



Same-Race Friendships and School Attachment: Demonstrating the Interaction Between Personal Network and School Composition¹

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Previous research has demonstrated that students are strongly attached to school when many same-race peers are present. This study extends the literature by considering students' immediate social environment at school—egocentric friendship networks. I hypothesized that same-race friendships contribute to school attachment by increasing the amount of support that students receive for their racial backgrounds in direct interactions. Further, the association between same-race friendships and school attachment should be stronger when the school includes many same-race peers because the organizational condition increases the ability of same-race friendships to connect students to the major components of school-wide networks and reduces perceived racial contrast between friends and nonfriend peers. Statistical analysis of the National Longitudinal Study of Adolescent Health (Add Health) provided some support for these hypotheses, but white, black, Hispanic, and Asian students showed somewhat different patterns, suggesting group differences in how students develop and view same-race friendships. The study highlights the importance of individual agency in navigating the multileveled social environment as well as the ability of organizational contexts to shift emotional consequences of personal relationships.

KEY WORDS: education; emotion; friendship; race; social networks; social psychology.

INTRODUCTION

The racial distribution of students varies substantially across schools and creates differences in how students feel about their schools. In general,

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adolescents show stronger attachment to school when many same-race peers are present because the condition reduces overall exposure to racial discrimination and allows them to feel at home (Johnson *et al.*, 2001; Moody and Bearman, 2001; Rosenberg, 1979). Previous research has focused on school-level racial composition and paid little attention to the fact that racial composition of egocentric friendship networks varies across students in a given school. The purpose of this study is to examine the relationship between friendship racial composition and school attachment among white, black, Hispanic, and Asian students in U.S. middle and high schools using the Add Health data.

School attachment has been an important concept in education research because it indicates quality of school experience at the individual level and degree of cohesion at the school level. The concept is multifaceted, and its major elements include emotional attachment to peers, a sense of belonging, and satisfaction with school experience (for a review of the concept, see Libbey, 2004). Research has shown that strong attachment to school predicts several outcomes of adolescent development, including lower rates of mental health problems (Ueno, 2005), delinquency (Resnick *et al.*, 1993), and sexual activities (Small and Luster, 1994) as well as higher GPA (Johnson *et al.*, 2006). More broadly, sociologists have examined the relationship between racial composition and attachment in various organizational or spatial contexts such as workplace (e.g., Mueller *et al.*, 1999) and neighborhood (e.g., Sampson, 1991). These studies generally addressed racial composition only at one level, although psychological conditions are shaped by multileveled social environments (Lin *et al.*, 1999; McLeod and Lively, 2003). Using students' racial backgrounds as an example, this study attempts to increase our understanding about how the consistency among individual attributes, personal network composition, and organizational composition relates to one's attachment to social organizations.

SCHOOL COMPOSITION AND SCHOOL ATTACHMENT

Previous studies have identified several school characteristics that influence students' attachment levels. For example, attachment tends to be stronger in private schools and those with small student enrollment and dense friendship networks, whereas schools with high delinquency rates and harsh discipline policies tend to have weaker attachment (Johnson *et al.*, 2001; McNeely *et al.*, 2002; Moody and Bearman, 2001). These findings seem to indicate that school attachment increases under structural conditions and school climates that promote personal and pleasant interactions among students and teachers. In addition to these school characteristics, sociodemographic composition of the student body correlates with school attachment. Specifically, students who attend schools with many same-race peers tend to have stronger attachment (Johnson *et al.*, 2001; Moody and Bearman, 2001).

To explain the effect of school-level racial composition, researchers frequently turn to Rosenberg's (1979) study of Baltimore schools, where he presented theoretical arguments about why black students in segregated schools have higher levels of self-esteem than those in integrated schools. The first mechanism he proposed was peer responses. Attending segregated schools increases the amount of exposure to positive views about the racial group (e.g., praise, respect) and decreases the amount of exposure to negative stereotypes. Rosenberg's main concern was about how peer responses influence students' self-esteem through internalization (i.e., reflected appraisal), but peer responses are also likely to influence students' overall experience at school and feelings toward the organization where adolescents receive those responses.

The second mechanism that Rosenberg (1979) proposed was social comparison. In integrated schools, black students may negatively evaluate themselves because of their disadvantaged backgrounds and low academic performance, but these challenges are common in segregated schools and thus do not necessarily lead to low self-esteem. Rosenberg emphasized that low self-esteem does not result from having low status at school per se, but stems from being in a "dissonant" context. Therefore, white students and those from wealthy family backgrounds also feel "different" or "out of place" in schools where they are numerical minorities. The social comparison mechanism has direct implications for school attachment because it addresses the degree of fit adolescents perceive between them and their peers.

FRIENDSHIP NETWORK COMPOSITION AND SCHOOL ATTACHMENT

Unlike school-level composition, racial composition of egocentric friendship networks has received little attention in studies of school attachment. School composition determines the pool of potential friends and thus directly influences the likelihood of same-race friendship formation (Joyner and Kao, 2000; Quillian and Campbell, 2003). Other school characteristics, such as school size and racial representations of tracks and extracurricular activities, are known to influence rates of same-race friendships (Hallinan and Williams, 1989; Moody, 2001). Within a given school, however, there is a considerable degree of individual variation in racial composition of friendship networks.

Despite the lack of empirical examination, the existing literature suggests several theoretical reasons to expect a positive relationship between having same-race friends and school attachment. First, students spend a great amount of time interacting with their school friends and engage in many school activities in the company of their friends (e.g., commuting, eating lunch, and attending same classes) (Coleman, 1961; Csikszentmihalyi and Larson, 1984; Eder and Nenga, 2003; Milner, 2006). Therefore, racial composition of friendship networks is likely to shift the degree to which students are exposed to positive and negative responses to their racial backgrounds at school. For example,

even in white-dominant schools, black students can, to some extent, increase support for their racial background and reduce exposure to discrimination by limiting their social interactions to same-race friends. Further, because adolescents generally view their friends' opinions as credible and important (Rosenberg, 1979), their school experience should be more strongly influenced by their friends' racial attitudes than by those of nonfriend peers.

This argument assumes that adolescents receive greater support for their racial backgrounds from same-race friends than from cross-race friends. The assumption has rarely been tested, but previous studies have provided some indirect support. First, students who have many same-race friends tend to show more stable racial identity over time (Ethier and Deaux, 1994). Second, some studies suggested that same-race friendships have better relational quality than cross-race friendships. For example, same-race friendships provide stronger emotional closeness (Hansell, 1984; Schneider *et al.*, 2007), involve a greater number of shared activities (Kao and Joyner, 2004), and show greater stability over time (Hansell, 1984).

Racial composition of friendship networks is also likely to influence the social comparison process. In general, people who have direct contact and those in geographically proximal settings tend to use each other as referents of social comparison (Singer, 1990; Zagefka and Brown, 2005). Therefore, students should be more likely to compare themselves to their friends than to nonfriend peers, and same-race friendships should help reduce the feeling of being out of place. Further, due to the greater emotional closeness and subjective importance of friends, perceived difference from friends is likely to have a more direct effect on students' sense of belonging than perceived difference from nonfriend peers.

Finally, racial composition of friendship networks is closely tied to crowd memberships. For example, some crowds such as "preppies" and "skaters" mostly consist of white students, whereas other crowds include some or many minority students (e.g., "athletes" and "homeys") (Milner, 2006; Perry, 2001). Further, many schools include minority crowds, whose boundaries are explicitly defined by racial or ethnic backgrounds (McFarland and Pals, 2005; Perry, 2001). Having many same-race friends thus signals students' success in finding a niche, which should improve their social experience at school. The present study cannot directly measure crowd memberships, but this literature suggests that same-race friendships should be positively associated with school attachment.

Although I expect to find an overall positive relationship between having same-race friends and school attachment, the relationship may vary to some extent across racial groups because groups differ in how they develop same-race friendships and how they view those friendships. Among black students, for example, those who are academically oriented tend to have more cross-race friendships, partly due to their placement in advanced tracks, which increases social contact with white students (Carter, 2006). Despite the heterogeneity in their friendship networks, these black students may show strong attachment to

school because of their academic orientation. For another example, some Asians may strive to assimilate into the dominant culture and thus view same-race friendships as a sign of failure (Lee, 1994; Shih, 1998; Ying *et al.*, 2001). This process would weaken the hypothesized positive relationship between same-race friendships and school attachment among Asians. Unlike racial minorities, white students may not have a strong need to maintain their racial identity, but their friendship composition is closely tied to popularity. In white-dominant schools, popular crowds mostly consist of white students, whereas peripheral crowds tend to include some racial minorities (Perry, 2001). Thus, for white students, having many same-race friendships may indicate higher status in the popularity hierarchy, which generally correlates with strong school attachment (Moody and Bearman, 2001). These group-specific meaning and formation processes of same-race friendships may create a unique relationship between same-race friendships and school attachment in each group.

INTERACTION BETWEEN SCHOOL AND FRIENDSHIP NETWORK COMPOSITION

So far, I have discussed the relationship between racial composition of friendship networks and school attachment independent of school-level composition. Drawing from the social-psychological literature, I develop a hypothesis that the relationship between same-race friendships and school attachment depends on school-level racial composition.

In general, skewed racial distributions in organizations (i.e., presence of a very few minority individuals) exaggerate the uniqueness of minority members and increase a sense of alienation and emotional distress among them (Jackson *et al.*, 1995; Kanter, 1977). Some minority individuals cope with the situation by developing close relationships within their racial groups (i.e., racial enclaves) (Ethier and Deaux, 1994; Miller and Major, 2000). For two reasons, the ability of same-race friendships to promote school attachment is likely to be limited for minority students in skewed school conditions. First, these students intensively interact within their racial enclaves but lack strong connections to the primary components of school-wide networks. In general, this combination of network characteristics lowers attachment to the higher-level organization (Paxton and Moody, 2003). Second, according to social identity theory (Sidanius *et al.*, 2004; Turner, 1999), the sharp contrast in racial distributions between friends and other members in the organization intensifies attachment to the “in-group” friends while lowering attachment to the “out-group” peers. For minority students, schools in skewed conditions mostly consist of out-group or cross-race peers, so these students are likely to develop emotional distance from their schools. A similar argument has been made in community studies—urban subcultures facilitate social connections among residents who share interests and lifestyles but increase perceived “foreignness”

of other residents (Fischer, 1982). Consequently, urban residents tend to have a lower sense of trust in community members than people who live in rural areas.

One could also draw on Rosenberg's (1979) concepts of "self-consistency motive" and "psychological centrality" to predict the limited ability of same-race friendships to promote school attachment in skewed school conditions. In a high school dominated by white students, for example, a Hispanic student's racial identity is not consistent with the normative image of students. When surrounded by Hispanic friends, she is likely to increase the subjective importance or "psychological centrality" of the friendship network identity and reduce the centrality of the X High School student identity in order to maintain her Hispanic identity.

These psychological dilemmas should be absent among students with many same-race friends attending schools with many same-race peers. Instead, presence of same-race peers should increase the ability of same-race friendships to connect students to the major components of school-wide networks, reduce perceived racial contrast between friends and nonfriend peers, and lower the risk of identity conflict as a member of the racial group and as a member of the school.

Summary

Extending previous research that has focused on school-level racial composition, this study examines the relationship between racial composition of egocentric friendship networks and school attachment. I hypothesize a positive association between number of same-race friends and school attachment. The relationship is likely to vary to some extent across racial groups because groups differ in how they develop same-race friendships and how they view those friendships. I further hypothesize that the relationship between same-race friendships and school attachment will be stronger when the school includes a large proportion of same-race peers.

METHODS

Data and Sample

To test the hypotheses, I used the National Longitudinal Study of Adolescent Health (Add Health). Add Health is an ongoing longitudinal study designed to assess health status and health-related behaviors in adolescence and young adulthood. Among the four waves currently available, I used the initial wave collected at school in 1994 (In-School Survey, contract use version), which included the most extensive friendship data and the largest sample. In the first stage of the sampling process, all high schools in the United

States were given unequal probabilities of selection, depending on region, degree of urbanization, proportion of white students, and enrollment size. In total, 80 high schools and 52 middle schools that sent students to those high schools were selected. Questionnaires were administered at each school to students who were present on that day.

Among the 132 schools, my analysis only included 112 schools that had a response rate of 50% or higher because the measure of friendship network composition was based on friends' direct reporting of their racial backgrounds, which required an adequate level of study participation *at the school level*. Of all racial groups included in the sample, I focused on the following four major groups: non-Hispanic whites ($n = 32,555$); non-Hispanic blacks ($n = 7,761$); Hispanics ($n = 7,693$); and Asians ($n = 2,808$) (total $N = 50,817$). The operational sample did not include respondents who reported mixed racial backgrounds unless they reported their primary racial backgrounds in later waves. It was beyond the scope of this article to address how mixed-race students perceive their friends' racial backgrounds and how those friendships influence their attachment to school. The in-school survey administration allowed the large sample but also produced a large number of missing responses, especially toward the end of questionnaire, where school attachment questions were asked (about 12% of the original sample). To address this issue, list-wise deletion and multiple imputation were used in the analysis. Because those two methods produced similar results, I only present those based on list-wise deletion in this article.

Measures: School Attachment

To construct a measure of school attachment, I first conducted exploratory factor analysis with several possible items from the in-school survey and selected three items that loaded on the same factor. These items included: "You felt close to people at your school," "You felt like you were part of your school," and "You were happy to be at your school." For each question, students chose from five response categories (1 = strongly disagree; 5 = strongly agree). Summed scores across the three items, ranging from 3 to 15, were treated as a continuous dependent variable ($\alpha = .79$). This measure has been used in previous studies based on the Add Health data (Johnson *et al.*, 2001, 2006; Moody and Bearman, 2001; Ueno, 2005).

Measures: Racial Background, Egocentric Network Composition, and School Composition

Racial background was based on the questions: "What is your race?" and "Are you of Hispanic or Spanish origin?" I considered students who reported Hispanic/Spanish origin as members of the Hispanic group, regardless of their

racial identity in the previous question. Thus, the Hispanic ethnicity was treated as an independent racial category in this study.³ To compute *school-level racial composition*, I first aggregated students' racial backgrounds to the school level and then divided the number of respondents from each racial background by the total number of respondents at each school.⁴

Friendship nomination data were used to construct measures of racial composition in egocentric networks. Students taking the in-school survey listed up to five male friends and five female friends. On average, respondents nominated 7.3 friends. When respondents and their friends went to the same schools, friends' identification numbers were recorded. In this study, students were considered as Respondent A's friends if Respondent A had nominated them ("sent nominations") or if they had nominated Respondent A ("received nominations").

For three reasons, it was important to include received nominations as well as sent nominations in the analysis. First, some students might not have reported friendships that they had reluctantly developed, although these friendships might have influenced their school attachment, as discussed earlier. Second, number of received nominations is often used as a measure of popularity (Wasserman and Faust, 1994) and shows positive associations with school attachment in empirical studies (e.g., Moody and Bearman, 2001). School attachment might be affected by which racial group helps maintain each student's popularity. Third, considering both sent and received nominations allowed for more comprehensive measurement of friendship composition and helped reduce any bias caused by random omission in recall and by the maximum limit in nominations. In fact, an exploratory analysis showed that egocentric networks defined by sent ties only tended to be more homogeneous and had a weaker relationship between same-race friendships and school attachment than the primary analysis reported in this article.

Proportion of same-race friends was computed by dividing the number of same-race friends by the total number of friends each respondent had. About

³ Within the Hispanic group, friendships are more likely to develop among those sharing racial identities (e.g., black Hispanics befriend other black Hispanics) (Quillian and Campbell, 2003) and among those sharing national identities (e.g., Mexicans befriend other Mexicans) (Kao and Vaquera, 2006). It is possible that friendships within these subgroups may be associated with school attachment in ways different from the patterns based on the broad category of Hispanics that I report in this article. Subgroup analysis was not feasible because the small size of each subgroup did not provide sufficient numbers of students across various configurations of friendship composition and school composition.

⁴ In some schools, almost all students had the same racial backgrounds. These schools raised two concerns. First, percentage of same-race friends varied very little across students and thus was not appropriate as an individual-level variable. Second, some mechanisms proposed for friendship composition did not apply to these schools. For example, in an almost all-white school, egocentric network composition would not necessarily indicate students' popularity. Add Health included 21 schools with less than 10 racial minorities. Eleven of these schools had been already dropped from the operational sample due to the low response rates. Excluding the remaining 10 schools did change the coefficients in the multivariate analysis to some extent, but produced the same conclusions as described in the text. I thank anonymous reviewers for pointing out this issue.

3% of students who did not have any school friends received 0 for proportion of same-race friends. Excluding these students did not change the overall pattern. In an exploratory analysis, *proportion squared* was used to examine non-linearity in the relationship between same-race friendships and school attachment. The squared term, however, did not show a significant coefficient and thus was not included in the final set of multivariate models.

Control Variables

The analysis included several control variables that measured sociodemographic backgrounds and school-related behaviors because they were correlated with both friendship patterns and school attachment, as demonstrated in previous studies (Johnson *et al.*, 2001; Moody and Bearman, 2001; Ueno, 2005). *Sex* was a dichotomous variable (0 = females; 1 = males). *Grade level* was measured as a continuous variable (ranging between 0 = 7th grade and 5 = 12th grade). As a proximal measure of socioeconomic background, I created five dummy variables for *parents' educational level*, using mother's or father's education, whichever was higher (less than high school; high school graduate; some college; college graduate; don't know/missing).⁵ To measure academic orientation, I used *self-reported grades* in English, math, history or social studies, and science. The average grade was converted into dummy variables (less than 2.5; higher than or equal to 2.5 but lower than 3.5; higher or equal to 3.5; and schools do not give grades).⁶ *Extracurricular activities* counted the number of activities in which students participated. The variable was dichotomized between at least one activity (coded as 1) and no activity (coded as 0) due to its high skewness and nonlinear relationship with school attachment.

At the school level, a dichotomous variable was used to identify private schools (coded as 1). In addition, I considered the following control variables: *punitive school climates*, *delinquency rate*, *school size*, and *school-level friendship network density*.⁷ An exploratory analysis showed, however, that these variables did not affect the relationship between racial composition of friendship networks and school attachment when other control variables were

⁵ For about 7% of students, parents' educational levels were missing from the in-school survey and any later waves in which they participated. These students were placed in a (valid) category of "missing" and included in the analysis to maintain the overall sample size.

⁶ For about 10% of respondents, GPA was missing because their schools did not give grades. As with parents' education, a valid category of "no grades" was used in the analysis. Because of this category, GPA was treated as a nominal variable, instead of an ordinal or interval variable.

⁷ *Punitive policy* was an average score of 12 items from the school administrator survey regarding how the school would respond to certain student behaviors (e.g., cheating, fighting with another student). *Delinquency rate* was a school-level average of seven items based on students' self-report (e.g., skipping school, drinking alcohol, smoking cigarette). *School size* was measured by the number of students on the school roster. *School-level density* was computed by dividing the number of existing friendship pairs by the number of all possible pairs at school.

introduced. To simplify the analysis and minimize the number of missing cases, the models presented below do not include these variables.

ANALYSIS PLAN

Descriptive statistics of the key variables were first computed separately for each racial group and for the four groups combined. For multivariate analysis, hierarchical linear model (HLM) was used (Raudenbush and Bryk, 2002). Because students were clustered within schools, HLM was superior to traditional methods (e.g., ordinary least square model) in computing unbiased standard errors. As the initial step of model building, an unconditional model was run to estimate how much variation in school attachment existed within schools and across schools. The next model regressed school attachment on individual-level predictors, including racial background, proportion of same-race friends, and individual-level control variables. By adding interaction terms between racial background and proportion of same-race friends, the subsequent model tested whether the relationship between same-race friendships and school attachment varied across the four racial groups. In the following step, school-level predictors were added to see whether school-level racial composition was associated with school attachment after individual-level predictors had been taken into account. Finally, cross-level, three-way interaction terms among individual race, friendship composition, and school composition were used to examine whether the relationship between same-race friendships and school attachment depended on school composition. Throughout the analysis, sampling weights were used to account for the oversampling of certain adolescent groups.⁸

RESULTS

Descriptive Statistics

Table I presents descriptive statistics of key variables for each racial group. White students showed the strongest attachment to school, black students the weakest, with Asians and Hispanics in between. These group differences were not particularly large, however, given the great amount of variation within each racial group. As reported in previous studies (Joyner and Kao, 2000; Quillian and Campbell, 2003), the overall proportion of same-race friends was high, indicating friendship networks tended to be racially homogenous, but the degree of homogeneity varied across groups. Compared to white and black students, Hispanic and Asian students had lower

⁸ Add Health oversampled black students from educated families, Chinese students, Cuban students, and Puerto Rican students.

Table I. Descriptive Statistics of Key Variables by Racial Groups

	White (<i>n</i> = 32,555)		Black (<i>n</i> = 7,761)		Hispanic (<i>n</i> = 7,693)		Asian (<i>n</i> = 2,808)		All (<i>N</i> = 50,817)		Group Difference
	Mean	<i>SD</i>	Mean	<i>SD</i>	Mean	<i>SD</i>	Mean	<i>SD</i>	Mean	<i>SD</i>	
Individual Level											
School attachment	10.92	(2.90)	10.29	(2.96)	10.50	(2.98)	10.71	(2.69)	10.76	(2.92)	$F = 14.30^{**}$
Prop. same-race friends	.79	(.27)	.55	(.36)	.31	(.35)	.31	(.35)	.68	(.35)	$F = 37.93^{**}$
Sex (male = 1)	.49		.44		.50		.52		.48		$X^2 = 10.03^{**}$
Grade level (7th = 0 thru 12th = 5)	2.66	(1.68)	2.65	(1.66)	2.57	(1.67)	2.88	(1.66)	2.65	(1.68)	$F = .96$
Parents' education											
Less than HS	.05		.08		.22		.06		.08		$X^2 = 34.93^{**}$
HS graduate	.39		.39		.33		.17		.37		
Some college	.13		.15		.12		.08		.13		
College graduate	.38		.29		.21		.52		.35		
Missing	.05		.09		.12		.17		.07		
Extracurricular activity	.85		.86		.79		.86		.85		
GPA											
<2.5	.23		.32		.32		.13		.25		$X^2 = 9.47^{**}$
2.5-3.5	.38		.39		.36		.36		.38		$X^2 = 17.88^{**}$
≥3.5	.31		.15		.15		.43		.27		
No grades received	.08		.15		.16		.08		.10		
School Level (<i>n</i> = 112)											
Private									Mean	<i>SD</i>	
Proportion white ^a									.09	(.31)	
Proportion black									.19	(.25)	
Proportion Hispanic									.13	(.16)	
Proportion Asian									.05	(.08)	

^aSchool-level proportions do not add up to 1.00 due to students who reported other racial backgrounds.

p* < .05; *p* < .01.

proportions of same-race friends, mainly because they made up smaller portions of student body in many schools and thus had fewer opportunities to meet possible friends from the same racial backgrounds (Joyner and Kao, 2000; Quillian and Campbell, 2003). In bivariate analysis, proportion of same-race friends showed a weak correlation with school attachment ($r = .08$, $p < .001$).

Multivariate Analysis

This subsection describes the process of multivariate model construction. A reader who wishes to focus on interpretations of the final model may skip to the next subsection (Group Comparisons). First, the amounts of variation within schools and across schools were estimated in an unconditional model (i.e., intercept-only model). The result showed variance components of 8.23 at the individual level and .36 at the school level and an intraclass correlation of .04, indicating that most of the variation in school attachment existed within schools. Table II presents the results from subsequent models. These models specified white students as the reference category and included all control variables described in the Methods section. As expected, Model 1 showed that proportion of same-race friends was positively associated with school attachment. To test whether this association varied across racial groups, I added in Model 2 interaction terms between respondent's racial background and proportion of same-race friends. None of these interaction terms was significant, indicating that the relationship between friendship racial composition and school attachment was similar across racial groups (when school composition was not considered).

Models 3 through 5 examined the relationship between school-level racial distribution and school attachment, controlling for friendship-level racial distribution. Because school-level proportions of blacks, Hispanics, and Asians were collinear with each other, I entered each variable in a separate model. Each model also included a cross-level interaction between respondent's racial background and school composition in order to test whether having many same-race peers was associated with school attachment. Model 3, for example, shows that proportion of black peers had a significantly more positive association with school attachment among black students than among white students ($b = 1.33$ for School Proportion Black * Black), as hypothesized. School Proportion Hispanic * Hispanic (Model 4) and School Proportion Asian * Asian (Model 5) did not reach statistical significance, however. Overall, the main effect of school composition was small or nonexistent once friendship composition was taken into account.

In the final set of models in Table II (Models through 6 and 8), I examined the three-way interactions among respondent's racial background, proportion of same-race friends, and school composition. The models tested one of the main questions in this study: Is the relationship between same-race

Table II. (Continued)

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
School prop. Asian * Same-race friends						.88		-.44
School prop. black * Same-race friends * Black							1.64	
School prop. Hispanic * Same-race friends * Hispanic								4.23*
School prop. Asian * Same-race friends * Asian								9.36**
Intercept	9.42**	9.39**	9.50**	9.38**	9.36**	9.47**	9.37	9.36**
df	.17**	.18**	.17**	.18**	.17**	.17**	.17	.17**
Intercept Variance	110	110	109	109	109	109	109	109
Chi-square	1203	1208	1165	1196	1187	1164	1192	1181
Level-1 Error Var.	7.69	7.69	7.68	7.69	7.69	7.68	7.69	7.69
Deviance	248192	248173	248138	248173	248166	248135	248164	248155

* $p < .05$; ** $p < .01$.
 $N = 50,817$ students in 112 schools.

friendships and school attachment more positive when the racial group makes up a higher proportion of the student body? The hypothesis was supported for Asians, as indicated in the positive coefficients of the three-way interactions in Model 8. The pattern did not appear for black or Hispanic students, however (Models 6 and 7).

Another set of multivariate models was constructed to identify the pattern of school attachment among white students. The set of analyses presented above specified whites as the reference category and thus could have demonstrated the pattern for their school attachment if a model simultaneously included all possible interaction terms (Jaccard and Turrisi, 2003). As mentioned previously, however, the collinearity among school-level measures of racial composition prevented me from running the full model. Therefore, in the next set of models, I contrasted white students to nonwhite students (i.e., blacks, Hispanics, and Asians combined in one category). Table III presents the results. Model 1 indicates a weak but significantly positive relationship

Table III. School Attachment Regressed on Racial Backgrounds (White Versus Nonwhite), Friendship Composition, and School Composition (Unstandardized Hierarchical Linear Model Coefficients)

	Model 1	Model 2	Model 3	Model 4
Individual-Level Predictors				
Sex (male = 1)	.30**	.30**	.30**	.30**
Grade level	-.21**	-.21**	-.21**	-.21**
Parents' ed. (ref: HS)				
Less than HS	-.15**	-.15*	-.15*	-.15**
Some college	.02	.02	.02	.02
College graduate	.18**	.18**	.18**	.18**
Missing	-.20**	-.20**	-.21**	-.21**
Extracurricular activity	1.31**	1.30**	1.30**	1.30**
GPA (ref: <2.5)				
2.5-3.5	.53**	.53**	.53**	.53**
≥3.5	.94**	.94**	.94**	.94**
No grades received	.11	.12	.12	.12
White	.30**	.19*	-.08	.21
Prop. same-race friends	.26**	.13	.06	.63**
Prop. same-race friends * White		.25	.22	-.74
School-Level Predictors				
Private	.14	.13	.13	.15
School prop. white	-.05	-.14	-.38	.10
Cross-Level Interactions				
School prop. white * White			.53*	-.09
School prop. white * Same-race friends				-1.92**
School prop. white * Same-race friends * White				2.46**
Intercept	9.20**	9.29**	9.41**	9.19**
Intercept Variance	.18**	.18**	.18**	.18**
df	109	109	109	109
Chi-square	1218	1226	1194	1170
Level-1 Error Var.	7.70	7.70	7.69	7.69
Deviance	248233	248228	248221	248175

* $p < .05$; ** $p < .01$.
 $N = 50,817$ students in 112 schools.

between proportion of same-race friends and school attachment in the overall sample, consistent with the first set of models. Model 2 shows that this relationship was not any stronger for whites than for nonwhites. As shown in Model 3, white students' attachment level increased as proportion of white peers increased ($b = .53$ for School Proportion White * White), similar to the pattern observed for black students. Model 4 shows a positive three-way interaction, indicating the relationship between same-race friends and school attachment was stronger for white students attending schools with large proportions of white peers than for those attending schools with small proportions of white peers, analogous to the pattern observed for Asian students.

GROUP COMPARISONS: A GRAPHIC DEMONSTRATION

Figure 1(a)–(d) graphically summarizes the results from the final models, which included the three-way interactions among racial background, friendship composition, and school composition (in Table II, Model 6 for blacks, Model 7 for Hispanics, and Model 8 for Asians, and in Table III, Model 4 for whites). Each line represents the relationship between friendship composition and school attachment for a selected proportion of same-race peers at school (2%, 5%, 15%, 50%, or 80%). Due to sparse data points, the figure does not

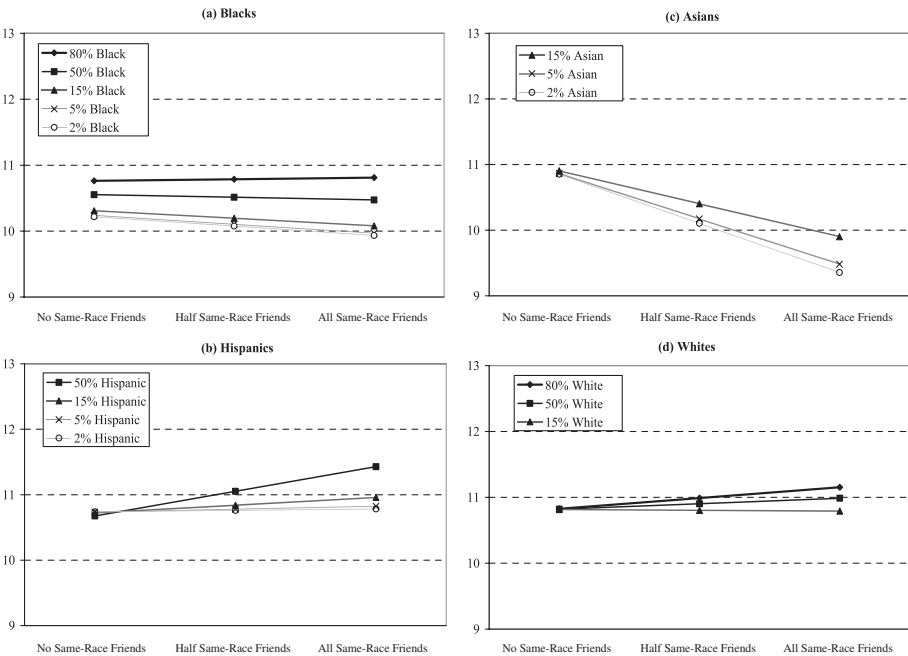


Fig. 1. Adjusted school attachment level by racial background, friendship composition, and school composition.

show certain combinations of school composition and racial categories (e.g., white students in 2% white schools, Asian students in 80% Asian schools). To facilitate comparison across racial groups, the figure displays predicted attachment scores in the same range (9 through 13). Given the standard deviation of school attachment (2.29), the association between racial composition and school attachment is fairly weak for all four groups.

For black students, Fig. 1(a) shows flat lines that run nearly parallel with each other, reflecting the following findings: (1) school composition is positively associated with school attachment; (2) friendship network composition is not associated with attachment; and (3) the association between friendship composition and school attachment does not depend on school composition. Previous studies emphasized the first finding (e.g., Johnson *et al.*, 2001; Moody and Bearman, 2001), but the second and third patterns have not been documented. There are at least two possible reasons for the lack of friendship composition effect among black students. First, the underlying mechanisms (social comparison and reflected appraisal) operate only at the school level. For example, presence of same-race peers may be more important than having same-race friends when students evaluate the degree of fit between them and others, or students may be more sensitive to the overall school climate than they are to their friends' racial attitudes. The second interpretation is that black students who have cross-race friends tend to be more academically oriented than other black students because their cross-race friendships, particularly those with white students, often result from their placement in advanced academic tracks (Carter, 2006). Academic orientation linked to cross-race friendships may thus counterbalance the effects of social comparison and reflected appraisal among black students.

For Hispanic students, Fig. 1(b) shows a flat line for 2% Hispanic schools, and lines slightly increase in positive slope as school-level Hispanic composition goes up. The difference in slopes is not large enough to reach statistical significance, however. The finding extends previous studies on Hispanic students' school experience, which have focused on friendship-level composition (e.g., Ethier and Deaux, 1994). The present study shows that school-level racial composition is not strongly related to Hispanic students' school attachment or does not strongly moderate the relationship between friendship composition and attachment.

As shown in Fig. 1(c), Asians' attachment level *decreases* as proportion of same-race friends increases, contrary to the general argument developed in this article. Previous studies offer two possible interpretations. First, same-race friendships among Asians could exacerbate individual pursuits for academic achievement and competition with each other (Hwang, 2005; Lee, 1994). Those experiences may reduce emotional closeness to other students at school. Second, Asians tend to assimilate into the mainstream culture quickly (Alba *et al.*, 2002), and they are often encouraged by parents to befriend non-Asian peers because parents view cross-race friendships as a means to increase social capital and improve life chances (Lee, 1994; Shih, 1998; Ying *et al.*, 2001).

Asians are not any less likely than other students to have same-race friends, however (Joyner and Kao, 2000; Quillian and Campbell, 2003). This contradiction seems to indicate that drift processes strongly operate for Asians' same-race friendships—some Asian students may become associated with each other after they fail in developing cross-race friendships. Same-race friendships resulting from attempts to avoid complete isolation, instead of a desire to share cultural backgrounds, might not help promote positive sentiments.⁹

The negative association between same-race friendships and school attachment among Asians should not be overemphasized, however. The pattern partly results from the fact that Asians make up small portions of the student body in many schools. As clear from Fig. 1(c), even within the limited variation of school-level Asian composition in the data (2–15%), having more Asian peers at school alleviates the negative relationship between same-race friendships and school attachment.

White students showed the expected pattern of same-race friends and school attachment—having many same-race friends is associated with strong attachment to school, and the relationship is stronger when they attend schools with many same-race peers (see Fig. 1(d)). White students may not be as concerned as other students about their racial identities because they make up the majority group in many schools. As pointed out earlier, however, racial composition of friendship networks is closely linked to their positions in the popularity hierarchy. Given that popular students tend to be strongly attached to school (Moody and Bearman, 2001), the association between same-race friendships and school attachment among white students might be partly explained by their popularity at school. Consistent with this argument, a supplemental analysis showed that the bivariate correlation between friendship composition and total number of friends was somewhat higher among white students ($r = .20$) than among other racial groups ($r = .09$ or lower). Further, controlling for total number of friends reduced the relationship between same-race friends and school attachment to insignificance among whites but not for other groups (results not presented here).

DISCUSSION

Theoretical Implications

The purpose of this study was to examine the relationship between friendship network composition and school attachment. Students who have many

⁹ Yet another possible way to interpret the negative association between same-race friendships and school attachment among Asian students is that the linguistic and cultural diversity within the racial group limits the benefit of having same-race friends. As Kao and Joyner (2006) demonstrated, however, Asian students' same-race friendships are mostly specific to nationality (e.g., a friendship between Korean students). Therefore, this interpretation is unlikely to account for the present finding.

same-race friends tend to be more strongly attached to school, consistent with the argument that friendship networks provide an immediate context for social interactions at school and shift the amount of support students receive for their racial backgrounds. However, the relationship is fairly weak, indicating the presence of other individual and school factors that influence school attachment. The weak relationship may also suggest that same-race friendships do not necessarily provide relational quality superior to cross-race friendships (Aboud *et al.*, 2003). Further, black and Asian students do not show the positive relationship between same-race friends and school attachment. I argued above that certain group-specific processes may counteract the ability of those friendships to promote school attachment.

The study extends previous research on school attachment that focused on school-level racial composition (Johnson *et al.*, 2001; Moody and Bearman, 2001) in two ways. First, when friendship-level composition is considered, the main effect of school-level composition is very weak. The finding is consistent with community and mental health studies that addressed the importance of immediate social environment that shapes psychological states (Fischer, 1982; Lin *et al.*, 1999). Second, school-level composition interacts with friendship-level composition in its associations with school attachment. The finding thus gives support for the argument that presence of many same-race peers at school increases the ability of same-race friendships to connect students to the primary components of school-wide networks and reduces perceived racial contrast between friends and nonfriend peers. The interaction between the two levels of racial composition was observed only for whites and Asians. Future research is necessary to explain the group differences.

Due to its focus on school-level racial composition, the existing literature tends to emphasize the structural influence of organizational characteristics on student experience. By incorporating friendship-level racial composition in the analysis, the present study sheds light on the role of agency in three ways. First, school-level racial composition has only a limited impact on network-level composition because students seek out same-race friends and cushion any negative influence of school composition on their racial identities. Second, students may place greater importance on their interaction with friends, who are more likely to be supportive of their racial backgrounds than are other peers at school. This process may partly explain why friendship composition is more strongly related to school attachment than school composition (except for black students). Third, when faced with conflicting composition at the friendship and school levels, students may lower their attachment to school in order to reduce the cognitive dilemma. In other words, adjustments in school attachment may be viewed as a coping behavior. This mechanism may partly account for the three-way interaction among individual racial background, network composition, and school composition.

The conceptualization of racial composition at two levels of social environment generates many possibilities for future research. First, the study can be extended to examine other dimensions of friendship network and school

composition. For example, the relationship between same-sex friendships and school attachment may vary across schools with different sex ratios. Second, the study design can be applied to organizational contexts in the adult population. For example, racial composition of neighborhoods or workplaces may intensify the relationship between personal networks and attachment to the community or the organization.

Policy Implications

Given that same-race environment is positively associated with school attachment under certain conditions, one may interpret the results as advocating racial segregation. Before drawing this conclusion, two issues need to be considered. First, the relationship between racial composition and attachment is fairly weak. Second, the correlation between same-race friendships and school attachment is likely to reflect a reciprocal causal relationship. Therefore, increasing the level of racial segregation in friendship networks may not necessarily strengthen school attachment to a great degree. Third, school attachment is only one correlate of same-race relationships, and racial segregation may create negative consequences in other areas. For example, increasing racial segregation would take away from students opportunities to learn about racial diversity, which could in turn undermine racial relations at the societal level. In sum, the results do not necessarily support racial segregation at the school or friendship level. Rather, the results should be understood as a warning that racial integration, even when intended to improve students' education and enrich their school experiences, entails a possible cost of weak attachment. My recommendation is in line with that of Goldsmith (2004), who addressed an increased sense of interracial conflict among students in racially integrated schools.

Perhaps the key to promoting school attachment lies in improving students' attitudes toward their cross-race friends and peers. For example, racial composition would not matter much for school experience if students can receive equal levels of support from same-race and cross-race friends or if having cross-race peers does not cause students to feel out of place. Therefore, reducing prejudice and promoting appreciation for racial diversity may help strengthen school attachment.

The study showed that having many same-race friends does not necessarily strengthen school attachment if the racial group makes up only a small portion of the student body. This finding thus indicates that creating a niche for racial minorities is not sufficient to improve their school experience. School administrators and teachers are encouraged to develop strategies to connect these students to other students outside of racial enclaves by promoting racial mixing in extracurricular activities and academic tracks (Moody, 2001), for example.

Limitations and Future Research

Add Health had many advantages that previous surveys lacked. Most importantly, the large national sample included students in various configurations of racial background, network composition, and school composition. The original data, however, were not designed to answer the specific questions asked in this article and thus did not include measures for the underlying mechanisms (e.g., peers' and friends' racial attitudes, social comparison, crowd memberships). Incorporating these measures in future studies will not only allow for direct tests of these mechanisms, but will also help clarify why the four racial groups differ in the relationship between friendship composition and school attachment. Qualitative studies will also be helpful in this regard. This study relied on cross-sectional data. Longitudinal data would help determine causal direction of the relationship as well as further enhance the ability to identify underlying mechanisms. Finally, the measure for network composition only included students attending the same schools as respondents. Future research is necessary to examine whether racial composition of friends outside school has a unique association with school attachment.

CONCLUSIONS

By examining the role of network-level racial composition, this study extends the existing literature on school attachment that focuses on school-level racial composition. Friendship composition generally shows a stronger relationship with school attachment than school composition, indicating the importance of immediate social environment for student experience. The study does not necessarily deny the importance of school composition, but elaborates on how school composition matters for school attachment—by influencing racial composition of friendship networks and shifting the ability of same-race friendships to promote school attachment. These findings help clarify the complex relationship among social organizations, personal relationships, and the self.

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