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Cross-Class Friendship and Academic Achievement in Middle School

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Academic achievement disparities based on parental education are robust during the middle school years. The current study examined whether cross-class friendship (i.e., reciprocal relationships between peers with different levels of parental education) decrease class-based achievement differences during a developmental phase when friends are particularly important. Relying on a sample of 4,288 sixth grade students ($M = 12.03$ years) from 26 ethnically diverse middle schools, multilevel analyses were conducted predicting seventh-grade grade point average, standardized achievement test scores, and teacher-rated academic engagement. The associations between parental education and academic achievement were reduced when students had at least 1 cross-class friendship at sixth grade. The findings are discussed in terms of how socioeconomic diversity of school-based friendships can level the academic playing field.

Keywords: friendship, early adolescence, academic achievement, parental education, middle school

Research documents robust academic achievement disparities based on socioeconomic status (SES), including parental occupation, annual income, and education. On average, students from lower-SES backgrounds perform more poorly than their higher-SES peers on standardized achievement tests and typically also receive lower grades (Reardon, 2013; Sirin, 2005). These achievement differences, although relatively stable throughout childhood, widen significantly during the middle school years (Caro, McDonald, & Willms, 2009). By high school, lower-SES students are five times more likely than their higher-SES peers to drop out (Chapman, Laird, Ifill, & KewalRamani, 2011). Parental education, in particular, sets the stage for students' academic performance both by directly providing resources at home and by indirectly providing social capital that is critical to succeed in school (Coleman, 1988). Yet, most research linking parental education to achievement focuses either on younger students in elementary school (e.g., opportunities for cognitive stimulation; Boca, Flinn, & Wiswall, 2016) or high school students (e.g., access to instrumental academic support; Crosnoe & Muller, 2014). Although it is recognized that early adolescence represents a critical window to boost achievement before some students fall off-track academically and

disengage from school (Juvonen, Le, Kaganoff, Augustine, & Constant, 2004), relatively little is known about factors that might moderate achievement differences related to parental education during middle school.

One relatively unexplored, yet potentially critical factor underlying widening achievement disparities during early adolescence is friends. At a time of increasing independence from parents and growing reliance on friends (Collins & Laursen, 2004), close peer relationships provide an ideal context to promote achievement especially among young adolescents from homes with lower educational privilege. However, given that beginning in middle childhood and early adolescence youth typically form friendships with peers who share similar attributes to themselves (McPherson, Smith-Lovin, & Cook, 2001), SES-related achievement differences are likely to widen when friendship networks are segregated by parental education level. In contrast, friendships between students from different family backgrounds—that is, *cross-class friendship*—may help equalize academic opportunities and performance. The current study is therefore designed to gain insights into the potential of cross-class friendship to function as social capital (cf. Crosnoe, Cavanagh, & Elder, 2003), attenuating the link between parental education and academic achievement. This topic is particularly timely given widening socioeconomic disparities and sheds light on the potential ramifications of increasing socioeconomic segregation in U.S. schools (Owens, Reardon, & Jencks, 2016; Reardon, 2013).

Parental Education, Achievement, and Friendships

Although all indicators of socioeconomic status (e.g., parental occupation, annual income, and education) are related to children's achievement, parental education level is the most consistent predictor of academic performance (e.g., educational expectations, attainment, engagement; Cherng, Calarco, & Kao, 2013; Sirin, 2005). These effects are robust over and above ethnic differences (Cherng et al., 2013). For example, only 13% of students with high school educated parents will obtain a bachelor's degree, far less than students whose parents have a bachelor's degree (49%), a

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master's degree (65%), or a doctorate (73%; Carnevale & Strohl, 2013). Moreover, having a mother, in particular, with a college degree is associated with 230% greater odds of college completion (Cherng et al., 2013). Although parents across all educational levels value education (Crosnoe & Muller, 2014), those who have not had the opportunity to graduate from high school or obtain postsecondary education are, on average, less likely to have access to information and resources to aid their children in navigating increasingly complex schooling processes (Cooper, Chavira, & Mena, 2005). Consequentially, constrained by society's opportunity structure, the interplay between family background and academic achievement significantly contributes to the intergenerational transmission of socioeconomic inequality (Black, Devereux, & Salvanes, 2005). To be able to disrupt such persistent intergenerational cycles, socioeconomically diverse schools might provide opportunities for leveling achievement disparities especially if students form close relationships *across* social class.

Developmental theorists have long recognized that peer interactions influence cognitive development and learning (Piaget, 1965; Vygotsky, 1978). When young adolescents from homes with different levels of parental education form a friendship, their exposure to one another's unique perspectives and life experiences provide opportunities for new insights and cognitive growth (cf. Benner & Crosnoe, 2011). Given that youth sharing a strong emotional bond are more likely to challenge each other's beliefs and behaviors (Azmitia & Montgomery, 1993; Gauvain, 2016), close friendships between dissimilar peers are particularly likely to promote learning and broaden youth's knowledge base. Friendships with dissimilar others may be especially critical during the adolescent years when exploring and affirming personal identity is considered a central developmental task and relationships with others are at the core of this process (Erikson, 1968). Without such difference-bridging relationships, adolescents are likely to develop relatively narrow world views and understandings of others. Thus, insofar as learning emerges through mutual discussion and accommodation of perspectives (Piaget, 1965; Vygotsky, 1978), cross-class friendships may promote cognitive or behavioral changes that are positively related to academic outcomes.

Although school-based friendships are constrained by lack of availability (e.g., neighborhood, school segregation; Owens et al., 2016; Reardon, 2013) and a preference to affiliate with similar peers (McPherson et al., 2001), interactions between dissimilar peers have, indeed, been linked to more positive school outcomes. For example, when students across ethnic groups or students with and without disabilities are assigned to work collaboratively, *all* students show academic gains (Roseth, Johnson, & Johnson, 2008). Also, students with cross-ethnic friendships have been shown to be more academically engaged, motivated to learn (Kawabata & Crick, 2015) and more likely to attend college than those with only same-ethnic friendships (Hallinan & Williams, 1990). Similar findings have been documented also for other types of cross-group friendships. For example, when examining cross-gender friendships in high school, Robnett and Leaper (2013) found that adolescent girls who were friends with boys showed more interest in STEM careers than those with no cross-gender friendships. Relative to cross-gender and cross-ethnic friendships, far less is known about friendships that cross social class boundaries.

Socioeconomic (Dis)similarity in Friendships

Friendship formation during adolescence is likely to be shaped in part by SES given its increasing salience (Leahy, 1981). That is, not only are friendship opportunities constrained by SES-segregated schools (Owens et al., 2016; Reardon, 2013), but as mentioned above, students tend to form friendships with similar others (McPherson et al., 2001). Indeed, both children (Kupersmidt, DeRosier, & Patterson, 1995) and adolescents (Cherng et al., 2013; Malacarne, 2017) are more likely to affiliate with same-class friends. Using data from the National Longitudinal Study of Adolescent Health (Add Health), Malacarne (2017) demonstrated that on average two thirds (63%) of nominated friends were same-class. Unfortunately, however, social networks consisting entirely of same-class friends may strengthen the association between SES and achievement. That is, inasmuch as SES achievement differences are accounted for by access to differential resources, homogeneous social class ties may limit the interactions students experience and further differentiate educational opportunities and information across SES groups.

Just like other social relationships (e.g., with teachers or mentors), cross-class friendships can function as one source of social capital (Cherng et al., 2013; Stanton-Salazar & Dornbusch, 1995). Namely, when youth form ties with peers from different family backgrounds, they can gain access (directly or indirectly) to new knowledge and resources. Exposure to peers with college-educated parents has been presumed to widen access to study strategies, enrichment opportunities, and so forth, that facilitate academic success (Crosnoe, 2009; Crosnoe & Muller, 2014). Joining a friend at the science museum, for instance, may serve as an important supplement to in-school learning and therefore promote confidence that motivates participation in classroom discussions. Indeed, evidence in high school suggests that students are more likely to enroll in and complete college when their friends have college-educated parents (Cherng et al., 2013; Choi, Raley, Muller, & Riegle-Crumb, 2008). Cherng, Calarco, and Kao (2013), for example, found that having a best friend with a college-educated mother increases the odds of college completion by 60%. Also, having college-educated friends on Facebook has been shown to predict working class young adults' application efficacy and anticipated college success (Wohn, Ellison, Khan, Fewins-Bliss, & Gray, 2013). Cross-class friendships may therefore represent a social mechanism that promotes intellectually enriching exchanges for all (Piaget, 1965; Vygotsky, 1978) and boosts in particular the academic know-how, confidence, and engagement among youth from families with less educational privilege.

Current Study

Extending past research highlighting the resources adolescents acquire from their families at home (Bowen, Chingos, & McPherson, 2009), the current study considers adolescents' close friendships as one potential resource that may help reduce achievement differences related to parental education. Consistent with past research based on Add Health (Malacarne, 2017), cross-class friendship is defined as mutual tie between two students whose parents vary in their level of education (e.g., no high school diploma vs. college degree; some college vs. graduate degree). For this study, we compare students with at least one cross-class friendship at the end of their first year in middle school to those

who have no cross-class friendships. Given that friendship relations are particularly powerful following major transitions (e.g., Crosnoe, 2000), we presume that friendships during the first year of middle school can predict changes in students' academic engagement and achievement—regardless of whether these particular relationships are maintained across multiple years in middle school. Descriptive information about the prevalence and demographic correlates of cross-class friendships in ethnically diverse middle schools are provided first to shed light on socioeconomic (dis)similarity in friendships.

The main analyses examine whether cross-class friendship during the first year of middle school (sixth grade) moderates the association between parental education and academic achievement 1 year later (seventh grade), as indicated by grade point average (GPA), standardized achievement test scores, and teacher-rated classroom engagement. Consistent with social capital perspectives (e.g., Cherg et al., 2013; Crosnoe et al., 2003), we presume that cross-class friendship attenuates the link between parental education and achievement. That is, achievement disparities based on parental education are expected to be smaller when students' have at least one cross-class friendship.

The present study contributes to the existing research in several ways. First, we focus on early adolescence, when achievement disparities based on SES widen (Caro et al., 2009) and when youth increasingly rely on their friends for academic support (Azmitia, Cooper, & Brown, 2009). Moreover, due to residential socioeconomic segregation (Bischoff & Reardon, 2014), opportunities for cross-class friendships are likely to increase as several neighborhood elementary schools feed into one larger middle school. Second, by focusing on parental education, the present research extends existing conceptualizations of cross-group friendships that bridge gender and ethnic groups. At a time of widening SES disparities in the U.S. and increasing SES segregation of schools (Owens et al., 2016; Reardon, 2013), it is critical to understand how friendships that cut across social class may impact youth academically. We also focus specifically on parental education level—the strongest social class indicator of achievement (Cherg et al., 2013; Sirin, 2005), yet presumably less observable than income or parental occupation. Finally, whereas past studies examining social class achievement differences rarely take ethnicity into account (e.g., Stephens, Hamedani, & Destin, 2014), we rely here on a large ethnically diverse public school sample and examine the effects of cross-class friendship over and above cross-ethnic ties which are positively associated with academic performance (Hallinan & Williams, 1990; Kawabata & Crick, 2015).

Method

Participants

The current study relies on data from a large, longitudinal study of adolescents recruited from 26 urban public schools in California that varied systematically in ethnic composition. The study was approved by the Institutional Review Board at UCLA (IRB protocol number 11–002066). Participants with at least one reciprocated friendship in the spring of sixth grade were included in the analytic sample ($n = 4,288$; 56% female).¹ Those without data necessary to assess cross-class friendship, including participants—or their reciprocated friends—with missing parent educa-

tion data were not included in the analytic sample. Based on self-reported ethnicity, the analytic sample was 30% Latino/a, 21% White, 15% Multiethnic/Biracial, 14% East/Southeast Asian, 11% African American/Black, 3% Filipino/Pacific Islander, 2% Middle Eastern, 2% South Asian, and 2% from other ethnic groups. The sample varied also in immigration history: 11% of participants identified as first generation immigrants, 49% as second generation and 40% as third-plus generation. In addition, the proportion of students eligible for free and reduced lunch price (a proxy for school SES) ranged from 18% to 86% ($M = 47.07$, $SD = 18.28$) across the 26 schools. Given the wide variation of free and reduced lunch eligibility across schools, the analyses take into account the availability of cross-class peers.

At the end of seventh grade (i.e., when achievement outcomes were assessed), the participation rate was 89% of the original sample, which is better or comparable with other longitudinal studies that rely on largely ethnic minority samples in urban school settings (e.g., Schwartz, Cappella, & Seidman, 2015). Independent samples t tests were conducted to compare the retained sample of students and those without the seventh grade outcome data on GPA, achievement test scores, and academic engagement. Compared with the retained students, those missing the seventh grade data had lower GPA's, $t(407.66) = 4.25$, $p < .001$; standardized test scores, $t(3465) = 4.41$, $p < .001$; and were rated by their teachers as less engaged in school, $t(466.03) = 4.47$, $p < .001$, during the sixth grade, suggesting that some of the most vulnerable students were not retained. Yet, because of our estimation methods, we were able to include participants with even just one wave of data (see Analytic Plan section).

Procedure

All school districts provided permission to conduct the study, and during sixth grade recruitment all students and families received informed consent and informational letters. To increase the return rates of parental consent forms, two \$50 gift cards were raffled in each school for those students who returned a consent form, regardless of parental permission to partake in the study. Additionally, two iPods were raffled among study participants. Across the 26 schools, participation rates ranged from 74% to 94% ($M = 84\%$). Only students who turned in signed parental consent and provided written assent participated.

Data collection was conducted in school. Prior to completing the questionnaires, students were informed about confidentiality and reminded that participation was voluntary. All instructions and questionnaires were read aloud by trained researchers as students followed along and provided written responses within a protected space. After completing the survey, students received cash or gift certificate compensation (\$5 in sixth grade and \$10 in seventh grade).

¹ Consistent with past research (e.g., Wentzel, Barry, & Caldwell, 2004), compared with the retained students with at least one friendship, the friendless youth ($n = 1,173$; 41% female) had lower GPA's, $t(1708.66) = -9.76$, $p < 0.001$; standardized test scores, $t(5169) = -8.52$, $p < 0.001$; and were rated by their teachers as less engaged in school, $t(5301) = -7.09$, $p < 0.001$ during the sixth grade.

Measures

Parent education level. The parent/guardian who completed informed consent at sixth grade (75% mothers) indicated their highest level of education using six categories (1 = elementary/junior high school, 2 = some high school, 3 = high school diploma or GED, 4 = some college, 5 = 4-year college degree, and 6 = graduate degree). The “elementary/junior high school” ($n = 402$) and “some high school” ($n = 269$) levels were merged into a “no high school diploma” group due to relatively small sample sizes across the ethnic groups. The sample breakdown across the five parental education categories was as follows: 17% no high school diploma, 12% high school diploma or GED, 28% some college, 23% 4-year college degree, 20% graduate degree. Within each school, all parental education categories were represented (to varying degrees). Given the high degree of overlap between ethnicity and SES in the U.S. (U.S. Census Bureau, 2014), Table 1 reports the pan-ethnic breakdown across each parental education category. As shown, Latino students were over-represented in the “no high school diploma” group, while African American students were heavily represented in the “some college” group. Parents of Asian and White students fell predominantly into the “some college” or higher education groups, with relatively even distributions across these categories.

Cross-class friendship. Presence versus absence of cross-class friendship was determined by student friendship nominations in the spring of sixth grade when students had already had several months to get to know one another. Students were asked to list the names of their good friends in their grade, using an unlimited nomination procedure. For the main analyses, only friendship nominations that were reciprocated by the nominee were considered to avoid nominations of desired friendships (Echols & Graham, 2016). (Supplementary analyses, were also conducted by relying on outgoing friendship nominations, see Footnote 3). Cross-class friendship was calculated by comparing the parental education level of the nominated friends to the nominee’s parental education level. Consistent with Malacarne (2017), friends whose parents’ educational attainment differed by two or more points on the five-level parental education measure (see above) were considered cross-class.² Presuming that having at least one cross-class friend would provide opportunity for access to novel resources and exposure to alternative perspectives, a dichotomous indicator was then calculated to indicate if students had at least one cross-class friendship or not.

Academic achievement outcomes. Three indicators were used to assess academic achievement at sixth grade as a baseline and at the end of seventh grade as the main outcome. Across the two time points, the intercorrelations varied between .43 and .67. In spite of the high intercorrelations, we test the robustness of the effects across indicators that rely on different data sources.

GPA. Students’ GPA was calculated using school transcripts. End-of-year grades for all courses were coded on a 5-point scale (4 = A and 0 = F) and then averaged to create a composite GPA for each student ($M_{6th} = 3.11$, $SD_{6th} = .78$; $M_{7th} = 3.00$, $SD_{7th} = .88$).

Achievement test scores. An annual California Standards Test (CST) provides indices of language arts and mathematics proficiency based on California content standards at each grade level. Test scores from the language arts and mathematics sections were

combined with possible scores ranging from 300 to 1,200 ($M_{6th} = 758.33$, $SD_{6th} = 128.44$; $M_{7th} = 762.58$, $SD_{7th} = 128.99$).

Academic engagement. One teacher completed six items from the Short Form of the Teacher Report of Engagement Questionnaire (TREQ; Wellborn & Connell, 1991) to assess the degree to which students were engaged, as opposed to disaffected from school activities (e.g., “In my class, this student concentrates on doing his/her schoolwork”). Items were rated on a 4-point scale (1 = *not at all characteristic of this student* to 4 = *very characteristic*), with higher mean values indicating higher levels of academic engagement ($\alpha_{6th} = .91$; $\alpha_{7th} = .91$).

Covariates. The analyses also included within- and between-person covariates that could function as possible confounds. At the individual level, we controlled for self-reported *sex*, *ethnicity* and *immigration status*. Students who were not in the four pan-ethnic groups (African American, Asian, Latino, White) or did not identify as Multiethnic were collapsed into an “Other” category to test a more parsimonious model given the small size of these other ethnic groups (e.g., Middle Eastern). Immigration status was measured by dummy variables differentiating students who were first generation (i.e., self and parent/s born outside of U.S.), second generation (i.e., born in U.S. but at least one parent born outside U.S.), and third-plus generation (i.e., born in U.S. and/or both parents born in U.S.). The analyses also controlled for whether students had at least one *cross-ethnic friendship* to consider whether the effects of cross-class friendships are unique from friendship between ethnically dissimilar peers, which have been positively related with academic performance (Hallinan & Williams, 1990; Kawabata & Crick, 2015). In addition, given that larger friendship networks are positively related to academic performance (Berndt & Keefe, 1995), *total number of reciprocated friendship nominations* was included as a covariate in the regression models. Finally, to account for differential opportunity to form cross-class friendships, we controlled for the *proportion of cross-class peers* at school. Consistent with Malacarne (2017), this variable measures for each student the proportion of schoolmates who differ by two or more points on the parental education level scale ($M = .40$, $SD = .18$, range = .10–.90). Given the wide range in availability of cross-class peers that might affect also the function of cross-class friendship, initial analyses also tested for three-way interactions between proportion of cross-class peers, parental education, and cross-class friendship.

At the school level, given that ethnic diversity has been linked with academic achievement (Wells, Fox, Cordova-Cobo, & Kahlenberg, 2016), we controlled for *school ethnic diversity*. Data from the California Department of Education were used to compute Simpson’s (1949) index:

$$D_c = 1 - \sum_{i=1}^g p_i^2$$

D_c (diversity) is calculated by summing the squared proportion of students in the same grade at school belonging to a given ethnic group (p) and subtracting this squared proportion from one. The index measures the probability that any two students randomly selected from the same school will be from different ethnic groups,

² Sensitivity analyses specifying the parental education difference as one or three points were also conducted demonstrating similar effects.

Table 1
Parental Education Breakdown Within Four Pan-Ethnic Groups

Ethnicity	No high school diploma	High school diploma	Some college	4-Year college degree	Graduate degree
African American	5%	12%	48%	19%	16%
Asian	12%	12%	24%	27%	25%
White	2%	5%	25%	35%	33%
Latino	43%	19%	23%	9%	6%

with scores closer to 1 indicating greater diversity. Ethnic diversity ranged from .48 to .77 ($M = 0.64$, $SD = 0.08$).

Analytic Plan

All analyses were conducted in Mplus 8.0 using multilevel modeling to account for the nested design (i.e., students within 26 middle schools). The primary predictors of interest, cross-class friendship (1 = at least one cross-class friend, 0 = no cross-class friends) and parental education were coded as categorical dummy variables. Given that much of the relevant literature dichotomizes parental education level by comparing students whose parents have a college degree to those whose parents do not (e.g., Cherng et al., 2013; Crosnoe & Muller, 2014), and consistent with Choi, Raley, Muller, and Riegle-Crumb (2008), we use a 4-year college degree as the reference group. Thus, the regression coefficients capture the difference between students *with* versus *without* cross-class friendship (the latter as a comparison group), and the difference between students' parental education level (no high school diploma, high school diploma, some college, or graduate degree) versus those whose parents have a 4-year college degree.

The multilevel models were built in a two-stage process. First, main effects models were estimated to examine the main effects of the primary predictors—parental education level and cross-class friendship—along with all demographic and control variables separately for each seventh grade achievement indicator (i.e., GPA, standardized achievement test scores and academic engagement). Second, to test the hypothesized two-way interactions (i.e., whether the effect of parental education level varied as a function of cross-class friendship), four interaction terms for each level of parental education (e.g., No High School Diploma \times Cross-Ethnic Friendship) were added to the models, while controlling for the baseline sixth grade achievement indicator. That is, we tested whether the effect of students' parental education level (i.e., the four categories), compared with those with a 4-year college degree, varies between students with and without at least one cross-class friendship. To examine whether the moderating effect of cross-class friendship varies as a function of opportunities to form cross-class friendship or cross-ethnic friendship, initial analyses also tested for three-way interactions with proportion of cross-class peers, and subsequently with cross-ethnic friendship. Given that the three-way interaction terms were nonsignificant, they were excluded from the final regression models.

Prior to considering the effects of any predictors, we estimated unconditional means (i.e., empty) models separately for GPA, standardized achievement test scores and academic engagement to compute the proportion of variability existing between schools. In the final models, each achievement outcome was examined as a

function of parental education level and cross-class friendship, as well as their two-way interactions. The analyses also used dummy variables to control for student sex (reference group = boy), ethnicity (reference group = White) and immigration status (reference group = third-plus generation). All continuous covariates (i.e., sixth grade achievement, friendship network size, proportion of cross-class peers, ethnic diversity) were grand-mean centered.

Missing data did not exceed 20% and was primarily due to lack of teacher-rated engagement and school records data (grades, achievement test scores). Eight percent of students were missing parental education data. There was no specific evidence suggesting that missing data was systematically related to the constructs themselves, thus data were considered to be missing at random (MAR; Enders & Bandalos, 2001). Although there is no empirical method to confirm a MAR mechanism, we addressed the assumptions of MAR through inclusion of covariates related to missing data (e.g., prior achievement, ethnicity). Missing data were handled using full information maximum likelihood (FIML) estimation with robust standard errors to correct for non-normality. FIML estimation—preferable to listwise deletion (Little, Jorgensen, Lang, & Moore, 2014)—treats all observed predictors as single-item latent variables, allowing each individual to contribute whatever data they have to the likelihood function (i.e., any participant with at least one wave of data was included).

Results

The results are divided into two main sections. First, we present descriptive findings about cross-class friendship at the end of the first year of middle school. Second, the main multilevel regression analyses testing the moderating effects of cross-class friendship on the association between parental education and each achievement indicator are provided.

Cross-Class Friendships at Sixth Grade

Of all reciprocated friendships in the spring of sixth grade, one third (33.5%) were cross-class. When considering students as the unit of analysis, about half (47%) of sixth grade students had at least one cross-class reciprocated friendship. Chi-square tests were conducted to compare demographic correlates of cross-class friendship. Girls were more likely to have at least one cross-class friend compared to boys, $\chi^2(1) = 8.46$, $p = .004$. Although there were no differences based on immigration status, $\chi^2(2) = 5.74$, $p = .057$, overall ethnic differences were found, $\chi^2(5) = 60.67$, $p < .001$, with White students less likely than all other ethnic groups to have a cross-class friend, p 's $< .01$. Specifically, while 37% of White students had at least one cross-class friend, 55% of

Latino students, 52% of African American students, 46% of Asian students, 47% of multiethnic students, and 45% of students from other ethnic groups (e.g., Middle Eastern) had at least one cross-class friend. Consistent with the prevalence of cross-ethnic friendships in our overall sample (54%), cross-class friends were slightly more likely to be cross-ethnic (57%) than to be same-ethnic. At the student level, among those with at least one cross-class friendship, about 60% had at least one cross-class cross-ethnic friend (66% of African American, 62% of White, 58% of Latino, and 51% of Asian students). Finally, as expected, a greater proportion of cross-class peers at school ($M_{\text{Latino}} = 46\%$; $M_{\text{African American}} = 40\%$; $M_{\text{Asian}} = 40\%$; $M_{\text{White}} = 34\%$) was associated with increased likelihood of cross-class friendship ($b = 3.55$, $SE = .32$, $p < .001$).

Multilevel Models

Intraclass correlations (ICC) were estimated by testing intercept-only models and calculating the proportion of variance at Level 2

(school level) separately for each dependent variable. The ICC for GPA was .18, .10 for academic engagement, and .16 for standardized test scores. Thus, 10–20% of the variation in the indicators of academic achievement were due to differences between the 26 schools.

Model 1 and Model 2 effects are displayed in Table 2. We interpret first the main effects models (Model 1) by describing the covariate, followed by the predictor, effects across all three outcomes. Thereafter, the hypothesized interaction effects (i.e., testing the moderating role of cross-class friendship) are described separately for each academic achievement indicator in Model 2.

Main effects models. Girls received higher grades, standardized test scores and were rated by their teachers as being more engaged, compared to boys. Ethnic differences revealed that relative to White students, African American, Latino, and Multiethnic (with the exception of achievement test scores) students received lower scores, whereas Asian students received higher scores, on each achievement outcome. Students who had at least one cross-

Table 2
Multilevel Models Predicting Seventh-Grade Academic Achievement

Variable	7th grade outcomes (Unstandardized coefficients and standard errors)					
	Grade point average		Standardized achievement test scores		Academic engagement	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Individual level						
Covariates						
Girl	0.07*** (.02)	0.07*** (.02)	5.55* (2.46)	5.58* (2.45)	0.17*** (.04)	0.18*** (.04)
African American	-0.10* (.04)	-0.09* (.04)	-17.91** (5.67)	-19.05** (5.68)	-0.17*** (.04)	-0.17*** (.04)
Asian	0.15*** (.03)	0.15*** (.03)	15.80** (4.58)	16.36*** (4.16)	0.20** (.07)	0.20** (.06)
Latino	-0.08* (.04)	-0.07 (.04)	-8.46* (3.96)	-8.87* (3.92)	-0.13** (.04)	-0.12** (.04)
Multiethnic	-0.07* (.03)	-0.07* (.03)	-2.92 (4.30)	-3.32 (4.16)	-0.11*** (.03)	-0.11*** (.03)
Other Ethnic	0.02 (.03)	0.02 (.03)	-0.57 (4.34)	-0.71 (4.21)	-0.02 (.03)	-0.01 (.03)
First-Generation immigrant	-0.03 (.02)	-0.03 (.02)	3.55 (3.94)	3.14 (3.91)	0.05 (.03)	0.05 (.03)
Second-Generation immigrant	0.00 (.02)	0.00 (.02)	-0.69 (2.09)	-0.78 (2.14)	0.01 (.02)	0.02 (.02)
Cross-Ethnic friendship	0.02 (.03)	0.02 (.03)	3.31 (3.28)	3.78 (3.14)	0.12** (.04)	0.11** (.04)
Proportion of cross-class peers	0.03 (.07)	0.05 (.07)	4.59 (8.65)	2.39 (8.35)	-0.08 (.06)	-0.07 (.06)
Number of friendships	0.01 (.01)	0.01 (.01)	1.43 (.82)	1.37 (.86)	0.03** (.01)	0.03** (.01)
6th Grade achievement	0.70*** (.01)	0.70*** (.01)	0.85*** (.02)	0.84*** (.02)	0.42*** (.04)	0.42*** (.04)
Predictors						
Parental education level						
No high school	-0.09** (.03)	-0.13* (.05)	-12.45* (4.86)	-20.19** (5.97)	-0.07 (.04)	-0.12** (.04)
High school	-0.12** (.04)	-0.20*** (.05)	-10.31** (3.13)	-16.77*** (4.71)	-0.10** (.03)	-0.16** (.05)
Some college	-0.10*** (.02)	-0.14*** (.03)	-6.99* (2.83)	-6.34 (4.16)	-0.06 (.03)	-0.10* (.05)
Graduate degree	0.02 (.03)	0.03 (.03)	1.36 (4.22)	5.43 (5.66)	0.04 (.03)	0.03 (.04)
Cross-Class friendship	0.02 (.02)	-0.07 (.04)	-3.76 (2.51)	-5.94 (4.40)	0.01 (.03)	-0.10 (.07)
Interactions between parental education level and cross-class friendship						
No high school × Cross-Class friendship		0.08 (.08)		10.49 (6.30)		0.15 (.12)
High school × Cross-Class friendship		0.21** (.07)		11.05* (5.52)		0.23* (.10)
Some college × Cross-Class friendship		0.13* (.06)		-0.80 (5.47)		0.13 (.09)
Graduate degree × Cross-Class friendship		0.03 (.07)		-3.96 (6.04)		0.08 (.08)
School level						
Covariates						
Ethnic diversity	0.58 (.41)	0.54 (.42)	66.73 (38.53)	62.93 (38.59)	0.43 (.56)	0.38 (.56)

Note. Sex reference group = boy; Ethnicity reference group = White; Immigrant status reference group = third-plus generation immigrant; 6th grade achievement = same outcome indicator assessed at 7th grade; Parental education reference group = Four-year college degree; Cross-class friend = at least one cross-class friendship at spring of 6th grade (no cross-class friends as a comparison group).

* $p < .05$. ** $p < .01$. *** $p < .001$.

ethnic friendship and those with a greater number of mutual friendships were rated as more academically engaged. Additionally, sixth grade (baseline) achievement effects were robust, indicating the relative stability of academic performance.

Controlling for the covariates, we turn to the main effects of the predictors of interest: parental education and cross-class friendship. Students whose parents had no college diploma (i.e., the three lower education groups) received lower grades and standardized achievement test scores relative to students whose parents had a college degree. Similar differences were obtained for teacher-rated academic engagement between those whose parents' had a high school diploma as compared with students with college-educated parents. Finally, the main effect of cross-class friendship, collapsed across levels of parental education, was nonsignificant for each achievement outcome.

Testing cross-class friendship as a moderator. We turn next to the hypothesized interactions between parental education and cross-class friendship. The findings are presented separately for each of the academic achievement outcomes.

GPA. Two significant two-way interactions between cross-class friendship and parental education emerged when predicting seventh-grade GPA. To decompose these interactions, the results are shown in two different ways. First, Figure 1a depicts the mean GPA at seventh grade by parent level of education for students without cross-class friendship (left side) and students with cross-class friendship (right side), to illustrate the differences in GPA relative to those with a college degree (i.e., the reference group used in the analyses), Figure 1b depicts GPA difference scores between those without and with cross-class friends. The comparison between the left and right sides of each figure illus-

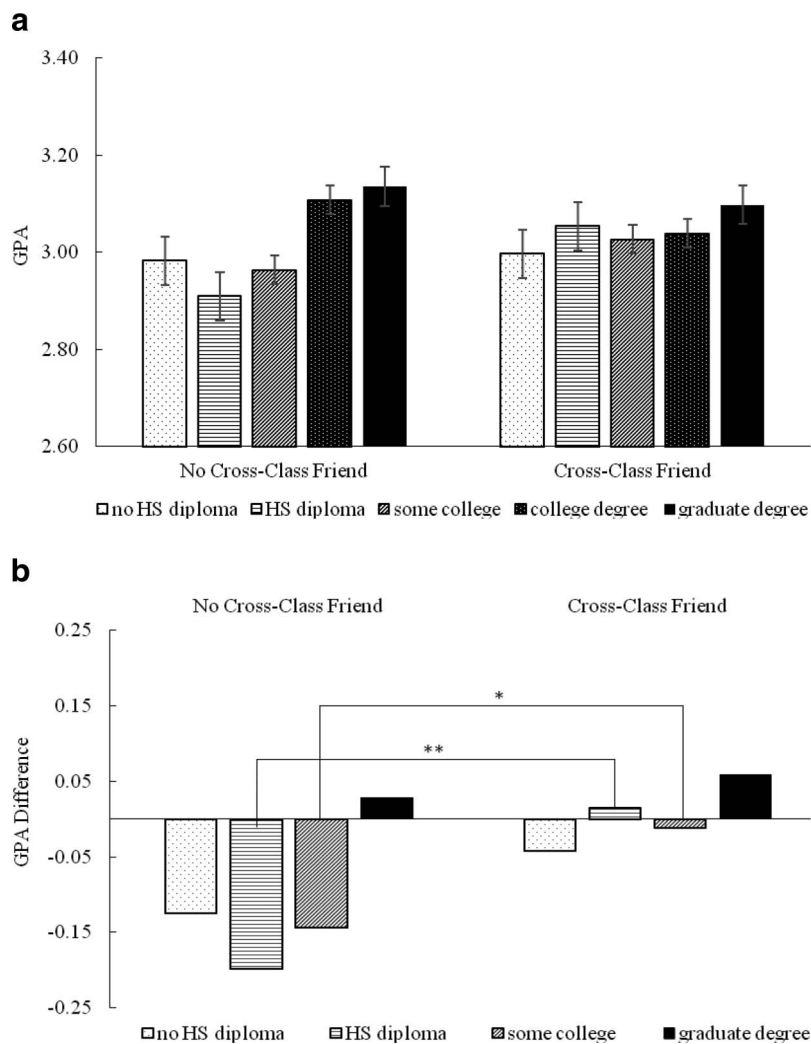


Figure 1. (a) Mean seventh-grade grade point average (GPA) as a function of parental education and cross-class friendship. Error bars show standard errors of the mean. (b) GPA difference scores relative to students whose parents have a 4-year college degree by parental education and cross-class friendship. Bars represent the difference between each parental education group and those with a 4-year college degree. Negative values indicate lower performance relative to the reference group (parents with college degree) whereas positive values indicate higher performance. * $p < .05$. ** $p < .01$.

trates how GPA differences between students whose parents had a college degree versus those whose parents had a high school diploma or some college were reduced when students had at least one cross-class friend. Tests of simple slopes revealed that whereas a difference of .20 grade points emerged between students whose parents had a high school diploma and those whose parents had a college degree when students did not have a cross-class friend, ($b = -.20$, $SE = .05$, $p < .001$), their grades did not differ when students had at least one cross-class friend ($b = .02$, $SE = .04$, $p = .728$). Similarly, whereas a difference of .14 grade points emerged between students whose parents had some college and those whose parents had a college degree when students did not have a cross-class friend ($b = -.14$, $SE = .03$, $p < .001$), their grades did not differ when students had at least one cross-class friend ($b = -.01$, $SE = .05$, $p = .793$).

Standardized achievement test scores. One significant interaction emerged for standardized achievement test scores. Consistent with the GPA model, we depict the interaction in Figure 2a using a mean plot of seventh grade achievement test scores by parent level of education for students without (left side) and with cross-class friendship (right side). Figure 2b in turn depicts the difference scores relative to the reference group (i.e., students whose parents have a college degree). As illustrated in the figures, achievement test score differences between students whose parents had a college degree and those with a high school diploma were attenuated when students had at least one cross-class friendship. Tests of simple slopes revealed that when students did not have a cross-class friend, a difference of 17 standardized test points emerged between students whose parents had a high school diploma and those whose parents had a

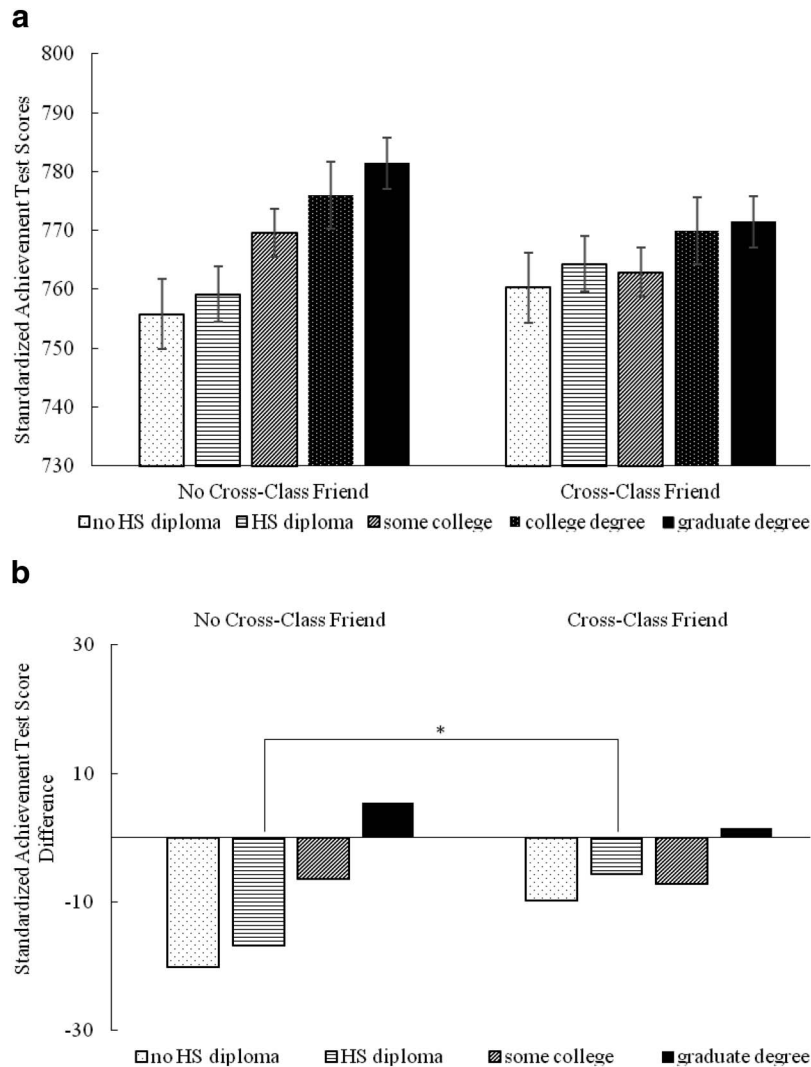


Figure 2. (a) Mean seventh-grade standardized achievement test scores as a function of parental education and cross-class friendship. Error bars show standard errors of the mean. (b) Standardized achievement test score difference scores relative to students whose parents have a 4-year college degree by parental education and cross-class friendship. Bars represent the difference between each parental education group and those with a 4-year college degree. Negative values indicate lower performance relative to the reference group (parents with college degree) whereas positive values indicate higher performance. * $p < .05$.

college degree, ($b = -16.77$, $SE = 4.71$, $p < .001$). However, when students had at least one cross-class friend, the achievement test score difference was nonsignificant ($b = -5.72$, $SE = 3.47$, $p = .100$).

Academic engagement. When estimating academic engagement, there was one significant interaction (depicted across Figures 3a and 3b). Specifically, differences in academic engagement between students whose parents had a high school diploma and those whose parents had a college degree were minimized when students had at least one cross-class friendship compared to no cross-class friendships. Tests of simple slopes revealed that when students did not have a cross-class friend, a difference of .16 points emerged between students whose parents had a high school diploma and those whose parents had a college degree ($b = -.16$, $SE = .05$, $p = .001$). However, academic engagement did not differ significantly when students had at least one cross-class friend ($b = .07$, $SE = .07$, $p = .321$).

Taken together, our findings demonstrate that while achievement differences based on parental education level are robust, these differences are reduced when students have friendships that bridge across social class (see right panels of Figures 1–3).³ Similar findings were obtained across the three indicators of academic achievement and when sensitivity analyses specified cross-class friendship as a difference of one or three parental education levels.

Discussion

As class-based achievement disparities continue to grow (Owens et al., 2016; Reardon, 2013), scholars have sought to understand factors that may disrupt the intergenerational transmission of educational (dis)advantage. While such research typically highlights the importance of resources accessible to adolescents at home (Bowen et al., 2009) or within schools (e.g., computers, libraries; Reardon, 2013), much less is known about other sources of social capital, such as peers. Given the heightened importance of close peer relationships during early adolescence (Collins & Laursen, 2004) and the potential to learn from dissimilar friends (Benner & Crosnoe, 2011; Gauvain, 2016), this study was designed to test whether cross-class friendship attenuates the association between parental education and academic achievement. Consistent with our expectations, achievement differences based on parental education in middle school were reduced when students had at least one cross-class friendship. As far as we know, these findings are the first to demonstrate the academic benefits of cross-class friendship during early adolescence—a developmental period when class-based achievement differences are likely to widen (Caro et al., 2009).

The effects of cross-class friendship were particularly robust for students whose parents did not have a 4-year college degree. That is, youth from homes with lower educational levels were able to make up some of the differences in GPA, achievement test scores, and academic engagement when they had close cross-class ties, whereas students with college-educated parents performed similarly regardless of whether their friendships did or did not bridge social class. Thus, consistent with social capital perspectives (Cherng et al., 2013; Crosnoe et al., 2003), cross-class friendship may afford students, whose parents have limited postsecondary education, access to instrumental academic resources (e.g., school-

related information, know-how) privileged by those with college-educated parents. In this way, cross-class friendship may function as an academic “equalizer” in middle school. That is, whereas social networks consisting entirely of same-class friends may widen SES-related achievement disparities, socioeconomically diverse friendships appear to level the academic playing field without compromising the achievement of students whose parents have higher education (college or graduate degree).

In addition to instrumental resources (e.g., knowledge about study strategies or practices), friendships that bridge across social class may promote access to social psychological resources, including emotional support for meeting academic challenges, confidence to seek out additional academic resources, and optimism for the future. Recent evidence suggests that a sense of optimism or hope of future success accounts in part for the association between SES and GPA in high school (Dixson, Keltner, Worrell, & Mello, 2018). It is possible that exposure to different academic skills and strategies through cross-class friendship promotes sense of agency that in turn propels action, such as academic advice seeking. Indeed, based on a brief intervention among college students, exposure to the school experiences and academic strategies of peers from different social class backgrounds increased first-generation college students’ utilization of available academic resources and thereby decreased class-based achievement disparities (Stephens et al., 2014). The authors presumed that when the first-generation students came to view their challenges as a result of situational factors (as opposed to inherent or fixed “deficits”), they were more motivated to take advantage of academic resources. Consistent with the conclusions of Stephens, Hamedani, and Destin (2014), another study found that college students were more academically motivated and earned higher grades when provided with evidence about social mobility (Browman & Destin, 2016). Thus, although lower-SES students are generally less likely to ask teachers for help already in middle school (Malecki & Demaray, 2006), exposure to the academic behaviors of their cross-class friends may stimulate a greater sense of confidence and agency for academic help seeking (Newman, 2002).

The potential of cross-class friendship to minimize class-based achievement disparities raises the question of how to foster such relationships. Despite parental education being a relatively unobservable characteristic, friendships were significantly more likely to occur between youth whose parents had similar educational backgrounds (66.5%). Moreover, even in our socioeconomically diverse sample, almost half of all students had no friendships that crossed social class. Given that friendships are constrained by availability, increasing socioeconomic segregation in U.S. schools

³ To test the robustness of the main findings, supplemental analyses relying on any outgoing (including unilateral) friendship nominations to assess cross-class friendship were conducted among the full sample of participants who nominated at least one friend at spring of sixth grade. As such, the sample size increased to 5,461 and the percentage of students with at least one cross-class friendship increased from 47% to 61%. Despite the potential inclusion of desired friendships (Echols & Graham, 2016), the results of the main analyses replicated with this “noisier” cross-class friendship variable, with one exception. Specifically, for GPA, the significant interaction between cross-class friendship and students whose parents had some college education (relative to those whose parents had a college degree) was no longer significant ($b = 0.07$, $SE = 0.05$, $p = .145$).

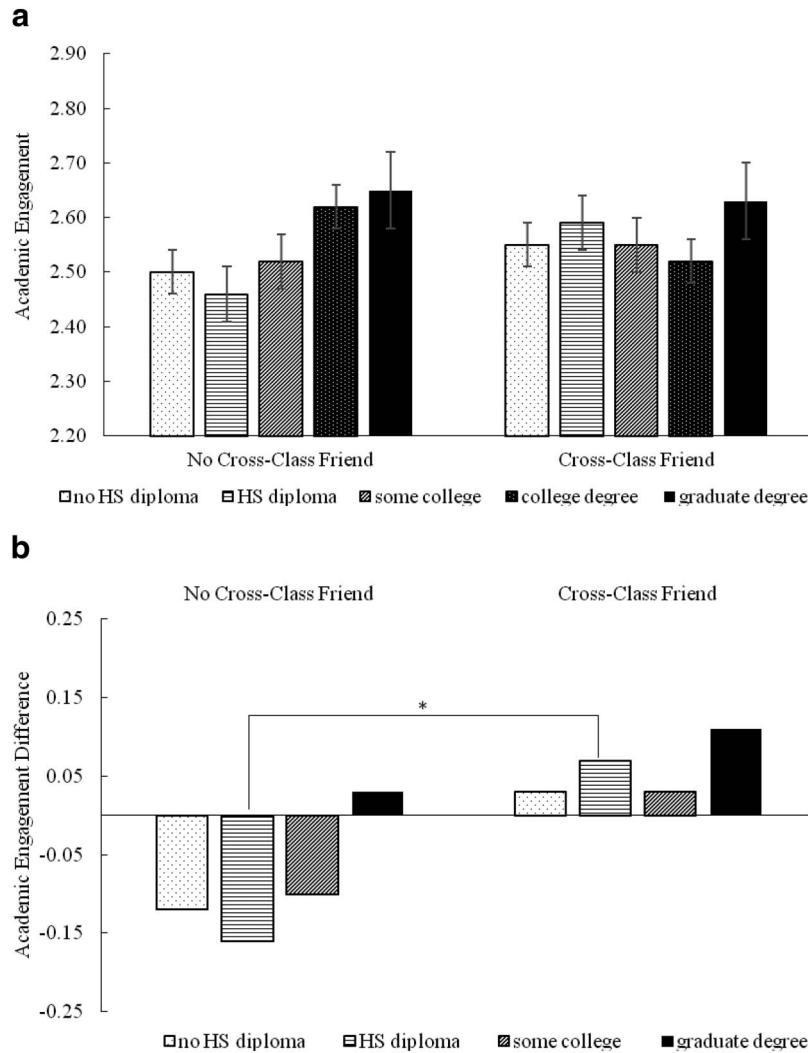


Figure 3. (a) Mean seventh-grade academic engagement as a function of parental education and cross-class friendship. Error bars show standard errors of the mean. (b) Academic engagement difference scores relative to students whose parents have a 4-year college degree by parental education and cross-class friendship. Bars represent the difference between each parental education group and those with a 4-year college degree. Negative values indicate less engagement relative to the reference group (parents with college degree) whereas positive values indicate higher engagement. * $p < .05$.

may represent a significant barrier to the formation of cross-class ties. Consistent with Malacarne (2017), our descriptive findings documented that the likelihood of cross-class friendship increased with greater availability of cross-class grade mates. At the same time, there may be some critical thresholds, such that too many cross-class peers may deter the crossing of social class boundaries. For example, when attending schools with predominantly high-SES peers, lower SES students are more likely to be socially alienated (Crosnoe, 2009; Malacarne, 2017). Such environments are also likely to magnify the salience of SES, possibly triggering stereotype threat effects among students from less educated family backgrounds (Spencer & Castano, 2007). Thus, increasing relative proportions of certain students (i.e., based on parent education) is likely to do little to narrow, and may in fact widen (Crosnoe &

Muller, 2014), achievement disparities unless close cross-group ties are established.

We presume that greater socioeconomic diversity (i.e., multiple groups with relatively similar representation) would provide an ideal context for the development of cross-class friendships. Just as greater ethnic diversity has been shown to promote the formation and maintenance of cross-ethnic friendships (Graham, Muniksma, & Juvonen, 2014; Lessard, Kogachi, & Juvonen, 2018), greater variation of students from different social class backgrounds may minimize ingroup-outgroup distinctions and encourage youth to befriend across social class lines. Unfortunately, students are often placed into academic classes that are segregated by level of parents' education (Choi et al., 2008). In contrast, extracurricular activities may represent an important avenue for

the formation of cross-group friendships insofar as they bring together students with similar interests and offer a potential shared identity for students across different family backgrounds (cf. Knifsend & Juvonen, 2014). Indeed, among students from low-SES backgrounds, participation in extracurriculars by itself has been positively linked with academic achievement (Marsh & Kleitman, 2002). However, given that low-SES students are least likely to participate in extracurriculars (Pedersen & Seidman, 2005), schools need to reduce typical barriers that prevent such involvement (e.g., cost, transportation). Malacarne (2017), for example, found that living more than one mile from school decreased the odds that a low-SES student would play sports by 28%, while it had no significant effect among higher SES students.

With increasing attention to SES diversity in school districts (Kahlenberg, 2012), it is also important to recognize the overlap of ethnicity and SES (U.S. Census Bureau, 2014). Consistent with past findings (e.g., Gandara & Contreras, 2009), in the current middle school sample, 43% of the Latino students had parents who did not have a high school diploma, compared with 2% of White students. Our results also show that cross-class friendships were slightly more likely to be cross-ethnic rather than same-ethnic. Given that the proportion of cross-ethnic cross-class friends was in line with the prevalence of cross-ethnic friendships in our ethnically diverse sample, we presume that this finding may reflect availability (just as with ethnic differences in cross-class friendship) more so than a cross-ethnic preference in cross-class friendships. Consistent with the considerable heterogeneity in parental education among Asian Americans (see Kao, 1995), we found that Asian students' cross-class friends were least likely to be cross-ethnic. At the student level, the nonsignificant three-way interactions with cross-ethnic friendship indicate that the effect of cross-class friendship does not vary depending on whether students also have cross-ethnic friendship. While additional research is needed to consider whether and how patterns of cross-ethnic and cross-class friends differ, our findings demonstrate substantial demographic heterogeneity among mutual friends that reflects the diversity of the schools selected. Accordingly, the current findings suggest that schools play a critical role in shaping close peer relationships (Juvonen, 2018) and their effects on student achievement.

Limitations and Future Directions

While the results of the current study are promising as they show one way in which achievement disparities based on parental education may be reduced, there are a number of methodological limitations and future avenues of research needed. First, our indicator of parental education was reported for only one parent (or guardian). However, maternal (75% of respondents in the current study) education level, is a particularly strong determinant of children's educational outcomes (Monserud & Elder, 2011). Second, while the intercorrelations among the achievement indicators suggest that teachers' engagement ratings were consistent with students' overall achievement, the courses taught were not uniform across teachers. Although all teachers reported knowing well the student being rated, follow-up studies could offer more precision by focusing on academic engagement in specific courses. Third, although sensitivity analyses revealed similar results regardless of whether cross-class friendship was defined as a parental education

difference as one, two or three levels, this measurement assumes equal distance across groups (e.g., no high school diploma vs. college degree; high school diploma vs. graduate degree). In future research, it would be important to rely on classification of cross-class friendship by considering parental education in combination with additional family background indicators, such as parental income or other critical family variables (e.g., immigration status). Involuntary migration, for example, can disrupt social networks in ways that negatively affect school achievement (Duong, Badaly, Liu, Schwartz, & McCarty, 2016). In addition, our less robust effects of cross-class friendship for students whose parents did not have a high school diploma may reflect receipt of additional educational services (e.g., community centers) that would be important to consider in follow-up studies.

Future research is also needed to explore the mechanisms by which cross-class friendship influences achievement. For this study, we compared students with and without cross-class friendships and hence cannot conclude whether the effects of cross-class friendship reflect student characteristics or unique features of cross-class relationships. Research at the dyad-level (i.e., friendship types nested within students) is needed to shed light on whether relationships between socioeconomically dissimilar peers indeed offer unique psychological benefits. For example, do cross-class friendships involve greater differences in opinion, negotiation, or conflict resolution than same-class friendships? Similarly, it would be critical to gain insights into potential social influence mechanisms (e.g., behavioral modeling, information exchange, or mutual encouragement and support) underlying the apparent effects of cross-class friendship.

It is also important to keep in mind that we considered friendships at only a single time point. While the current findings seem to imply promotion of cross-class friendships as a mechanism to reduce class-based achievement disparities, our comparisons between students with and without cross-class friendship cannot speak to temporal processes. That is, based on the present investigation, we do not know whether the academic benefits of cross-class friendship can be attained from newly formed cross-class friendships, or depend on relationship maintenance (i.e., continued resource access). Follow-up studies at the dyad level that compare newly formed and long-lasting cross-class friends would help shed light on whether even brief cross-class ties can provide inoculation-type effects, or whether the academic effects require relationship stability.

Future studies should also consider the effects of cross-class friendship on domains outside of achievement. Just as cross-ethnic friendships improve attitudes toward ethnic outgroups (Davies, Tropp, Aron, Pettigrew, & Wright, 2011), cross-class ties are likely to play a critical role in reducing negative class-based stereotypes (Gorski, 2012). It is also possible that students from educationally privileged homes benefit from their cross-class friendships by learning about social inequalities in ways that motivate them to engage in community service or political activism (Flanagan, Kim, Collura, & Kopish, 2015). Indeed, recent evidence indicates that with greater interwealth contact, young children from high-SES backgrounds distribute resources more equitably to their peers from more economically disadvantaged families (Elenbaas, 2019). Thus, given that the current investigation focused solely on academic achievement, we cannot conclude that cross-class friendships do not benefit youth whose parents

have college or graduate degrees. While youth from such educationally privileged homes may be performing at high levels, regardless of friends' family background, their insights into income inequalities and their role in addressing social justice issues (e.g., through community service) could be affected by cross-class ties.

Finally, we focused on early adolescence because class-based achievement disparities are known to widen significantly during the middle school years (Caro et al., 2009) and because of the heightened significance of friends during middle school (Collins & Laursen, 2004). However, we do not know whether our findings generalize to other developmental periods and phases of schooling (i.e., elementary or high school). Although some research suggests that children are still developing an understanding of parental occupational prestige during the middle school years (O'Bryant, Durrett, & Pennebaker, 1978), little is known about when and how youth come to understand parental education level. While cross-group friendships are typically based on highly observable characteristics (e.g., ethnicity, gender), our findings regarding greater friendship homophily of parental education likely reflects both a general cognitive-developmental trend away from external, observable qualities (Leahy, 1981) and an increasing salience of educational attainment.

Final Conclusion

As socioeconomic disparities continue to widen in the U.S. (Owens et al., 2016; Reardon, 2013), cross-class friendship may represent one important mechanism for educational mobility as long as schools serve families with diverse educational backgrounds. The academic benefits of cross-class friendship importantly come at no cost to the achievement of those whose parents have college degrees. Yet, even within socioeconomically diverse schools, cross-class contact and integration may be limited if efforts within schools do not support regular interaction, equal status, and cooperation across students with different family backgrounds (Allport, 1954). Organizational and instructional practices, such as academic tracking, that lead to an overrepresentation of higher-SES students in academically advanced classes and lower-SES students in lower level courses (Choi et al., 2008) restrict cross-class contact and as such, may magnify status differences. Just as with other cross-group relations, teachers, coaches, and administrators are likely to play a critical role in encouraging close cross-class ties (cf. Patchen, 1982). While climates of competition (e.g., academic, athletic) are likely to increase class-based distinctions (Gasser, Grutter, Torchetti, & Buholzer, 2017), cooperative practices—whether in the classroom or on the field—may be critical for students to recognize the value in the diverse friendships.

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