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Not All Diversity Interactions are Created Equal: Cross-Racial Interaction, Close Interracial Friendship, and College Student Outcomes

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Abstract Higher education researchers and practitioners have emphasized the educational benefits of fostering meaningful interracial interaction on college campuses. The link between cross-racial interaction and student growth has received considerable empirical attention, but far less is known about whether and when interracial friendship predicts student outcomes. Multiple theoretical frameworks suggest that these two types of interpersonal diversity experiences may have differential effects. The present study examined this issue using a 4-year longitudinal dataset with 2,932 undergraduates at 28 institutions. Regardless of students' race/ethnicity, cross-racial interaction is consistently associated with desired student outcomes, whereas close interracial friendship is often unrelated to these same outcomes.

Keywords Cross-racial interaction · Interracial friendship · Student outcomes · Race/ethnicity · College students

Introduction

Cross-racial interaction is critical for establishing a healthy campus racial climate (Harper and Hurtado 2007; Hurtado et al. 2008). That is, having a racially diverse student body is simply not sufficient to unlock the benefits associated with racial diversity; student engagement across racial/ethnic lines is necessary (Chang 2011; Milem et al. 2005). One type of interpersonal relationship that involves cross-racial interaction is interracial friendship. More specifically, interracial friendship is likely both a consequence of cross-racial interaction (since repeated interactions with an individual from a different race may

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lead to friendship) and a cause of cross-racial interaction (since people often seek out their existing different-race friends for conversations and shared activities). Interracial friendship among college students has been lauded for promoting positive outcomes such as reduced intergroup bias, increased intellectual self-confidence, and higher degree aspirations (Antonio 2004; Levin et al. 2003).

A seemingly logical assumption is that the deeper and more prolonged the interracial relationship, the more benefits will accrue. However, this supposition has yet to be empirically tested in the collegiate setting. To date, different forms of cross-racial interaction have mainly been studied in isolation rather than in comparison with one another, so there is limited knowledge about whether various forms of diversity interactions and relationships might affect student outcomes differently (Mayhew and Engberg 2010). In this paper, we address this gap by studying the differential relationships of cross-racial interaction versus close interracial friendship on various student outcomes (e.g., college satisfaction, ease in getting along with people from different races, emotional well-being). In doing so, we seek to deepen our understanding of which diversity interactions may be most beneficial for students and why.

Our findings have multiple potential implications. While cross-racial interaction and close interracial friendship are not mutually exclusive (with the former arguably encompassing the latter), universities may have more control over promoting more casual interaction versus deeper relationships. Indeed, the factors that contribute to cross-racial interaction versus interracial friendship diverge notably (Bowman and Park 2014). Being able to compare the potential benefits of each can illuminate how universities can direct their efforts to promote a healthy campus racial climate. Theoretically, our work seeks to extend analysis of how different types of social ties and relationships influence student outcomes, thereby deepening understanding of how students are influenced by racial diversity in higher education.

Cross-Racial Interaction, Interracial Friendship, and Student Outcomes

In the context of legal challenges to race-conscious admissions, the link between cross-racial interaction and college student outcomes has been studied extensively. As Chang (2011) summarized in his recent review, cross-racial interaction is positively associated with a variety of outcomes, including academic skills (Denson and Chang 2009; Gurin 1999; Gurin et al. 2002; Luo and Jamieson-Drake 2009); cognitive skills and proclivities (Antonio 2004; Chang et al. 2004, 2006; Denson and Zhang 2010; Gurin et al. 2002; Hurtado 2005; Nelson Laird 2005); academic and social self-concept (Antonio 2004; Chang 1999; Chang et al. 2004, 2006; Denson and Chang 2009; Gurin et al. 2002; Hurtado 2005; Nelson Laird 2005); leadership and teamwork skills (Antonio 2001b; Denson and Zhang 2010; Hurtado 2005; Jayakumar 2008; Luo and Jamieson-Drake 2009); prejudice reduction (Gottfredson et al. 2009; Pettigrew and Tropp 2006; Tropp and Pettigrew 2005); reduced social distance between racial groups (Bowman 2013; Odell et al. 2005); comfort with people from other races (Engberg 2007; Engberg and Hurtado 2011; Hurtado 2005); perceived exposure to different ideas (Antonio et al. 2004; Gottfredson et al. 2009); racial/cultural understanding and engagement (Antonio 2001a; Astin 1993; Chang et al. 2006; Denson and Chang 2009; Denson and Zhang 2010; Gurin 1999; Gurin et al. 2002; Pike et al. 2007); social agency and civic development (Astin 1993; Chang et al. 2004; Denson and Chang 2010; Hurtado 2005; Johnson and Lollar 2002; Kotori 2009; Nelson Laird 2005; Nelson Laird et al. 2005); college sense of belonging (Locks et al. 2008); college

satisfaction (Astin 1993; Bowman 2013; Bowman and Denson 2012; Luo and Jamieson-Drake 2009); and retention (Chang 1999).

Several quantitative meta-analyses have synthesized the literature on cross-racial interaction and student outcomes. According to these systematic reviews, cross-racial interaction during college is associated with greater cognitive development (Bowman 2010b) and civic engagement (Bowman 2011). Cross-racial interaction is associated with decreased prejudice among people of all ages, and college students' intergroup interactions are associated with lower levels of intergroup prejudice (Pettigrew and Tropp 2006). In addition, curricular and cocurricular college diversity experiences lead to greater bias reduction when they intentionally incorporate cross-racial interaction than when they do not (Denson 2009).

The link between college interracial friendship and student outcomes has received less empirical attention. A recent meta-analytic review synthesized the relationship between intergroup friendship and intergroup attitudes (Davies et al. 2011). The results indicated that interracial friendship is associated with more positive intergroup attitudes, but this effect size is weaker than for friendships that occur across nationality, sexual orientation, or religious affiliation. The overall link between intergroup friendship and attitudes is similar for college students, children, and other adults. However, this meta-analysis only included studies that were cross-sectional in nature, so it is possible that students' positive intergroup attitudes contributed to their having interracial friendships, not vice versa. Therefore, the few longitudinal studies on this topic are noteworthy. Levin et al. (2003) found that college interracial friendships were related to decreased intergroup bias and anxiety when controlling for relevant pretests and background characteristics. Antonio (2004) observed that the racial diversity of a friendship group is associated with increased intellectual self-confidence and degree aspirations for students of color, but not for White students. In an earlier study, Antonio (2001a) found that friendship group diversity is unrelated to cultural awareness and the importance of promoting racial understanding when controlling for other friendship group characteristics and college experiences. In short, the potential educational impact of interracial friendship may be weaker than for cross-racial interaction, but the evidence is quite limited.

As an additional consideration, the link between interracial experiences and outcomes sometimes varies as a function of students' own race. According to meta-analytic reviews, cross-racial interaction is more strongly associated with (lower) prejudice among Whites than among people of color (Tropp and Pettigrew 2005), and curricular and cocurricular diversity experiences are also more strongly related to reduced racial bias within samples that have a greater proportion of White students (Denson 2009). The weaker relationships for people of color (relative to Whites) may occur because the optimal conditions for intergroup contact are less likely to be met for students of color (e.g., perception of equal group status), or because Whites have more to learn about other racial groups than do students of color (and therefore have a greater opportunity for growth and change). Not all evidence is consistent with this view; other meta-analyses suggest that the relationship between intergroup friendship and intergroup attitudes is similar regardless of participants' dominant/stigmatized group status (Davies et al. 2011) and that the link between college diversity experiences and civic engagement is similar for students of color and for White students (Bowman 2011).

Theoretical Frameworks on Diversity Interactions and Student Outcomes

Several theoretical frameworks have posited mechanisms through which interpersonal interactions across difference may contribute to positive outcomes among college students

and other adults. Using a cognitive developmental perspective that draws upon the work of Piaget and others (e.g., Piaget 1971, 1975/1985; Ruble 1994); Gurin et al. (2002) argue that many traditional-age college students are at a developmental stage in which they are forming their identities and values, so they are particularly open to the growth associated with diversity experiences. Because students' K-12 schools and neighborhoods are often racially homogeneous (e.g., Orfield 2009; Orfield and Lee 2006; Reardon and Yun 2002), most students have had relatively few interracial interactions before entering college, and college provides a (relatively) greater opportunity for students to interact across race. Given the novelty of interracial interactions, these experiences are often inconsistent with students' preexisting stereotypes and worldviews. Students seek to resolve this discrepancy as a result; they may do so either by reconciling these interactions with their current beliefs and conceptions or by changing their views to incorporate this new information.

Crisp and Turner (2011) provide a social psychological framework (categorization-processing-adaptation-generalization [CPAG] model) that focuses on the conditions under which diversity experiences shape individuals' growth regardless of their age or level of development. Consistent with Gurin et al.'s framework, the CPAG model suggests that diversity interactions are effective in promoting positive outcomes only when (a) people's pre-existing stereotypes and worldviews are challenged, and (b) people are able to deeply consider and resolve the dissonance and disequilibrium that result from this challenge. It also states that "multiple diversity experiences [must] result in the repeated engagement of the inconsistency resolution process" in order to promote generalized improvement in psychological functioning (p. 243).

Drawing upon social network theory (e.g., Granovetter 1973, 1983); Clarke and antonio (2012) suggest that the presence of "weak ties" among students from different racial groups is critical for the achievement of desired outcomes. A tie refers to the relationship among two people, and the strength of a tie represents the closeness of that relationship; within a social network analysis, close friends or long-term romantic partners would be connected by strong ties. Given the various forces that promote racial homogeneity among friendship groups (e.g., Wimmer and Lewis 2010); Clarke and antonio (2012) posit that college students' cross-race ties are likely to be weak ties. They also assert that these weak ties across difference (also known as weak, bridging ties) should produce the strongest positive effects on cognitive and democratic outcomes, because those ties will link students who are dissimilar and therefore provide each other with new sources of information. Conversely, strong ties primarily represent redundant sources of information, so they are less likely to stimulate student growth. This social network framework, which emphasizes the importance of novel information and perspectives that challenge students' worldviews, is clearly consistent with those of Gurin et al. (2002) and Crisp and Turner (2011). All three theoretical models posit that diversity experiences may yield improvements in a variety of attitudes, skills, self-perceptions, and behaviors.

By definition, a close interracial friendship is a strong interpersonal tie that occurs across at least one dimension of demographic difference. Based on the logic of Clarke and antonio's (2012) framework, close interracial friendship should have a modest effect (if any) on student outcomes; although such an interpersonal relationship probably provided novel information early in its development, the persistence of an interracial friendship is unlikely to yield much new information after an extended period of time. In contrast, students who have frequent cross-racial interactions with a variety of students should experience the greatest growth, because they encounter numerous sources of new information. Cross-racial interaction across weak ties should be conducive to growth whether such interactions occur informally (e.g., via casual encounters in residence halls or campus

events) or within formal curricular or co-curricular settings (e.g., in structured intergroup dialogue courses; see Gurin et al. 2013).

Present Study

The present study explores the extent to which cross-racial interaction and close interracial friendship are associated with various college student outcomes. By examining these two types of diversity experiences within a single longitudinal dataset, the magnitude of these relationships can be compared using the same participants and measures. The particular operationalization of these variables also provides a strong test of the predictions that follow from these theories. As described in detail below, the cross-racial interaction variable consists of the frequency of interactions with students from several different racial groups (e.g., for African American/Black students, this would consist of the average frequency of interactions with Asians, with Latinos/as, and with Whites). As a result, frequent interactions with only one or two students from a different racial background will not yield high scores on this measure; instead, students with high scores will have interacted frequently with students from multiple different racial/ethnic groups, which should yield new information that may challenge students and therefore result in improved outcomes. Because this variable indicates the simple frequency of cross-racial interaction regardless of the nature or valence of these experiences, the results will actually provide a more modest estimate of the relationship between cross-racial interaction and student outcomes (relative to assessing positive or meaningful cross-racial interactions; see Denson and Chang 2015; Hurtado 2005; Nelson Laird 2005). While these interactions may occur across ties that are weak, moderate, or strong, this cross-racial interaction measure clearly reflects weaker ties, on average, than would be indicated by close interracial friendships. In addition, the interracial friendship variable only includes the race/ethnicity of students' four closest friends at that campus; students have likely spent a great deal of time with these friends, so these interpersonal relationships will probably not result in substantial exposure to new perspectives or information.

This study will also examine whether the potential outcomes associated with cross-racial interaction and interracial friendship differ as a function of students' own race/ethnicity. Many previous studies of college diversity experiences have performed analyses only on the entire sample, have combined all students of color into one (overly heterogeneous) group, and/or had small s11ample sizes for specific racial/ethnic groups. The dataset used in this study sampled approximately equal numbers of African American/Black, Asian American/Pacific Islander, Latino/Hispanic, and White/Caucasian students, so these subgroup analyses contained a fairly large number of participants for each racial/ethnic group.

Method

Data Source and Participants

Data from the National Longitudinal Survey of Freshmen (NLSF) were used. The sample included 28 academically selective institutions, which are diverse in terms of student demographics, region, and institutional type (for a complete list of institutions and other information, see NLSF 2014). Among incoming first-year students at these institutions, the

median combined SAT score was 1,243, and 71 % were in the top 10 % of their high school graduating class. Students of color were oversampled to obtain approximately equal numbers of Asian American, Black, Latino/a, and White participants. A total of 4,573 first-year students were invited to take part in a face-to-face interview in Fall 1999, and 3,924 students (86 %) agreed to participate. The response rates were reasonably similar across racial/ethnic groups, ranging from 83 % for White students to 89 % for Black students. Although this initial data collection occurred in person, virtually all of the questions were closed-ended (i.e., the resulting data were quantitative, not qualitative). Four follow-up surveys were conducted via telephone in Spring 2000, 2001, 2002, and 2003. Students who transferred to a different institution or who dropped out of university were followed and retained in the sample to minimize selection bias. A total of 2,932 students participated in both the junior- and senior-year surveys, which constitutes a 75 % retest response rate from the initial data collection (ranging from 72 % for Blacks to 77 % for Whites). This analytic sample included 766 Black students, 757 White students, 736 Asian American students, and 673 Latino/a students.

Listwise deletion was used to remove cases that had missing data. Although listwise deletion is preferable to most other options for analyzing incomplete data, maximum likelihood and multiple imputation procedures are generally seen as preferable (e.g., Allison 2002; Little and Rubin 2002). We hesitated to impute data for all participants for the final analyses, because we would almost certainly be estimating experiences and outcomes for many students who had dropped out of college. Therefore, as a form of sensitivity analysis, we used the expectation–maximization (EM) algorithm to yield maximum likelihood estimates for all missing data, and we re-conducted the analyses with a complete dataset. The results were very similar—and the substantive conclusions were identical—to those reported here, which provides further support for the current findings.

Measures

Dependent Variables

This study included two types of senior-year outcomes that have been explored in college diversity research: intergroup attitudes and affective measures (for reviews, see Bowman 2011; Chang 2011; Davies et al. 2011; Pettigrew and Tropp 2006). Participants reported how easy it is to get along with people from a particular racial group (e.g., Asians; 1 = hard to get along with, to 7 = easy to get along with). A three-item index for ease of getting along with other races was created for each student; for example, for Latino/a students, this index was the average of the three items regarding Asians, Blacks, and Whites. Because the items that comprise this scale vary depending upon one's own racial background, a single internal reliability for the entire sample cannot be computed. For each racial/ethnic group, the Cronbach's alphas ranged from .67 for Blacks to .85 for Whites. Participants also rated the extent to which people from a particular racial/ethnic group (e.g., Whites) are generally hardworking (1 = lazy, to 7 = hardworking) and are generally persistent in accomplishing tasks (1 = give up easily, to 7 = stick with it). Six-item indices were created using participants' ratings of each of the other three racial/ethnic groups; thus, for Black students, this index was the average of the three hardworking items and the three persistence items regarding Asians, Latinos/as, and Whites. As with the previous index, the internal reliability cannot be computed for the entire sample, but these ranged from .72 for Blacks to .79 for Whites. The degree to which racial minorities should

Table 1 Overview of dependent variables

Outcome	Sample item and response scale	# of items	Cronbach's alpha
Ease of getting along with people from other races	"Where would you rate Whites on a scale, where 1 means tends to be hard to get along with and 7 means tends to be easy to get along with?"	3	.67–85
Believe people from other races are hardworking	"Where would you rate Asians on a scale, where 1 means tends to be lazy and 7 means tends to be hardworking?"	6	.72–79
Situational attributions for life outcomes of people of color	"Many Blacks have only themselves to blame for not doing better in life. If they tried harder, they would do better." (0 = strongly agree, to 10 = strongly disagree)	3	.93
Emotional well-being	"You were happy" in the past week. (0 = never, to 4 = all the time)	13	.67
College satisfaction	"If I had to do it all over again, I would choose to attend [name of college]" (0 = totally disagree, to 10 = totally agree)	7	.82
Self-reported growth	"College has given me a mastery of the subjects I studied" (0 = totally disagree, to 10 = totally agree)	6	.81
Postcollege volunteering intentions	"Beginning in the fall…do you expect to participate either full or part time in a voluntary organization?" (0 = no, 1 = yes)	1	N/A

Because the exact items used to create the first two outcomes differ by race/ethnicity (i.e., only the outgroups are used for each participant), a single Cronbach's alpha cannot be computed for the entire sample. Therefore, the values above indicate the range of alphas across the four racial/ethnic groups in this study

be blamed for not having better life outcomes was assessed via three items, each of which used an 11-point scale (0 = strongly disagree, to 10 = strongly agree). These items were identical to one another, except that one asked about the blame that should be given to Asians, another to Blacks, and another to Latinos/as. Unlike the other three intergroup outcomes, this measure used the same items across all participants, so an overall reliability index could be computed ($\alpha = .93$). This variable was then reverse-coded and conceptualized as endorsing situational attributions for the life outcomes of people of color, so that higher values represented more favorable outcomes.

Several additional measures assessed affective outcomes and intentions for democratic participation. Emotional well-being was indicated by the frequency of experiencing positive emotions and lack of negative emotions. This scale contained 13 items ($\alpha = .67$), which each used a five-point scale (0 = never, to 4 = all of the time). Overall college satisfaction was measured with a seven-item scale ($\alpha = .82$), and self-reported growth was measured with a six-item scale ($\alpha = .81$). Previous research suggests that self-reported gain items are best represented as a single construct (e.g., Bowman and Hill 2011) and that these are not synonymous with actual learning or growth (e.g., Bowman 2010a). Instead, this construct is intended to serve as an affective outcome that indicates subjective perceptions of the learning experience (see Gonyea and Miller 2011; Sitzmann et al. 2010). The college satisfaction and self-reported growth items all used an 11-point scale (0 = totally disagree, to 10 = totally agree). Finally, postcollege volunteering intentions were indicated with a single item (0 = no, 1 = yes). An overview of these variables, along with sample items, is provided in Table 1.

Key Independent Variables

Cross-racial interaction was indicated via several items that assessed the frequency of interpersonal interactions during college with each of the four major racial/ethnic groups (0 = no interaction at all, to 10 = a great deal of interaction). The items for the three racial/ethnic outgroups were averaged to provide the overall frequency of cross-racial interaction for each student. Participants were also asked to think of their four closest friends from college and then identify their race/ethnicity. These responses were used to tally the total number of close friends (out of four) who were from a different racial/ethnic group. This approach appears to yield more conservative and accurate estimates of intergroup friendships than simply asking participants about their outgroup friends (Davies et al. 2011). The correlation between these two interracial experience variables was small to moderate ($r = .22$).

Control Variables

Additional variables that have been established as frequent predictors of college student outcomes were also included (e.g., see Pascarella and Terenzini 2005; Renn and Reason 2012). Race/ethnicity was assessed via several dummy-coded variables (Asian American/Pacific Islander, African American/Black, and Latino/Hispanic, with White/Caucasian as the referent group). Gender was indicated with a dichotomous variable (0 = male, 1 = female), and parental education was assessed via the average of mother's and father's education (1 = grade school, to 7 = graduate or professional degree). Self-reported high school grade point average (HSGPA) was measured by computing the average of six items that asked for students' typical high school grades (1 = mostly D's, to 4 = mostly A's) in six core subjects (English, history, mathematics, natural sciences, social studies, and foreign languages). Given the skewed distribution and high academic achievement of students within this sample, the HSGPA measure was recoded into dummy variables indicating (relatively) low HSGPA (less than 3.5) and medium HSGPA (3.5–3.9), with high HSGPA (4.0) as the referent group. Participants reported the percentage of students in their high school from various racial groups, percentage of people in their neighborhood from various racial groups, and the race/ethnicity of their 10 closest high school friends. From these data, the percentages of people from a different racial/ethnic group than the participant were computed for one's high school student body, local neighborhood, and high school friends. Preliminary analyses demonstrated that these three constructs were very highly correlated with one another (rs $> .69$), so these were averaged to provide a single variable for high school diversity exposure ($\alpha = .88$). Pretests for each of the intergroup outcomes were included in the corresponding models. The dataset did not contain pretests for the affective outcomes (emotional well-being, college satisfaction, and self-reported growth), so self-esteem upon entering college was included as a predictor in these models. The 10 items in this index (e.g., "On the whole, I am satisfied with myself") were each measured on a five-point scale (1 = strongly disagree, to 5 = strongly agree; $\alpha = .86$).

Several college experience variables were used. The particular items that were administered differ somewhat across years, so we used the best available measure(s) for each construct. An index of time spent socializing and relaxing was created. During spring of the freshman, sophomore, and junior years, students reported the number of hours in the previous week that they had spent doing several activities (these items were not included in the senior survey). The index of socializing and relaxing included the number of hours students spent attending parties, socializing with friends (other than at parties), and

listening to music, which yielded a total of nine items across the 3 years ($\alpha = .62$). Involvement in study abroad was represented with a dichotomous variable (0 = no, 1 = yes). College major in the senior year was indicated with several dummy variables: arts/humanities, math/engineering, natural sciences, professional majors, and "other" majors (typically interdisciplinary degrees), with social sciences as the referent group. Participation in various student organizations and activities was measured in the third year; dichotomous variables were created for religious groups, fraternities/sororities, service-based groups, and racial/ethnic organizations. Living on campus during the third year (whether in a residence hall or university-owned apartment) was also indicated with a binary variable.

For the institutional characteristics, structural racial diversity was indicated with a diversity density index formula that takes into account the proportional representation of students from several racial/ethnic groups (Meyer and McIntosh 1992; Umbach and Kuh 2006). Institutional type was indicated via dummy-coded variables for public university and liberal arts college, with private university as the referent group. Descriptive statistics for all variables are reported in Table 4. Finally, all continuous dependent variables and independent variables were subsequently standardized with a mean of zero and a standard deviation of one. As a result, the unstandardized coefficients for cross-racial interaction and interracial friendship predicting continuous student outcomes are analogous to standardized regression coefficients (Cohen et al. 2003).

Analyses

Hierarchical linear modeling (HLM) analyses were conducted. HLM is preferable to ordinary least squares (OLS) multiple regression for examining this multi-institutional sample, because the nesting of students within colleges and universities violates a key assumption of OLS regression, and HLM is designed to model multi-level data appropriately (Raudenbush and Bryk 2002). The dependent variables were ease of getting along with people from other races, belief that people from other races are hardworking, situational attributions for the life outcomes of people of color, emotional well-being, college satisfaction, self-reported growth, and postcollege volunteering intentions. Because postcollege volunteering intentions were measured with a dichotomous variable, hierarchical generalized linear modeling analyses were used to predict this outcome. All analyses included race/ethnicity, gender, parental education, high school GPA, high school diversity exposure, time spent socializing, study abroad, undergraduate major, student organization participation, living on campus, and the corresponding pretest (or proxy pretest) as independent variables at level 1, while institutional type and structural racial diversity were modeled at level 2. This simultaneous inclusion of a pretest and other covariates to examine predictors of change over time is a well-accepted statistical approach (e.g., see Pascarella et al. 2003; Pike 2004).

To ensure that the relationship for close interracial friendship was not explained or obscured by the cross-racial interaction variable, three models were examined for each analysis: Model 1 included cross-racial interaction as a predictor, Model 2 included close interracial friendship as a predictor, and Model 3 included both of these variables. As shown below, the results for Model 3 are extremely similar to Models 1 and 2. All of these analyses were then conducted separately for each racial/ethnic subgroup. Because the results were substantively identical across models—and providing the results for all three

models would therefore be largely redundant—only the Model 3 results for the subgroup analyses are provided.

The proportion of variance in the dependent variables that occurred between institutions was typically small, with intra-class correlations (ICCs) generally ranging from 1 to 3 %. Although some scholars recommend that multilevel modeling be used if the ICC is at least 5 % (Heck and Thomas 2009; Porter 2006), others do not provide a specific minimum ICC value (Luke 2004; Raudenbush and Bryk 2002), and single-level analyses should not be performed on multilevel data if the predictor variables occur at both the individual and institutional levels (Thomas and Heck 2001), which is the case here. In addition, multilevel analyses are simply considered unnecessary—not incorrect or inappropriate—if the ICC is low (Heck and Thomas 2009). The independent variables at both level 1 and level 2 were grand-mean centered. Preliminary analyses showed that all variance inflation factors (VIFs) were below 3.3, so multicollinearity did not seem to be a problem (the highest VIFs were for the three dummy-coded racial/ethnic groups; all others were below 2.5).

Because several outcomes were examined with seven distinct analyses, it becomes increasingly likely that a statistically significant result will occur by random chance even if no actual relationship exists within the population. As a result, we have provided Bonferroni-adjusted significance values for the HLM results (i.e., $p = .05/7 \approx .007$). However, we also did not want to "stack the deck" in our favor by using a more stringent significance criterion when our hypotheses include the lack of significant findings (and/or weak relationships) for close interracial friendship. Therefore, we used $p < .05$ as our main significance criterion, but we also note significance values at $p < .007$ within Tables 2 and 3 for readers who are interested in this more conservative threshold.

Limitations

Some limitations should be noted. First, this sample consists of selective US colleges and universities, so it is unclear to what extent these results might generalize to less selective schools. Some research has shown that the link between interpersonal diversity interactions and student outcomes does not vary by academic achievement or socioeconomic status (Goodman 2011; Loes et al. 2013; Padgett et al. 2010; Pascarella et al. 2012), whereas others have found that diversity interactions are more strongly related to changes in critical thinking and political views among students with lower ACT scores (Loes et al. 2012; Pascarella et al. 2014; Pascarella et al. 2012). As a result, the present analyses of selective institutions may, if anything, underestimate the relationships between cross-racial interaction and college outcomes. If that is true, then the disparity for the relationships between the two types of diversity experiences examined here is also likely to occur at less selective institutions. Second, the interracial friendship variable only included students' four closest friends on campus. The present findings may have differed if students' broader friendship networks were examined, and a more detailed network analysis of these friendship groups may have yielded additional insights. Third, the theoretical frameworks that are relevant to this study (Clarke and antonio 2012; Crisp and Turner 2011; Gurin et al. 2002) suggest that cross-racial interaction should promote a broad range of outcomes among students and other adults. To explore this prediction, we used several intergroup, affective, and democratic outcomes, but unfortunately no direct measures of cognitive growth were available in this dataset. Finally, our hypotheses are based on the assumption that the cross-racial interaction variable reflects weaker interpersonal ties than those represented in the close interracial friendship variable. This assumption is almost certainly true when expressed as

Table 2 Hierarchical linear modeling analyses for cross-racial interaction and interracial friendship predicting student outcomes

Dependent variable	Independent variable	Model 1	Model 2	Model 3
Ease of getting along with people from other races	Cross-racial interaction	.138*** (.024)		.134*** (.024)
	Interracial friendship		.046 (.031)	.037 (.030)
Believe people from other races are hardworking	Cross-racial interaction	.045* (.023)		.047* (.024)
	Interracial friendship		−023 (.030)	−025 (.030)
Situational attributions for life outcomes of people of color	Cross-racial interaction	.092*** (.022)		.083*** (.022)
	Interracial friendship		.052 (.028)	.048 (.028)
Emotional well-being	Cross-racial interaction	.028 (.023)		.021 (.023)
	Interracial friendship		.048 (.029)	.046 (.029)
College satisfaction	Cross-racial interaction	.139*** (.023)		.139*** (.023)
	Interracial friendship		.010 (.029)	.004 (.029)
Self-reported growth	Cross-racial interaction	.210*** (.022)		.218*** (.023)
	Interracial friendship		−007 (.029)	−016 (.029)
Postcollege volunteering intentions	Cross-racial interaction	.197*** (.053)		.198*** (.053)
	Interracial friendship		−152* (.066)	−161* (.066)

Standard errors are in parentheses. Hierarchical generalized linear modeling analyses were used to examine postcollege volunteering intentions. All analyses controlled for structural racial diversity, institutional type, race/ethnicity, gender, parental education, high school GPA, time spent socializing, study abroad, undergraduate major, fraternity/sorority membership, racial/ethnic student organization, religious student organization, service-based organization, and living on campus. Models predicting intergroup outcomes also controlled for the corresponding pretest, and model predicting affective outcomes controlled for students' entering self-esteem

* $p < .05$, ** $p < .007$, *** $p < .001$

a relative statement, but the actual strength of ties indicated by this cross-racial interaction measure is unclear.

Results

The HLM results for cross-racial interaction and interracial friendship within the full sample are shown in Table 2. In Model 1, cross-racial interaction is significantly and positively related to every outcome except emotional well-being. This relationship is

Table 3 Hierarchical linear modeling analyses for cross-racial interaction and interracial friendship predicting student outcomes by race/ethnicity

Dependent variable	African American/Black		Asian American/ Pacific Islander		Latino/Hispanic		White/Caucasian	
	Cross-racial interaction	Interracial friendship	Cross-racial interaction	Interracial friendship	Cross-racial interaction	Interracial friendship	Cross-racial interaction	Interracial friendship
Ease of getting along with people from other races	.206*** (.056)	.042 (.057)	.106* (.054)	−019 (.057)	.240*** (.056)	.227** (.081)	.065 (.039)	.036 (.076)
Believe people from other races are hardworking	−021 (.056)	−070 (.057)	.027 (.049)	.039 (.051)	.174** (.058)	−049 (.084)	.015 (.037)	−040 (.073)
Situational attributions for life outcomes of people of color	.045 (.052)	.036 (.053)	.129* (.050)	.179*** (.053)	.074 (.053)	−040 (.077)	.091* (.035)	−112 (.070)
Emotional well-being	.001 (.053)	−003 (.054)	−004 (.053)	.069 (.056)	.105* (.053)	.059 (.078)	−003 (.036)	.216** (.071)
College satisfaction	.185** (.059)	.064 (.060)	.207*** (.049)	−037 (.052)	.215*** (.051)	−008 (.074)	.076* (.036)	−045 (.071)
Self-reported growth	.259*** (.054)	.041 (.055)	.347*** (.049)	−130* (.051)	.196*** (.052)	−072 (.077)	.145*** (.035)	.113 (.070)
Postcollege volunteering intentions	.230 (.118)	−397** (.120)	.220 (.122)	−111 (.130)	.041 (.119)	−129 (.172)	.258* (.097)	−005 (.187)

Standard errors are in parentheses. Hierarchical generalized linear modeling analyses were used to examine postcollege volunteering intentions. All analyses controlled for structural racial diversity, institutional type, gender, parental education, high school GPA, time spent socializing, study abroad, undergraduate major, fraternity/sorority membership, racial/ethnic student organization, religious student organization, service-based organization, and living on campus. Models predicting intergroup relations outcomes also controlled for the corresponding pretest, and model predicting affective outcomes controlled for students' entering self-esteem. The results provided here are for Model 3 (with cross-racial interaction and interracial friendship entered simultaneously); the findings are substantively identical when these diversity predictors are included in separate analyses

* $p < .05$, ** $p < .007$, *** $p < .001$

modest in size for believing that people from other races are hardworking ($B = .045$, $p < .05$), whereas it is notably larger for ease of getting along with people from other races, situational attributions for life outcomes of people of color, college satisfaction, self-reported growth, and postcollege volunteering intentions ($.09 < Bs \leq .21$, $ps < .001$). As described earlier, the rescaling of the independent and dependent variables means that the HLM coefficients are analogous to standardized regression coefficients for continuous outcomes (i.e., all except postcollege volunteering intentions). As a result, cross-racial interaction uniquely explains about 1–4 % of the variance within five of the six continuous outcomes. In contrast, only one coefficient for close interracial friendship is significant in Model 2, which is actually a negative relationship with postcollege volunteering intentions ($B = -.152$, $p < .05$). The HLM coefficients in Model 3 (which simultaneously includes both cross-racial interaction and close interracial friendship as predictors) are very similar to those in Models 1 and 2, and the pattern of significant results for Model 3 is identical to the other two models. In short, cross-racial interaction is positively associated with virtually every outcome, whereas close interracial friendship is not positively related to any outcome within the full sample.

Table 3 contains the results of the racial/ethnic subgroup analyses. Cross-racial interaction is positively and significantly related to college satisfaction and self-reported growth among students from all racial/ethnic groups. However, these relationships tend to be larger for African Americans/Blacks, Asian Americans/Pacific Islanders, and Latinos/Hispanics ($.18 < Bs < .35$, $ps < .001$) than for Whites/Caucasians ($.07 < Bs < .15$, $ps < .05$). Supplementary analyses showed that these HLM coefficients differ significantly across groups ($ps < .05$) in several instances (for both Asian Americans and Latinos/as vs. Whites when predicting college satisfaction and for both African Americans and Asian Americans vs. Whites when predicting self-reported growth). Cross-racial interaction also significantly predicts changes in ease of getting along with people from other races among all groups except Whites ($.10 < Bs \leq .24$, $ps < .05$); moreover, these coefficients are significantly greater for African Americans and Latinos/as than for Whites (for details on conducting statistical comparisons of multiple regression and HLM coefficients, see Cohen et al. 2003). Cross-racial interaction is positively associated with believing that people from other races are hardworking among Latinos/as ($B = .174$, $p < .007$), situational attributions for life outcomes of people of color among Asian Americans and Whites ($.09 < Bs < .13$, $ps < .05$), and postcollege volunteering intentions among Whites ($B = .258$, $p < .05$).

As also shown in Table 3, close interracial friendship is positively and significantly related to ease of getting along with people from other races among Latinos/as ($B = .227$, $p < .007$), situational attributions for life outcomes of people of color among Asian Americans ($B = .179$, $p < .001$), and emotional well-being among Whites ($B = .216$, $p < .007$). However, this diversity experience is also significantly and negatively associated with self-reported growth among Asian Americans ($B = -.130$, $p < .05$) and postcollege volunteering intentions among African Americans ($B = -.397$, $p < .007$).

To explore whether the prevalence of non-significant results for close interracial friendship is a statistical artifact, we conducted supplemental analyses to test for potential ceiling effects. In this instance, problems with ceiling effects would be indicated by (a) pretest and posttest means that are near the highest possible value, and (b) a positive, non-trivial relationship between interracial friendship and the pretests. However, the data do not support either of these conditions. As shown in Table 4, the means are near the midpoint for all three interracial attitudes upon entering college, and the means for senior-year outcomes are well below the maximum values. Moreover, out of the three true pretests

Table 4 Descriptive statistics for all variables

Variable	Mean	SD	Min	Max
Public university	.300	.458	0	1
Liberal arts college	.103	.304	0	1
Structural racial diversity	.460	.138	.15	.67
Asian	.251	.434	0	1
Black	.261	.440	0	1
Latino/a	.230	.421	0	1
Female	.598	.490	0	1
Parental education	5.224	1.465	1	7
Average A-high school grades	.460	.498	0	1
Average B+ or lower high school grades	.156	.363	0	1
Precollege exposure to racial/ethnic difference	.567	.320	0	1
Time spent socializing and relaxing	6.820	4.679	.67	47
Study abroad	.289	.454	0	1
Natural science major	.121	.326	0	1
Engineering/math major	.137	.343	0	1
Humanities/fine arts major	.173	.378	0	1
Professional major	.171	.376	0	1
Other major	.033	.179	0	1
Religious organization	.082	.275	0	1
Fraternity/sorority membership	.120	.325	0	1
Service organization	.199	.399	0	1
Racial/ethnic organization	.132	.339	0	1
Live on campus	.513	.500	0	1
Cross-racial interaction	6.683	1.778	0	10
Interracial friendship	1.952	1.531	0	4
Easy to get along with people from other races—time 1	4.552	1.062	1	7
Believe people from other races are persistent/hardworking—time 1	4.501	.698	1	7
Situational attributions for life outcomes of people of color—time 1	6.055	2.499	0	10
Self-esteem	4.215	.558	1.60	5
Easy to get along with people from other races—time 2	4.416	.913	1	7
Believe people from other races are persistent/hardworking—time 2	4.479	.653	1.83	7
Situational attributions for life outcomes of people of color—time 2	7.428	2.418	0	10
Emotional health	2.567	.386	1	3.62
College satisfaction	7.424	1.524	.71	10
Self-reported growth	7.509	1.541	.67	10
Postcollege volunteering intentions	.403	.491	0	1

All continuous dependent and independent variables were subsequently standardized for inclusion in the hierarchical linear modeling analyses

and one proxy pretest (self-esteem), interracial friendship is significantly correlated only with ease of getting along with people from other races ($r = .09, p < .001$); the other three correlations with interracial friendship are all non-significant ($rs < .04$, $ps > .10$).

Discussion

Overall, cross-racial interaction is significantly and positively related to almost every student outcome, while close interracial friendship is not positively associated with any of the dependent variables within the full sample. These findings provide support for Clarke and antonio's (2012) proposal—which was derived, in part, from Granovetter's (1973, 1983) "strength of weak ties" framework—that overall cross-racial interaction provides stronger and more consistent benefits to students than close interracial relationships. To our knowledge, this study is the first to explore this framework in the context of racial diversity in higher education, underscoring the unique significance of findings. The current findings also further support frameworks proposed by Gurin et al. (2002) and Crisp and Turner (2011) in that cross-racial interaction, which presumably facilitates frequent exposure to novel situations and information, is positively related to student growth and desired outcomes.

Given the modest correlation between the cross-racial interaction and interracial friendship variables, many students with high levels of cross-racial interaction likely have interracial friendships that exist beyond their four closest friends, which was the measure of interracial friendship in the present study. Future studies should compare cross-racial interaction with various types of interracial friendship (i.e., within students' four, ten, and twenty closest friends and acquaintances) to further expand understanding of Granovetter's framework and different forms of interracial contact. Thus, our findings should not be interpreted to mean that there is no or little value in interracial friendship; instead, these point to the relative benefits of frequent cross-racial interaction (which may or may not include interracial friendship) in comparison to having racial diversity within one's few closest friends.

Regarding relationships across race/ethnicity, a point of interest is the consistent significant results of cross-racial interaction across groups for two dependent variables: college satisfaction and self-reported growth. We have no clear-cut answer for why cross-racial interaction is so consistently linked to satisfaction and perceived growth (relative to the findings for the other outcomes); it could be that those who interact more across race with multiple different racial/ethnic groups also tend to be more positive about their college experience and their growth from it. Perhaps students who engage in more cross-racial interaction feel a sense of satisfaction that they were able to maximize the potential of their college experience. In one ethnographic study, participants saw engagement with diversity as part of the ideal university experience, and some students' lack of meaningful cross-racial interaction made them feel like they had missed out on an important part of college (Abelman 2009). It is also possible that students who are more optimistic about or open to college experiences are simultaneously predisposed to interacting across race (among other forms of engagement) and to being satisfied with college overall. Finally, the fact that neither of these two outcomes has a true pretest may also help explain the consistency and strength of these relationships. Pretests often explain a substantial amount of variance in the posttest, so multivariate analyses that include an actual pretest may be less likely to obtain significant results across several student subgroups than those with no pretest.

Cross-racial interaction predicts changes in ease of getting along with other races for every group except Whites. Although previous research generally shows a positive link between cross-racial interaction and a host of outcomes (see Chang 2011), multiple psychological biases often work to reduce the effects of cross-racial interactions on race-related attitudes and perceptions. For instance, someone may have frequent interactions

with another person from a different race, but they then view that person as an "exception" to a stereotype that they hold about that race, or they mentally assign that person to a "subgroup" to which the stereotype does not apply (Hewstone and Lord 1998; Wilder et al. 1996). These psychological dynamics allow people to hold favorable views about particular individuals or subgroups while retaining their negative attitudes and/or stereotypes about the broader category to which they belong. It is possible that these processes are more pronounced among White students than among students of color, which would explain why White students who have frequent cross-racial interaction do not have improved attitudes regarding other races more generally.

Asian Americans are the only group for which close interracial friendship significantly predicts changes in situational attributions for life outcomes (positively) and self-reported gains (negatively). While interracial friendship is generally not associated with benefits for the overall sample, it does exhibit some significant relationships for this population. Within the present multi-institutional sample, Asian Americans have the lowest situational attributions for the outcomes of people of color; however, both cross-racial interaction and close interracial friendship predict gains in this outcome among Asian Americans. Thus, both forms of interracial contact may be especially meaningful in challenging Asian American students to think critically about the world. These differences between Asian Americans and students from other races and ethnicities illustrate the importance of conducting subgroup analyses, and future research would benefit from disaggregating the AAPI category to further explore whether outcomes related to interracial contact differ for various sub-populations.

A few significant, negative relationships are observed in this study, but we hesitate to draw strong conclusions from these results. Although close interracial friendship is negatively related to postcollege volunteering intentions in the full sample, this coefficient is actually not significant when using the Bonferroni-adjusted value ($p < .007$). Moreover, the subgroup analyses involved 56 different statistical tests—28 for each type of diversity experience—so the two negative and significant findings (at $p < .05$) may simply have occurred from random chance. It does not seem surprising that both negative results are for close interracial friendship, since cross-racial interaction is often positively related to student change or desired outcomes (and therefore less likely to exhibit a false negative result).

Lastly, interracial friendship predicts emotional well-being only for White students; emotional well-being is also the only outcome that is not significantly related to cross-racial interaction in the full sample. Given that diversity interactions are often seen as being part the ideal university experience (Abelman 2009) and that interracial interactions and friendships are much less common for Whites (e.g., Bowman and Park 2014; Saenz et al. 2007), White students may accrue particular benefits from having at least one close friend of another race. In addition, because Whites are the privileged majority group throughout US society, they may have had fewer opportunities to develop certain personal attributes related to difference, such as perspective taking and cognitive flexibility. As a result, interracial friendship may be particularly useful for Whites in promoting these outcomes, which are then associated with psychological and emotional flourishing within an increasingly pluralistic and globalized society.

Conclusion and Implications

Overall, this paper contributes to research on racial diversity by showcasing the disparate findings for cross-racial interaction versus close interracial friendship. By providing a

comparative analysis, we demonstrate that not all forms of diversity engagement appear to yield the same benefits or any benefits at all. That is, high levels of cross-racial interaction (which may or may not include interactions with a broader network of interracial friends) are positively related to numerous student outcomes, whereas close interracial friendship is generally unrelated to these same outcomes. Although we found much more consistent significant results for cross-racial interaction than interracial friendship, we caution that our measure of interracial friendship is limited to a student's four closest friends.

Through this analysis, we were able to help delineate some of the boundary conditions for the possible impact of different types of interracial contact. In this paper, we examined what are perhaps two extremes of interracial contact—very close interracial friendship and the simple frequency of cross-racial interaction with multiple groups. Future studies should examine and compare other types of interracial contact (e.g., the racial composition of students' ten closest friends), which will help researchers further understand the parameters and boundaries of interracial contact and college student outcomes. Additionally, the study provides empirical backing for Clarke and antonio's (2012) theoretical framework by offering some support for the educational strength of (relatively) weak, bridging ties in higher education. Future research needs to draw upon additional data to better compare the benefits of different types of social networks, cross-racial interaction, and interracial friendship. Our study certainly does not suggest that universities should not care whether students have close interracial friendships at all; our paper identifies some positive findings, as do other studies (see Davies et al. 2011). However, to maximize the potential benefits of interracial contact, close interracial friendship should be accompanied by frequent cross-racial interaction in order to provide novel sources of information and concomitant growth.

These results also suggest that having a variety of same-race and different-race relationships may help students. In particular, some students of color may benefit from having close same-race friendships as a source of support; such relationships do not prevent them from engaging with the broader diversity of campus, given that they have high rates of interracial contact. Bowman and Park (2014) found that participation in ethnic student organizations is actually linked with higher rates of cross-racial interaction. Similarly, same-race close friendships may give students of color a supportive base that helps them to engage with the diversity of the institution.

Regardless of the makeup of students' closest friends, these findings underscore the importance of cross-racial interaction with students from a variety of different racial/ethnic groups. Thus, universities should consider settings that promote continuous, casual, and meaningful cross-racial interaction, such as diverse roommate pairings, racially diverse classes, and diversity co-curricular activities (Saenz 2010; Saenz et al. 2007). Some studies have identified environments within the university that may discourage cross-racial interaction, such as Greek life. White students who participate in Greek life generally have lower cross-racial interaction (Jayakumar 2008; Saenz 2010; Saenz et al. 2007) and lower interracial friendship (Bowman and Park 2014; Stearns et al. 2009); this consistent trend for multiple forms of interracial contact is troubling. Interestingly, the predictors of interracial friendship and cross-racial interaction often diverge from one another; for instance, involvement with campus religious groups and ethnic student organizations predict less frequent interracial friendship, yet these experiences are unrelated to cross-racial interaction (Bowman and Park 2014; Park and Kim 2013). Thus, the conditions that may foster cross-racial interaction are not synonymous with those that may foster interracial friendship; universities primarily need to provide ample opportunities to student

interaction across difference in their broader networks of classmates, acquaintances, and friends.

Finally, this paper affirms the need for universities to attract and retain racial diversity in order to provide the pre-conditions for both cross-racial interaction and interracial friendship (Museus 2011). Clearly, heterogeneity within a student population is necessary to maximize opportunities for cross-racial interaction between students from several racial/ethnic groups. The findings speak to the need for race-conscious admissions to support both racial and socioeconomic diversity in institutions, as affirmed by the US Supreme Court's ruling in Fisher v. University of Texas (2013). Institutions must work to support a healthy campus racial climate that maximizes learning and development for all students—since a racially diverse student body on its own will not produce positive outcomes, it needs to be accompanied by intentional policies that support and nurture that diversity. From diversifying the faculty to ensuring that the curriculum addresses issues of equity and diversity in a meaningful fashion, institutions must act to maximize opportunities for students to engage with diversity. However, a racially diverse student body is the first step in providing the essential conditions needed to support healthy intergroup contact.

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