or "acquaintance potential" (Cook, 1978), is a third critical contact condition. When students get to know their classmates as individuals, rather than as members of an in-group or an out-group (Devine, 1995; Miller & Brewer, 1986), they will be less likely to hold prejudiced beliefs about those classmates. Finally, institutional support for positive contact is needed. Teachers and school administrators send important signals in this regard.

Inter-racial attitudes

Attitudes are "cognitions or perceptions which the person has about some object, together with the affect or feelings which the person has toward the object" (Patchen, 1982, p. 37). Attitudes can be positive or negative in valence. The attitudinal objects, or targets, in this study are racial / ethnic categories of classmates. Whereas previous research on inter-racial attitudes in schools has concentrated on Black-White relations, the present study assessed high school students' attitudes toward Black, White, Latino, and Asian classmates.

In a meta-analytic review of 203 studies of the contact-prejudice effect, Pettigrew and Tropp (2000) found a mean effect size of $-.42$. In general, as contact conditions improved, prejudice decreased. These studies covered racial desegregation in school, workplace, housing, and military settings. Most studies did not directly assess perceptions of contact conditions.

Many studies were neither experimental nor longitudinal, so selection biases were often confounded with contact effects.

Predictions for the current study

The current study tests three predictions: (1) that a new inter-district magnet school, designed to reduce racial and economic isolation of students in the Hartford metropolitan region, will provide positive inter-racial contact conditions; (2) that students who voluntarily attend this new magnet school will be relatively non-prejudiced, that is, hold equally strong positive attitudes toward members of in-group and out-group races and hold equally weak negative attitudes toward members of various races; and (3) that this magnet school will produce contact effects that reduce racial prejudice, as opposed to simply selecting non-prejudiced students.

Method

Sample recruitment

The Greater Hartford Academy of Mathematics and Science (GHAMAS) opened for students in the Fall of 2000. In 2001-2002, approximately 170 students attended GHAMAS from 14 school districts in the Hartford, Connecticut, metropolitan region. GHAMAS offers a specialized program for 9th through 12th grade students who are highly motivated in mathematics and science. The Academy functions as an extension of each participating district's high school(s), with 9th and 10th grade students attending in the mornings and 11th and 12th grade students attending in the afternoons. Each student attending GHAMAS makes a major daily transition in school environments, commuting between the magnet program and a home high school. GHAMAS combines mathematics and science content with problem-solving skills in an integrated curriculum. Students learn experientially in laboratories by conducting scientific research with applied mathematics (Blumenfeld, Soloway, Marx, Krajcik, Guzdial, & Palincsar, 1991; Edelson, Gordin, & Pea, 1999).

All students attending GHAMAS during the 2001-2002 school year were invited to participate; the final participation rate was 47 percent (80 out of 170 enrolled students). Principals at several of the high schools that sent students to GHAMAS were contacted and also invited to participate. Two such principals agreed. The principal at one racially-integrated suburban high school (with a White student population of approximately 70 percent) directed all students in two Honors sections of mathematics ($n = 39$) to participate; similarly, the principal at a racially-isolated suburban high school (with a White student population of approximately 90 percent) directed students in two Honors sections ($n = 31$) to participate.

Sample characteristics

The racial characteristics of the three participating school populations, and the student samples within these schools, are displayed in Table 1. The GHAMAS student population was racially diverse, and the participating sample reflected the population quite closely (with a slight over-representation of White students and under-representation of Latino students). Although the racially-integrated suburban high school population included appreciable percentages of

Black and Latino students, the participating sample did not reflect this racial diversity. Ostensibly, enrollment in the Honors mathematics sections was associated with race. Finally, the racially-isolated suburban high school population was closely represented by the participating sample.

Samples of students from the three schools were comparable with respect to several demographic variables. No significant group differences were found for student gender, χ^2 (df = 2, n = 153) = 1.08, $p = .58$; language other than English spoken at home, χ^2 (df = 2, n = 149) = 0.36, $p = .84$; likelihood of living in a dual-parent household, χ^2 (df = 4, n = 150) = 3.15, $p = .53$; likelihood of family owning their home, χ^2 (df = 2, n = 152) = 1.89, $p = .39$; likelihood of family owning a car, χ^2 (df = 2, n = 151) = 3.04, $p = .22$; mother's education, F (2, 137) = 1.62, $p = .20$; father's education, F (2, 130) = 0.71, $p = .49$; or years attending schools in a student's home district, F (2, 144) = 0.10, $p = .90$.

Procedure

GHAMAS students completed questionnaires in late November / early December 2001, and again in April 2002. GHAMAS 9th and 10th graders completed questionnaires at school in classrooms with their mathematics or science teachers present; 11th and 12th graders completed questionnaires individually at home. Students at the racially-integrated and -isolated high schools completed questionnaires only in April / May 2002; these students all completed questionnaires at school with their regular classroom teachers present.

Measures

Measures of contact conditions at school were adapted from Green, Adams, and Turner (1988). Perceptions of equal status at school were measured with nine indicators (Cronbach's $\alpha = .89$), such as "I don't know of any race or ethnicity that gets special treatment at this school." Support from authorities was measured with 10 indicators (Cronbach's $\alpha = .87$), including "Teachers encourage students to make friends with students of different races or ethnicities." Common goals were assessed with 13 indicators (Cronbach's $\alpha = .83$), using items such as "Students of different races at my school work together well in student activities." Finally, opportunities for individualized contact were determined by 15 indicators (Cronbach's $\alpha = .89$), with items like "When I interact with a classmate of a different race at this school, it's easy to see that person as an individual, not just a member of another race." Students responded to each item on a <1> "strongly disagree" to <5> "strongly agree" scale. Responses were averaged across all indicators of a construct.

Measures of inter-racial attitudes were adapted from Patchen (1982). Positive inter-racial attitudes toward Black, White, Latino, and Asian classmates were assessed with 10 indicators (Cronbach's α ranged from .83 to .92), based on questions such as "How many [Black / White / Latino / Asian] students of my own sex want to get good grades?" Negative inter-racial attitudes were assessed with 16 indicators (Cronbach's α ranged from .91 to .95), with questions such as "How many [Black / White / Latino / Asian] students of my own sex are loud and noisy in school?" Students responded to each item on a <1> "none" to <6> "all or almost all" scale. Responses were averaged across all indicators of a construct.

Results

Effects of Schools on Contact Conditions

A repeated-measures MANOVA indicated that students at GHAMAS were more likely to agree that positive contact conditions were present ($Mean = 3.99, SE = .06$) than students either at the racially-isolated high school ($Mean = 3.67, SE = .09$) or at the racially-integrated school ($Mean = 3.51, SE = .08$), $F(2, 143) = 13.06, p \leq .001$. In addition, perceptions of opportunities for individualized contact ($Mean = 3.86, SE = .05$) were higher than perceptions of support from authorities ($Mean = 3.76, SE = .05$) and equal status ($Mean = 3.74, SE = .05$), which in turn were higher than perceptions of common goals ($Mean = 3.54, SE = .05$), $F(3, 141) = 29.20, p \leq .001$. Finally, students' perceptions of contact conditions varied significantly across schools, $F(6, 284) = 3.70, p \leq .001$. The positive contact conditions at GHAMAS were most pronounced for perceptions of equal status and common goals. Table 2 displays the descriptive statistics relevant to these results.

Effects of Schools on Inter-Racial Attitudes

Table 3 displays descriptive statistics for students' positive and negative inter-racial attitudes at the three schools. A repeated-measures MANOVA was performed to test for effects of school, the valence (positive or negative) of attitudes, and the target (Asian, Black, Latino, or White) of attitudes. Not surprisingly, positive attitudes ($Mean = 4.28, SE = .06$) were stronger than negative attitudes ($Mean = 2.37, SE = .06$), $F(1, 129) = 284.24, p \leq .001$. In addition, the gap between positive and negative attitudes was larger at GHAMAS ($Mean$ positive = 4.74, $SE = .08$; $Mean$ negative = 1.95, $SE = .09$) than at the isolated high school ($Mean$ positive = 4.20, $SE = .12$; $Mean$ negative = 2.50, $SE = .13$) and the integrated high school ($Mean$ positive = 3.90, $SE = .11$; $Mean$ negative = 2.65, $SE = .12$), $F(2, 129) = 21.13, p \leq .001$. Finally, and most relevant to the hypotheses of this study, the pattern of inter-racial attitudes varied by school, $F(6, 256) = 5.44, p \leq .001$. Whereas positive attitudes at GHAMAS were uniformly positive for Asian, Black, Latino, and White classmates, and negative attitudes at GHAMAS were uniformly negative for all racial groups, positive attitudes at the suburban schools were weaker for Black and Latino classmates (than for Asian or White classmates), and negative attitudes at the suburban schools were stronger toward Black and Latino classmates.

In order to unconfound selection biases (i.e., the possibility that GHAMAS simply selects non-prejudiced students) and contact effects on attitudes (i.e., the possibility that GHAMAS actually changes students' inter-racial attitudes after they arrive at the school), students who had attended GHAMAS for one versus two years were compared. Because all GHAMAS students had volunteered to attend, differences between these two groups could not be explained by selection biases. A repeated-measures MANOVA was performed to test for effects of years at GHAMAS, season (Fall versus Spring questionnaire administration), attitudinal valence, and attitudinal target. As noted in the preceding analysis, positive attitudes ($Mean = 4.67, SE = .08$) were stronger than negative attitudes ($Mean = 1.98, SE = .08$), $F(1, 59) = 320.72, p \leq .001$. In addition, the gap between positive and negative attitudes was larger for Asian classmates ($Mean$ positive = 4.78, $SE = .09$; $Mean$ negative = 1.68, $SE = .07$) and for White classmates ($Mean$

positive = 4.88, $SE = .07$; *Mean* negative = 2.03, $SE = .09$) than for Black classmates (*Mean* positive = 4.55, $SE = .10$; *Mean* negative = 2.11, $SE = .10$) and Latino classmates (*Mean* positive = 4.52, $SE = .11$; *Mean* negative = 2.09, $SE = .11$), $F(3, 57) = 10.39, p \leq .001$. Notably here, the gap between positive and negative attitudes tended to vary more across racial categories for students who had been at GHAMAS for only one year, compared to students who had attended GHAMAS for two years, $F(3, 57) = 2.11, p = .10$. Table 4 displays descriptive statistics for GHAMAS students' inter-racial attitudes, depending on the number of years they had attended. In general, negative inter-racial attitudes (toward all groups of classmates) were weaker for second-year GHAMAS students than for first-year students, and positive attitudes toward Black and Latino classmates were stronger for second-year than for first-year students. This pattern is consistent with the hypothesis that GHAMAS is producing contact effects, as opposed to simply selecting non-prejudiced students.

Effects of Contact Conditions on Inter-Racial Attitudes

In order to estimate the direct effects of contact conditions on inter-racial attitudes, a series of cross-lagged panel analyses were performed on the longitudinal data available from GHAMAS students. Measures of contact conditions and attitudes in the Spring were regressed on corresponding measures from the Fall. Tables 5 and 6 summarize results from analyses of positive and negative inter-racial attitudes, respectively. Table 5 shows, for instance, that in the Fall the synchronous correlation between perceptions of equal status and positive attitudes toward Asian classmates was $r = 0.39$; the synchronous correlation between these variables in the Spring was $r = 0.35$. The lagged (contact) effect of Fall perceptions of equal status on Spring positive attitudes toward Asian classmates was $\beta = .11$. The mean synchronous correlation between contact conditions and positive attitudes in the Fall was $r = 0.39$. The mean synchronous correlation between contact conditions and positive attitudes in the Spring was $r = 0.46$. The mean lagged contact effect was $\beta = .07$. Effect size estimates (Wolf, 1986, p.35), based on the Fall and Spring synchronous correlations, would be .84 and 1.04, respectively. Estimated effect size, based on the path coefficient linking Fall contact conditions and positive attitudes in the Spring, would be .14.

Table 6 shows similar results when contact conditions are analyzed in relation to negative inter-racial attitudes. The mean synchronous correlation between contact conditions and negative attitudes in the Fall was $r = -0.36$. The mean synchronous correlation between contact conditions and negative attitudes in the Spring was $r = -0.38$. The mean lagged contact effect was $\beta = -.10$. Effect size estimates, based on the Fall and Spring synchronous correlations, would be $-.77$ and $-.82$, respectively. Estimated effect size, based on the path coefficient linking Fall contact conditions and negative Attitudes in the Spring, would be $-.20$. This finding supports the conclusion that contact conditions at GHAMAS reduce negative inter-racial attitudes. The magnitude of this reduction is modest, but understandable insofar as students attending GHAMAS were extremely non-prejudiced to begin with, and the estimation of effect size was based on a within-school analysis.

Discussion

This study provided evidence in support of all three major predictions: (1) the inter-district magnet school created positive contact conditions; (2) students attending the magnet school showed stronger positive inter-racial attitudes, and weaker negative inter-racial attitudes, than academically comparable students in racially-integrated and racially-isolated suburban schools; and (3) the magnet school reduced negative inter-racial attitudes, and didn't just select non-prejudiced students, as demonstrated by a comparison of students who had attended the school for one versus two years, and by a longitudinal analysis of contact conditions and inter-racial attitudes within one school year.

This study made distinctive contributions to scholarship on contact effects of schools on inter-racial attitudes, insofar as contact conditions were directly assessed and linked longitudinally to change in students' inter-racial attitudes, and students' inter-racial attitudes toward four racial groups (Black, White, Latino, and Asian classmates) were measured. Nevertheless, out of approximately 21,000 students who attended public high schools in the 14 districts that sent students to this magnet school, only 170 students (fewer than 1 percent) directly experienced the benefits of the positive contact conditions at GHAMAS. Contact conditions and inter-racial attitudes of students in the sending high schools should not be ignored. In fact, inter-racial attitudes toward Black and Latino classmates tended to be more negative and less positive at the integrated suburban high school than at the isolated-White high school in this sample, suggesting that racially-integrated schools, per se, won't necessarily produce positive contact conditions or reduce negative inter-racial attitudes. The challenge of improving inter-racial attitudes won't be solved simply by creating inter-district magnet schools in regions with racially-isolated district schools. Contact conditions at all schools must be examined and improved.

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Table 1
 Racial Characteristics of Participating Schools and Students

	<u>GHAMAS</u>		<u>Racially-Integrated HS</u>		<u>Racially-Isolated HS</u>	
	<u>Pop</u>	<u>Sample</u>	<u>Pop</u>	<u>Sample</u>	<u>Pop</u>	<u>Sample</u>
% White	49	60	69	90	90	84
% Black	17	15	17	0	4	0
% Latino	21	12	11	5	3	3
% Asian	13	10	4	5	3	6
% Multi	-	2	-	0	-	6
n	170	80	1940	39	644	31

Table 2
Effects of Schools on Contact Conditions

Contact Condition	GHAMAS		Racially- Integrated HS		Racially- Isolated HS	
	Mean	Std Err	Mean	Std Err	Mean	Std Err
Equal Status	4.17	.08	3.40	.11	3.66	.13
Individualized Contact	4.10	.06	3.63	.09	3.85	.10
Support from Authorities	3.92	.07	3.66	.09	3.70	.11
Common Goals	3.78	.06	3.36	.08	3.47	.10

Note. Students' perceptions of contact conditions were assessed through multiple indicators. Composite measures were formed by averaging indicators. Response options included <1> "strongly disagree", <2> "disagree", <3> "neither agree nor disagree", <4> "agree", and <5> "strongly agree". In this analysis, the numbers of valid cases were: GHAMAS, n = 75; integrated HS, n = 41; and isolated HS, n = 30.

Table 3
Effects of Schools on Inter-Racial Attitudes

<u>Attitude</u>	<u>GHAMAS</u>		<u>Racially-Integrated HS</u>		<u>Racially-Isolated HS</u>	
	<u>Mean</u>	<u>Std Err</u>	<u>Mean</u>	<u>Std Err</u>	<u>Mean</u>	<u>Std Err</u>
Positive toward						
Asians	4.87	.10	4.32	.13	4.55	.15
Blacks	4.66	.11	3.35	.14	3.95	.16
Latinos	4.56	.12	3.61	.16	3.91	.18
Whites	4.90	.08	4.32	.10	4.40	.12
Negative toward						
Asians	1.66	.08	1.96	.11	2.03	.12
Blacks	2.06	.11	3.19	.15	2.83	.17
Latinos	2.08	.11	2.83	.15	2.50	.17
Whites	2.01	.09	2.63	.12	2.64	.14

Note. Students' inter-racial attitudes were assessed through multiple indicators. Composite measures were formed by averaging indicators. Response options included <1> "none", <2> "only a few", <3> "quite a few", <4> "about half", <5> "most", and <6> "all or almost all". In this analysis, the numbers of valid cases were: GHAMAS, n = 67; integrated HS, n = 37; and isolated HS, n = 28.

Table 4
Effects of Years at GHAMAS on Inter-Racial Attitudes

<u>Attitude</u>	<u>One Year at GHAMAS</u>		<u>Two Years at GHAMAS</u>	
	<u>Mean</u>	<u>Std Err</u>	<u>Mean</u>	<u>Std Err</u>
Positive toward				
Asians	4.80	.12	4.77	.14
Blacks	4.38	.13	4.73	.15
Latinos	4.38	.15	4.67	.16
Whites	4.80	.10	4.88	.11
Negative toward				
Asians	1.80	.10	1.55	.11
Blacks	2.36	.13	1.87	.15
Latinos	2.20	.15	1.98	.17
Whites	2.22	.12	1.84	.13

Note. Students' inter-racial attitudes were assessed through multiple indicators. Composite measures were formed by averaging indicators. Response options included <1> "none", <2> "only a few", <3> "quite a few", <4> "about half", <5> "most", and <6> "all or almost all". In this analysis, the numbers of valid cases were: at GHAMAS for one year, n = 34; at GHAMAS for two years, n = 27.

Table 5
Effects of Contact Conditions on Positive Inter-Racial Attitudes

Contact Condition	Attitudinal Target	Synchronous r 's		Fall Contact Effect (β) on Spring Attitude	Fall Attitude Effect (β) on Spring Contact
		Fall r	Spring r		
Equal Status	Asian	.39	.35	.11	.08
	Black	.44	.43	.06	.15
	Latino	.37	.45	.18	.08
	White	.26	.27	.04	.05
Common Goals	Asian	.43	.42	.03	.15
	Black	.49	.54	-.04	.23
	Latino	.38	.55	.18	.28
	White	.32	.46	.08	.15
Support from Authorities	Asian	.46	.29	.02	.14
	Black	.35	.41	.09	.17
	Latino	.26	.53	.11	.23
	White	.29	.39	.04	.03
Individualized Contact	Asian	.41	.45	.13	.22
	Black	.51	.57	.02	.23
	Latino	.44	.63	.08	.36
	White	.38	.56	.05	.26
<i>Mean</i>		.39	.46	.07	.18
<i>Mean effect size</i>		.84	1.04	.14	.36

Table 6
Effects of Contact Conditions on Negative Inter-Racial Attitudes

Contact Condition	Attitudinal Target	Synchronous r 's		Fall Contact Effect (β) on Spring Attitude	Fall Attitude Effect (β) on Spring Contact
		Fall r	Spring r		
Equal Status	Asian	-.47	-.34	-.04	-.19
	Black	-.55	-.44	-.13	-.14
	Latino	-.38	-.35	-.10	-.15
	White	-.44	-.45	-.16	-.08
Common Goals	Asian	-.37	-.26	-.01	-.19
	Black	-.46	-.35	-.01	-.17
	Latino	-.29	-.26	-.15	-.08
	White	-.30	-.35	-.13	-.22
Support from Authorities	Asian	-.29	-.25	-.04	-.17
	Black	-.25	-.37	-.12	-.15
	Latino	-.26	-.33	-.06	-.17
	White	-.18	-.38	-.12	-.17
Individualized Contact	Asian	-.38	-.39	-.10	-.27
	Black	-.44	-.54	-.11	-.23
	Latino	-.32	-.50	-.15	-.32
	White	-.37	-.54	-.18	-.33
<i>Mean</i>		-.36	-.38	-.10	-.19
<i>Mean effect size</i>		-.77	-.82	-.20	-.39