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How Much Diversity is Enough? The Curvilinear Relationship Between College Diversity Interactions and First-Year Student Outcomes

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Abstract Recent legal challenges to race-conscious college admissions processes have called into question what constitutes a sufficient level of diversity on college campuses. Previous research on the educational benefits of diversity has examined the linear relationship between diversity interactions and student outcomes, but multiple theoretical frameworks suggest that this relationship may be curvilinear. The present study investigated this possibility using a longitudinal sample of 8,615 first-year undergraduates at 49 colleges and universities. The results indicate that rare or moderate diversity interactions are associated with virtually no growth (and sometimes even slight declines) in leadership skills, psychological well-being, and intellectual engagement, whereas very frequent diversity interactions are associated with considerable growth. The results are similar regardless of students' race, institutional characteristics, and whether the interactions are interracial or across multiple forms of difference. Implications for institutional practice and future research are discussed.

Keywords Diversity · College students · Race/ethnicity · Student outcomes · Intergroup contact

The population of the United States is becoming increasingly heterogeneous. While the number of non-Hispanic Whites grew by only 1.2 % between 2000 and 2010, the population increase during this decade was substantial among Hispanics/Latinos (43 %), Asians (43 %), Native Hawaiians/Pacific Islanders (35 %), and people who identify with two or more races (32 %) (Humes et al. 2011). Trends toward greater pluralism are also apparent for other demographic categories, including a 223 % increase in the foreign-born population from 1970 to 2000 (Gibson and Jung 2006). These shifts within the overall population are paralleled by changes among U.S. undergraduates, who are now considerably

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less likely to be White, male, traditional college age (18–24 years old), U.S.-born, and Christian than in previous decades (e.g., The Chronicle of Higher Education 2011; Pryor et al. 2007). Thus, the ability to interact effectively across multiple forms of difference has become increasingly important for today's college graduates.

Despite this burgeoning heterogeneity, American K-12 schools and neighborhoods are becoming increasingly segregated (Orfield 2009). As a result, college provides many students with a unique opportunity to have meaningful interactions and friendships with people who are different from themselves, which can result in a host of educational benefits. College students' interpersonal interactions with diversity are associated with improved cognitive skills, leadership skills, civic engagement, self-concept, sense of belonging, cultural awareness, and intergroup attitudes (e.g., Antonio 2001a; Astin 1993; Chang et al. 2006; Gurin et al. 2002; Hu and Kuh 2003; Hurtado 2005; Jayakumar 2008; Locks et al. 2008; for a recent qualitative review, see Chang 2011). However, the exact nature or functional form of this relationship is still largely unclear. Do increases in the frequency of diversity interactions always result in more desirable outcomes for all students? And is this relationship linear, or might the apparent effect of diversity interactions be enhanced—or perhaps attenuated—when students interact with a certain level of diversity? These questions certainly have important practical implications for colleges and universities, and they have taken on greater significance in the context of legal challenges to race-conscious admissions policies.

Recent Legal Background for Considering Race in College Admissions

In 2003, the United States Supreme Court ruled on two separate lawsuits against the University of Michigan: *Grutter v. Bollinger* (2003) and *Gratz v. Bollinger* (2003). In *Grutter*, the Court upheld the use of race-based admissions as a means of fostering the educational benefits that may result from interactions with racially diverse peers. This decision determined that the use of race as a "plus factor" in additional to various other individualized factors was permissible, but the Supreme Court's decision in the *Gratz* case struck down the practice of assigning a fixed number of points for belonging to an underrepresented racial group. After these rulings occurred, the University of Texas began to consider race as a plus factor in their college admissions policies. The university still continued to enroll the vast majority of their students through their "Top 10 Percent" policy, in which the top tenth of students within each Texas high school are automatically granted admission.

However, the legality of this revised admissions practice was recently challenged in *Fisher v. University of Texas at Austin* (2008), which was heard by the U.S. Supreme Court in October 2012. The plaintiffs argued that the university should not be allowed to consider race in admissions if it can achieve a racially diverse student body through race-neutral approaches, and they have also asserted that the university's previous race-neutral policies "successfully produced a diverse student body" (*Fisher v. University of Texas at Austin* 2008, p. 33). This argument broaches the difficult question of how one determines whether a sufficiently diverse student body has been achieved. It would seem inappropriate to make this judgment on the basis on a predetermined number of students from underrepresented racial groups, because this would be akin to a racial quota, which was deemed illegal in *Regents of the University of California v. Bakke* (1978). In *Grutter* and *Gratz*, the University of Michigan argued that admissions policies should seek to establish a "critical mass" of underrepresented racial minority students, which they described as a proportion that was sufficiently large so that (a) all students have opportunities to engage in

cross-racial interactions, (b) minority students do not feel as if they are speaking on behalf of their group, and (c) students hear multiple viewpoints from members of a single racial group (also see University of Michigan 2003). Indeed, the proportion of underrepresented students of color is strongly and negatively related to campus discrimination (Hurtado and Ruiz 2012), but these legal cases and empirical research do not provide guidance as to how one knows that a critical mass has been achieved.

The attainment of a critical mass does not suggest that the full educational potential of racial diversity has been realized; instead, a critical mass likely constitutes the *minimum* level of diversity required to produce growth for all students. Because the use of race-conscious admissions is justified through its ability to produce educational benefits, it seems logical to determine whether sufficient student diversity has been achieved using the same criterion. Therefore, if diversity interactions yield diminishing returns for promoting student growth (i.e., students who have moderately frequent and very frequent interactions across race tend to have similar outcomes), then this finding would support the logic that universities should stop seeking to further diversify their campuses at some point. However, if the impact of diversity interactions is linear or actually increases at greater frequencies of interaction, then there is no particular level of campus diversity at which the educational benefits have been maximized.

Research on College Diversity Interactions and Student Growth

The link between intergroup interactions and desired outcomes (particularly improved intergroup relations) has received considerable empirical attention in psychology and other fields (e.g., Allport 1954; Pettigrew 1998). Several quantitative meta-analyses have recently synthesized the findings from this research. The evidence supporting the benefits of interracial interactions and other intergroup contact is irrefutable. College students' intergroup interactions, whether these take the form of friendships or other encounters, are consistently associated with reduced prejudice and more favorable intergroup attitudes (Davies et al. 2011; Pettigrew and Tropp 2006). College students' diversity interactions are also associated with improved cognitive skills (Bowman 2010a) and civic engagement (Bowman 2011). In addition, interventions that intentionally facilitate intergroup interactions within the context of a structured program (e.g., diversity courses, workshops, and dialogues) tend to yield the strongest effects (Denson 2009; Pettigrew and Tropp 2006). Importantly, these positive relationships are observed even for the most methodologically rigorous studies across a host of circumstances and conditions (e.g., regardless of the gender and race/ethnicity of participants, the dimension of difference with which student interact, publication status of the manuscript, use of experimental or correlational design, and geographic location of the study). Multi-institutional, longitudinal studies have also demonstrated a positive link between interracial interactions and a host of other college outcomes, including academic skills (e.g., Denson and Chang 2009; Gurin 1999; Gurin et al. 2002), academic and social self-concept (e.g., Chang 1999; Chang et al. 2006; Gurin et al. 2002), teamwork and leadership skills (e.g., Antonio 2001b; Denson and Zhang 2010; Hurtado 2005; Jayakumar 2008), college sense of belonging (Locks et al. 2008), and college satisfaction (Astin 1993; Bowman 2013; Bowman and Denson 2012; Chang 1999).

Some research further suggests that the potential impact of diversity interactions is even broader than initially suspected. First, secondary transfer effects of intergroup contact occur when interactions with one type of outgroup (e.g., across racial/ethnic difference) generalizes to perceptions of other outgroups (e.g., toward people from a different sexual

orientation or another race/ethnicity). Several longitudinal studies have demonstrated that interracial interactions are associated with improved attitudes toward groups that were not involved in those interactions (Bowman and Griffin 2012; Tausch et al. 2010; van Laar et al. 2005). This research mostly used college student samples, so the findings are quite applicable to current discussions of campus diversity. Second, interracial interactions are positively linked to desired outcomes not only through students' own experiences, but also by attending an institution at which students have greater average levels of diversity engagement (even when controlling for students' individual experiences; see Chang et al. 2006; Denson and Chang 2009). In other words, it appears that students' outcomes can be improved from their peers' engagement in meaningful experiences.

As Gurin and others have argued (e.g., Gurin 1999; Gurin et al. 2002), having a racially diverse student body only provides educational benefits to the extent that students from different racial backgrounds actually interact with one another. In other words, the presence of racially diverse students on campus is a necessary condition—but not sufficient in and of itself—for promoting growth. Even when controlling for precollege characteristics, college experiences, and other institutional attributes, the proportion of students of color on campus is positively associated with cross-racial interactions (Chang et al. 2004; Saenz 2010; also see Engberg 2007; Gurin 1999). This relationship is also present when using more complex indicators of structural diversity that account for the representation of several racial groups (Chang 1999; Fischer 2008). The link between structural diversity and interracial friendships is also most positive at the highest levels of structural diversity (Bowman 2012b; Fischer 2008), which suggests that achieving a very heterogeneous student body may be particularly likely to lead to interracial interactions and subsequent student outcomes.

Interestingly, structural racial diversity is associated not only with more frequent cross-racial interactions, but also with broader diversity measures that include interactions across racial, religious, political, and socioeconomic difference (Pike and Kuh 2006; Pike et al. 2007). In fact, when aggregating data to the institutional level and controlling for other institutional characteristics, Pike and Kuh (2006) found that structural racial diversity explained more than ¼ of the variance in intergroup interactions. Research also shows that the link between structural diversity and student outcomes is fully mediated by diversity interactions. That is, when diversity interactions are included in a multivariate statistical model, structural diversity is unrelated to student growth (Chang et al. 2006; Denson and Chang 2009, 2010; Pike et al. 2007), but structural diversity has a significant indirect effect via students' interpersonal interactions with diversity (Engberg 2007; Jayakumar 2008).

Theoretical and Empirical Evidence for Curvilinear Effects of Diversity Experiences

Multiple theoretical frameworks have posited processes through which intergroup contact can promote positive psychological outcomes. Gurin et al. (2002) provide a cognitive developmental framework that draws upon the seminal work of Piaget, Erikson, and others; they argue that the traditional college years provide a unique opportunity for fostering diversity-related (and particularly race-related) growth. Crisp and Turner (2011) offer a social categorization framework that is based upon several lines of psychological research and is not specific to a particular age group or developmental stage. Although these frameworks take somewhat divergent lenses, they both assert 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. Two higher education studies have explicitly tested—and provided direct support—for the psychological processes proposed by Gurin and colleagues (Bowman and Brandenberger 2012; Jayakumar 2008).

However, numerous experiences with diversity are likely necessary to achieve positive outcomes, because prejudice and stereotypes often persist even when people are exposed to substantial disconfirming evidence. Indeed, the need to engage in repeated diversity experiences is an explicit component of Crisp and Turner's (2011) Categorization-Processing-Adaptation-Generalization model. Three separate types of bias operate against the potential impact of diversity interactions. First, people often falsely perceive that their real-world observations support their stereotypes when this is not the case; this bias can occur through the flawed perception of a single encounter or through a perceived association between social groups and behaviors that does not actually exist (e.g., Bernsden et al. 2002; Stroessner and Plaks 2001). Second, people tend to attribute counter-stereotypical behavior to situational or circumstantial factors, such that people's behavior is not viewed as reflecting their "true" interests, preferences, or abilities (e.g., Sekaquaptewa et al. 2003; Seta et al. 2003). Third, even when an outgroup member's behavior unequivocally contradicts prevailing stereotypes, that person is often viewed as a single "exception to the rule" or as belonging to a special "subtype" of that group (e.g., Hewstone and Lord 1998; Wilder et al. 1996). Thus, it is quite unlikely that occasional or superficial diversity interactions would be sufficient to overcome these flawed perceptions, attributions, and generalizations. However, these biases can all be substantially reduced through repeated interactions across difference (Crisp and Turner 2011; Dasgupta and Asgari 2004; Hewstone and Brown 1986; Seta et al. 2003).

If these forms of resistance to disconfirming evidence occur among today's college students, then a curvilinear relationship between diversity interactions and student outcomes should exist, such that rare interactions are associated with no growth, whereas frequent interactions are associated with considerable growth. Several college student studies seem consistent with this prediction. Bowman (2010b, c) found that taking two or more diversity courses is related to increases in comfort with differences, complex intergroup perceptions, and psychological well-being, but these positive effects are not present for students who only take one diversity course. Similarly, high levels of curricular/cocurricular diversity involvement are associated with improved intergroup attitudes and civic engagement, but moderate levels have no effect (Denson and Bowman in press). Moreover, relative to students in all-White classrooms, students in classrooms with a high percentage of students of color tend to have greater academic achievement, whereas those in classes with only a small percentage of students of color have lower achievement (Terenzini et al. 2001).

Present Study

This study examined whether interpersonal interactions with diversity exhibit a positive, curvilinear relationship with several different first-year student outcomes (leadership skills, psychological well-being, intellectual engagement, and intercultural effectiveness). These skills and tendencies are quite useful for effectively navigating the workplace and social settings, especially within an increasingly diverse and globalized society. To determine whether the same processes occur for both students of color and White students, additional analyses explored potential group differences in the linear and curvilinear effects of diversity interactions. As noted earlier, structural racial diversity is positively related not only to cross-racial interactions (e.g., Saenz 2010), but also to interactions with several

forms of diversity (Park et al. in press; Pike and Kuh 2006; Pike et al. 2007). As a result, two independent variables were used: a measure that solely indicated interracial interactions and a broader measure of diversity interactions (i.e., that includes engagement across differences in race, socioeconomic status, religion, etc.). Finding similar effects for these two diversity interaction measures would yield stronger evidence about both the presence of curvilinear relationships as well as the potential indirect impact of structural diversity on student outcomes. The use of a large multi-institutional sample, multilevel analyses, longitudinal design, relevant control variables, and several well-established outcome measures all constitute strengths of this study.

Three hypotheses were tested. First, consistent with a substantial body of previous research, interracial and overall diversity interactions will have a positive, linear relationship with all student outcomes. Second, a positive curvilinear relationship between interactions and outcomes will also exist, such that rare diversity interactions will be associated with virtually no gains, whereas frequent interactions will be associated with considerable gains. Third, consistent with meta-analyses that find very small (if any) between-group differences in the link between diversity experiences and attitudinal outcomes (Bowman 2011; Davies et al. 2011; Tropp and Pettigrew 2005), the magnitude of the linear and curvilinear relationships between college diversity interactions and student outcomes will not differ systematically between students of color and White students.

Method

Data Source and Participants

The 2006–2009 Wabash National Study of Liberal Arts Education was used; all three cohorts from this large-scale dataset were included in the current study to ensure sufficient sample size for the conditional analyses. Colleges and universities were selected to participate on the basis of their strong commitment to liberal arts education. The sample contained 49 private and public institutions (30 liberal arts colleges, 16 universities, and three community colleges), which included religiously affiliated, single-sex, and minority-serving schools. Institutions exhibited a wide range of selectivity, tuition costs, and geographic diversity.

Students who were beginning their freshman year were invited to participate in a longitudinal study. Before classes began or during their first 2–3 weeks on campus (Time 1), 17,504 students completed a registration form that included demographic information; a questionnaire of various high school experiences, interests, attitudes, and values; and a battery of assessments. Approximately two weeks before the end of their first year (Time 2), students who took part in the initial assessment were invited to participate in a second round of data collection. They completed the same battery of assessments, along with questionnaires that asked about their college experiences, interests, attitudes, and values. A total of 8,615 students participated in the second wave, yielding a retest response rate of 49.2 %. Students received $50 for completing each wave of data collection. To provide some adjustment for potential nonresponse bias, a sample weighting algorithm was developed and implemented to make the sample more representative of the incoming first-year classes of those institutions in terms of sex, race, academic ability, and institutional type. The weights were normalized (i.e., with a mean of 1.0) so that weighting did not

affect the overall sample size. Among the weighted sample of students, 56.5 % were female, 75.7 % were White non-Hispanic, 9.4 % were Black non-Hispanic, 5.1 % were Hispanic/Latino, 4.9 % were Asian/Pacific Islander, .3 % were American Indian/Alaska Native, .6 % reported "other" race, and 3.7 % did not report their race or ethnicity.[1]

Measures

Dependent Variables

Leadership skills were measured with the 68-item revised version of the Socially Responsible Leadership Scale (Dugan 2006; Tyree 1998). An overall leadership index was used, which was a composite of all eight subscales ($\alpha = .93$): Consciousness of Self (awareness of the values, emotions, and attitudes that motivate one to take action), Congruence (actions are consistent with one's most deeply held beliefs and convictions), Commitment (energy that motivates one to serve and drives the collective effort), Collaboration (working effectively with others in a common effort), Common Purpose (working with shared goals and values to achieve the task at hand), Controversy with Civility (recognition that viewpoint differences are inevitable and that these differences must be aired with respect), Citizenship (responsibility for and connection with the community and society), and Change (ability to adapt to environments and situations that are constantly evolving).

Psychological well-being was measured with the 54-item version of the Ryff Scales of Psychological Well-Being (Ryff 1989a, b; Ryff and Keyes 1995). An overall index of well-being was used, which included all six subscales ($\alpha = .89$): Autonomy (sense of self-determination and independence), environmental mastery (capacity to effectively manage one's life and surrounding world), personal growth (sense of continued growth and development as a person), positive relations with others (quality interpersonal relationships), purpose in life (identifying and working toward a particular life purpose), and self-acceptance (positive evaluation of self and one's own attributes). Intellectual engagement was indicated with the 18-item Need for Cognition Scale (Cacioppo et al. 1996), which does not contain any subscales ($\alpha = .90$). The Need for Cognition Scale is very highly correlated—and seemingly synonymous with—traditional measures of intellectual engagement (Woo et al. 2007). Finally, intercultural effectiveness was measured with the 15-item short version of the Miville-Guzman Universality-Diversity Scale (Fuertes et al. 2000; Miville et al. 1999). The overall score was used, which consisted of items from all three subscales ($\alpha = .80$): Relativistic Appreciation (cognizance of both similarities and differences across people and groups), Comfort with Differences (level of comfort with diverse individuals), and Diversity of Contact (interest and intent to participate in diverse cultural and social activities).

[1] The unweighted sample is 61.8 % female, 75.5 % White, 8.9 % Black, 6.0 % Asian, 4.8 % Hispanic, .3 % reported American Indian, and .8 % other race/ethnicity. The weighted sample had somewhat greater proportions of men, students at two-year colleges, and students whose parents had lower educational attainment than did the unweighted sample. These group differences are quite consistent with persistence patterns in American higher education (Radford et al. 2010), so student attrition from college may account, at least in part, for patterns of unit nonresponse in Wave 2. Although preliminary analyses showed that the results were similar regardless of whether weighting was used, all analyses were conducted with the weights, which is consistent with the recommendations of survey methodologists and statisticians (e.g., Allison 2002; Bethlehem 2002; Groves et al. 2009; Little and Rubin 2002).

Independent Variables

The independent variables of interest assessed students' interpersonal interactions with diverse peers. The two measures used here reflect what some higher education scholars refer to as "positive interactions" with diversity (e.g., Saenz et al. 2007); that is, they indicate meaningful, informal interactions with students from different backgrounds or with different perspectives than their own. Previous research has shown that positive diversity interactions are more strongly associated with student outcomes than is the simple frequency of interactions across difference (Denson and Chang 2010; Hurtado 2005; Nelson Laird 2005). An eight-item index was used to measure overall diversity interactions, which consisted of having meaningful discussions and friendships with students who differed from themselves in terms of race, national origin, values, religion, and/or political beliefs. The exploratory factor analysis provided strong support for the presence of a single factor from these eight items (e.g., the first factor was the only one with an eigenvalue greater than 1.0 and all loadings onto this factor are at least .70). This overall diversity interaction measure had a normal distribution and strong internal reliability ($\alpha = .87$). However, given the substantial scholarly, political, and legal interest in interracial interactions, the two items from this overall scale that focused specifically on interactions across race were combined to create a separate interracial interactions scale ($\alpha = .63$). An overview of the dependent and key independent variables is provided in Table 1. These variables were subsequently standardized with a mean of zero and a standard deviation of one, which allows unstandardized coefficients for continuous predictors to be interpreted as standardized coefficients (Cohen et al. 2003). Each of the standardized diversity interaction variables was then squared (i.e., multiplied by itself) to indicate the curvilinear relationship of diversity interactions. Moreover, to determine whether the effects of diversity varied by racial/ethnic group, interaction terms were created by multiplying a dichotomous race variable (0 = White/Caucasian, 1 = student of color) by each diversity interaction variable. A single race variable was used for these analyses, because the inclusion of several racial groups would have resulted in a large number of interaction terms in the same analysis, which would yield substantial multicollinearity.

Control Variables

Several precollege control variables were used; these included race/ethnicity, gender, nontraditional age, parental education, standardized test scores, and academic motivation. College experiences were also entered in the model to isolate the effects of diversity interactions above and beyond engagement in other educationally effective practices and interpersonal interactions. Many of Kuh's (2008) high-impact practices were used; these were participation in first-year seminar, learning community, collaborative learning, undergraduate research, internship, study abroad, diversity coursework, diversity workshops, and service-learning (almost none of these first-year students had participated in capstone projects, so this high-impact practice was not entered in the models). Time spent socializing and relaxing, time spent participating in co-curricular activities, membership in a Greek organization, and the pretest for each dependent variable upon entering college were also included. Finally, institutional type was measured via dummy variables for community college, regional university, and research university (with liberal arts college as the reference group), and structural racial diversity was computed via the representation of students from several racial/ethnic groups using the diversity density index formula from Umbach and Kuh (2006). An overview of the control variables is provided in Table 2.

Table 1 Overview of dependent and key independent variables

Variable	Loading	Coding
Leadership skills (68 items, $\alpha = .92$ at Time 1 and .93 at Time 2)		1 = Strongly disagree, to 5 = strongly agree
Consciousness of self		
Congruence		
Commitment		
Collaboration		
Common purpose		
Controversy with civility		
Citizenship		
Change		
Psychological well-being (54 items, $\alpha = .88$ at T1 and .89 at T2)		1 = Strongly disagree, to 6 = strongly agree
Autonomy		
Environmental mastery		
Personal growth		
Positive relations with others		
Purpose in life		
Self-acceptance		
Intellectual engagement (18 items, $\alpha = .89$ at T1 and .90 at T2)		1 = Strongly disagree, to 5 = strongly agree
Intercultural effectiveness (15 items, $\alpha = .78$ at T1 and .80 at T2)		1 = Strongly disagree, to 6 = strongly agree
Relativistic appreciation		
Comfort with differences		
Diversity of contact		
Overall diversity interactions (8 items, $\alpha = .87$)		1 = Never, to 5 = very often
Had discussions regarding intergroup relations with diverse students…while attending this college	.76	
Had meaningful and honest discussions about issues related to social justice with diverse students…while attending this college	.76	
Had serious discussions with other students about different lifestyles and customs	.76	
Had serious discussions with other students about major social issues such as racial diversity, human rights, equality, or justice	.74	
Made friends with a student whose race was different from your own	.71	
Had serious conversations with a student from a different race or ethnicity than your own	.70	
Shared personal feelings and problems with diverse students…while attending this college	.70	
Made friends with a student from another country	.70	
Interracial interactions (2 items, $\alpha = .63$)		1 = Never, to 5 = very often
Made friends with a student those race was different from your own	.87	
Had serious conversations with a student from a different race or ethnicity than your own	.87	

Table 2 Overview of control variables

Variable	Coding
Race/ethnicity (several variables)	0 = No, 1 = yes
African American/Black	
American Indian/Alaskan Native	
Asian/Pacific Islander	
Latino/Hispanic	
Other race/ethnicity	
Student of color (used only in analyses with interaction terms)	
Gender	0 = Male, 1 = female
Non-traditional age	0 = 19 or younger at beginning of first year, 1 = 20 or older
Parental education (average of mother's and father's education)	11 = Less than high school education, 20 = doctorate
Standardized test scores	ACT composite score or converted SAT score (verbal + math)
Academic motivation (8 items, $\alpha = .67$)	1 = Strongly disagree, to 5 = strongly agree
I am willing to work hard in a course to learn the material even if it won't lead to a higher grade	
When I do well on a test, it is usually because I am well-prepared, not because the test is easy	
In high school, I frequently did more reading in a class than was required simply because it interested me	
In high school, I frequently talked to my teachers outside of class about ideas presented during class	
Getting the best grades I can is very important to me	
I enjoy the challenge of learning complicated new material	
My academic experiences (i.e., courses, labs, studying, discussions with faculty) will be the most important part of college	
My academic experiences (i.e., courses, labs, studying, discussions with faculty) will be the most enjoyable part of college	
Frequency of socializing and relaxing in college	1 = 0 hours, to 8 = more than 30 hours
Frequency of co-curricular involvement	1 = 0 hours, to 8 = more than 30 hours
Membership in a Greek organization	0 = No, 1 = yes
High-impact college practices (several variables)	0 = No, 1 = yes
First-year seminar	
Learning community	
Collaborative learning	
Undergraduate research	
Study abroad	
Internship	
Service-learning	
Additional high-impact practices (different variable codings)	

Table 2 continued

Variable	Coding
Diversity coursework (3 items, $\alpha = .64$)	0 = 0 courses, to 4 = 4 or more courses
Courses focusing on diverse cultures and perspectives (e.g., African American studies, Latino studies)	
Courses focusing on women's/gender studies	
Courses focusing on issues of equality or social justice	
Racial or cultural awareness workshop	1 = Never, to 4 = often
Structural racial diversity	$1 - (\text{propAPI})^2 - (\text{propBlack})^2 - (\text{propHisp})^2 - (\text{propWhite})^2 - (\text{propMultiracial})$
Institutional type (several variables)	0 = No, 1 = yes
Community college	
Regional university	
Research university	

(Factor loadings for the academic motivation and diversity coursework variables are available upon request from the author.)

Analyses

Because the current sample contained students nested within institutions, hierarchical linear modeling (HLM) analyses were used. The nesting of students within institutions violates a key assumption of ordinary least squares (OLS) multiple regression; HLM accounts for this issue by partitioning the variance within groups and between groups and by adjusting standard errors accordingly (Raudenbush and Bryk 2002). Because the interracial interactions measure is actually a subset of the overall diversity interactions measure, separate analyses were conducted for each of these predictors. The student variables were entered at level 1, and institutional type and structural diversity were entered at level 2. The predictors used in all analyses were race/ethnicity, gender, age, parental education, standardized test scores, academic motivation, time spent socializing/relaxing, time spent in co-curricular activities, Greek membership, first-year seminar, learning community, collaborative learning, undergraduate research, study abroad, internship, service-learning, diversity coursework, diversity workshops, structural diversity, institutional type, diversity interactions (interracial or overall), diversity interactions squared (interracial or overall), and the relevant pretest. Preliminary HLM slopes-as-outcomes analyses showed that the linear and curvilinear effects of diversity interactions did not vary as a function of institutional type or structural diversity (for similar findings regarding structural diversity and interracial interactions, see Denson and Chang 2009). Specifically, only four out of 64 HLM coefficients were significant for level-2 variables predicting the slopes for diversity interactions, which is quite consistent with what one would expect by random chance with a Type I error or alpha of .05. Preliminary analyses also showed that including the curvilinear diversity variables in the model did not affect

the substantive results for the linear diversity variables. As a result, only fixed-slope analyses that include both linear and curvilinear predictors are presented here.

A second set of analyses added two interaction terms as predictors: one between a dichotomous race variable and diversity interactions, and a second between the dichotomous race variable and diversity interactions squared. To ensure that the interaction terms could be interpreted appropriately, this second set of analyses included the single dichotomous race variable instead of the several race/ethnicity variables used in the initial analyses (see Jaccard and Turrisi 2003).

The intraclass correlation coefficients (ICCs) were 8.5 % for intellectual engagement, 5.3 % for psychological well-being, 3.7 % for intercultural effectiveness, and 1.5 % for leadership skills (significant between-institution variance was observed for all outcomes, $ps < .001$). Although some scholars recommend that multilevel modeling be used if the ICC is at least 5 % (Heck and Thomas 2008), others do not provide a specific minimum ICC value for using HLM (Luke 2004; Raudenbush and Bryk 2002) and single-level analyses cannot 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 in this study. In addition, HLM is very well-suited for the preliminary slopes-as-outcomes analyses described earlier, and multilevel analyses are simply unnecessary—not incorrect or inappropriate—if the ICC is low (Heck and Thomas 2008), (Preliminary analyses showed that ordinary least squares multiple regression would yield results that are slightly less conservative than those obtained when using HLM.) The variance inflation factors were below 2.3 for all variables in all analyses, so multicollinearity did not appear to be a problem.

To illustrate more clearly the relationship between diversity interactions and student outcomes, the results from the HLM analyses were used to provide predicted values for engaging in several specific levels of diversity interactions (e.g., at the sample mean for interracial interactions, one standard deviation above the mean) relative to virtually never engaging in diversity interactions (i.e., two standard deviations below the sample mean). These standard deviation levels largely corresponded to the original scales for these items, such that values around the mean represented moderate levels or "sometimes" interacting across difference, values two standard deviations above the mean represented engaging in diversity interactions "very often," and so on. To simplify interpretation, after calculating the predicted values for the relevant coefficients, these scores were then recalibrated (i.e., a constant was added to each of these) so that the predicted outcome for the lowest level of diversity interactions was equal to zero.

Limitations

Some limitations should be noted. First, only first-year students were included in this sample, so it is unclear whether these results would generalize to more advanced undergraduates. Second, the sample only included three community colleges, so these findings may not be generalizable to students at two-year institutions. Third, the items used in the diversity interaction measures primarily assessed meaningful interactions across difference (e.g., serious conversations, friendships). As a result, the curvilinear relationships observed here may have been different if the simple frequency of intergroup interactions was examined. Fourth, the mediating processes of disequilibrium and resolution are not measured directly, so it is not possible to identify whether disequilibrium occurs for particular students. Finally, because diversity interactions were not experimentally manipulated, no definite conclusions about causal relationships can be drawn. When used in this study, the term "effect" simply refers to the observed relationship between a particular diversity

interaction and outcome when adjusting for all other variables in the model. It is worth noting that meta-analyses of the literature on intergroup contact and prejudice have found that experimental studies yield effect sizes that are equal to or larger than those for survey and field studies (Pettigrew and Tropp 2006; Tropp and Pettigrew 2005).

Results and Discussion

Because all analyses controlled for pretest levels of the relevant dependent variable, the results are interpreted as indicating the relationship between diversity experiences and changes in the outcome. The top half of Table 3 provides the results for analyses that examined the interracial interaction variables, and the bottom half contains results for the overall diversity interaction variables. As expected, interracial interactions are positively and significantly related to gains in leadership skills, psychological well-being, intellectual engagement, and intercultural effectiveness during the first year of college. Overall diversity interactions are also positively and significantly associated with growth in leadership skills, intellectual engagement, and intercultural effectiveness, whereas the relationship for overall diversity interactions predicting psychological well-being is positive, yet non-significant. These findings replicate the considerable research that demonstrates a linear relationship between interpersonal diversity interactions and a wide range of student outcomes (e.g., Astin 1993; Gurin et al. 2002; Hurtado 2005).

Importantly, the expected curvilinear relationships are also evident in most of the analyses. The positive values for the squared terms in Table 3 indicate an increasingly positive effect of diversity interactions; in other words, the link between diversity interactions and student outcomes becomes stronger at higher levels of diversity. Specifically, the relationships between interracial interactions and changes in leadership skills,

Table 3 Hierarchical linear modeling results for diversity interactions predicting college student outcomes at the end of the first year

Independent variable	Outcome variable			
	Leadership skills	Psychological well-being	Intellectual engagement	Intercultural effectiveness
Interracial interactions	.090*** (.022)	.057** (.018)	.066*** (.015)	.182*** (.017)
Interracial interactions SQUARED	.052*** (.009)	.038** (.012)	.029* (.013)	.010 (.018)
Level-1 variance explained	.370	.487	.487	.520
Level-2 variance explained	.241	.935	.970	.719
Overall diversity interactions	.084*** (.022)	.027 (.020)	.111*** (.027)	.200*** (.018)
Overall diversity interactions SQUARED	.066*** (.007)	.049*** (.011)	.011 (.010)	.019 (.017)
Level-1 variance explained	.371	.486	.492	.523
Level-2 variance explained	.277	.940	.971	.750

Standard errors are in parentheses. Separate analyses were conducted for interracial interactions and overall diversity interactions. All models controlled for race/ethnicity, gender, age, parental education, standardized test scores, academic motivation, time spent socializing/relaxing, time spent in co-curricular activities, Greek membership, first-year seminar, learning community, collaborative learning, undergraduate research, study abroad, internship, service-learning, diversity coursework, diversity workshops, structural diversity, institutional type, and the corresponding pretest. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

psychological well-being, and intellectual engagement become increasingly positive at higher frequencies of diversity engagement, and overall diversity interactions also have an increasingly positive effect on leadership skills and psychological well-being. The coefficients for the other three analyses are non-significant, but they are in the expected direction. All analyses controlled for a host of other predictors, including precollege characteristics, curricular and cocurricular diversity experiences, structural diversity, overall frequency of socializing, and various other college experiences; moreover, the proportion of student-level variance explained across these models is high (ranging from 37 to 52 %). As a result, it seems unlikely that the significant linear or curvilinear effects of diversity interactions can be attributed to other forms of student engagement.

Because the relationship between diversity interactions and each outcome is represented via two different HLM coefficients, it is difficult to determine the exact nature and magnitude of these effects from Table 3. Therefore, the predicted values of the dependent variable at several levels of diversity interactions are displayed in Table 4. Students who rarely—or even sometimes—engaged in interracial and overall diversity interactions have, if anything, slightly less growth in leadership skills and psychological well-being than students who virtually never had diversity interactions. This same pattern holds true for the link between interracial interactions and intellectual engagement. The lack of positive outcomes for students who rarely had diversity interactions (relative to those who virtually never had such interactions) is consistent with expectations, and the lack of effect for

Table 4 Predicted values for student outcomes at several levels of diversity interactions

Frequency of interactions	Outcome variable			
	Leadership skills	Psychological well-being	Intellectual engagement	Intercultural effectiveness
Interracial interactions				
Virtually never (2 standard deviations below the mean)	0	0	0	0
Rarely (−1 SD)	−.064	−.056	−.034	.154
Sometimes (mean)	−.026	−.037	−.001	.327
Often (+1 SD)	.116	.058	.098	.519
Very often (+2 SDs)	.361	.228	.265	.729
Overall diversity interactions				
Virtually never	0	0	0	0
Rarely (−1 SD)	−.113	−.119	.079	.143
Sometimes (mean)	−.096	−.140	.179	.324
Often (+1 SD)	.054	−.064	.300	.543
Very often (+2 SDs)	.336	.108	.443	.800

These figures are based upon the HLM coefficients presented in Table 3. The predicted value for the lowest level of interracial interactions was set at zero to serve as a comparison group for the relatively higher levels of engagement. Because the dependent variables were standardized, differences between groups can be interpreted in terms of standard deviation units (adjusting for all other predictors). Separate analyses were conducted for interracial interactions and overall diversity interactions. All models controlled for race/ethnicity, gender, age, parental education, standardized test scores, academic motivation, time spent socializing/relaxing, time spent in co-curricular activities, Greek membership, first-year seminar, learning community, collaborative learning, undergraduate research, study abroad, internship, service-learning, diversity coursework, diversity workshops, structural diversity, institutional type, and the corresponding pretest

students who sometimes had diversity interactions further implies that this engagement with diversity must occur on a regular basis to achieve educational benefits.

In some instances, positive outcomes are evident for students who sometimes engaged in diversity interactions; these include analyses of interracial interactions predicting intercultural effectiveness as well as overall diversity interactions predicting intercultural effectiveness and intellectual engagement. Given that previous studies have identified curvilinear relationships between curricular/co-curricular diversity experiences and intergroup outcomes (Bowman 2010c; Denson and Bowman in press), the lack of any curvilinear effect for intercultural effectiveness is somewhat surprising. Infrequent interpersonal interactions may serve to bolster diversity-related outcomes, because they provide emotional connections that lead to improved intergroup attitudes (Pettigrew and Tropp 2008). Furthermore, the intercultural outcome measure used in this study includes comfort with differences and intent for future engagement, as opposed to deep-seated worldviews that may be more resistant to change.

Across all analyses, students who interacted very often with diversity experienced considerable growth relative to those who interacted sometimes, rarely, or virtually never. All dependent variables were standardized, so the differences between groups can be interpreted in terms of standard deviation units (adjusting for all other variables in the model). For example, the difference in growth on leadership skills between students who had interracial interactions very often versus rarely is $.361 - (-.064) = .425$ standard deviations, the corresponding difference between engaging very often versus sometimes is $.361 - (-.026) = .387$ standard deviations, and the difference between interacting very often versus often is $.361 - .116 = .245$ standard deviations.

Additional analyses examined whether the magnitude of these relationships differs as a function of students' race; these results are displayed in Table 5. The linear effects for interracial interactions and overall diversity interactions predicting psychological well-being are significantly more positive for students of color than for White students, whereas the linear effect for overall diversity interactions predicting intellectual engagement is

Table 5 Hierarchical linear modeling results for interaction terms between race/ethnicity and diversity interactions predicting college student outcomes at the end of the first year

Independent variable	Outcome variable			
	Leadership skills	Psychological well-being	Intellectual engagement	Intercultural effectiveness
Student of color × interracial interactions	.054 (.039)	.055** (.021)	−.015 (.024)	.009 (.036)
Student of color × interracial interactions SQUARED	−.062 (.032)	−.022 (.038)	−.027 (.022)	.000 (.022)
Student of color × overall diversity interactions	.027 (.035)	.040* (.018)	−.085* (.034)	−.033 (.027)
Student of color × overall diversity interactions SQUARED	−.013 (.027)	.013 (.021)	−.004 (.021)	−.012 (.028)

Standard errors are in parentheses. Separate analyses were conducted for interracial interactions and overall diversity interactions. All models controlled for race/ethnicity, gender, age, parental education, standardized test scores, academic motivation, time spent socializing/relaxing, time spent in co-curricular activities, Greek membership, first-year seminar, learning community, collaborative learning, undergraduate research, study abroad, internship, service-learning, diversity coursework, diversity workshops, structural diversity, institutional type, and the corresponding pretest. * $p < .05$, ** $p < .01$, *** $p < .001$

stronger for White students than for students of color. The coefficients for the remaining 13 interaction terms are all non-significant. When the results of these interaction terms are considered as a whole, the paucity of significant relationships and the varied direction of the effects suggest that the linear and curvilinear effects for diversity interactions do not vary systematically by race. The consistency of these relationships regardless of one's racial group and the type of diversity interaction (i.e., interracial or multiple forms of difference) is congruent with Crisp and Turner's (2011) theoretical framework, which emphasizes the importance of the frequency and stereotypic-inconsistent nature of diversity experiences (not the particular demographics or social status of those involved in the interaction).

Conclusion

The present study finds that, in most instances, college diversity interactions are only associated with educational benefits when these experiences occur frequently. This important finding leads to two broad sets of recommendations, both of which are crucial for the realization of student growth. First, colleges and universities must promote a *highly* diverse student body. The legal arguments in *Grutter* and *Gratz* focused on the attainment of a critical mass of students, but this emphasis on obtaining a minimum threshold of underrepresented students may not be sufficient to facilitate frequent diversity interactions (and therefore concomitant increases in student learning and well-being). Of course, interactions across race and other forms of difference cannot occur if the campus is completely homogenous, and the representation of racially diverse students is, by far, the strongest institutional predictor of informal interactions across racial, socioeconomic, religious, and political difference (Pike and Kuh 2006; also see Jayakumar 2008). Moreover, the relationship between campus racial diversity and interracial friendships is also curvilinear, such that institutional diversity has an increasingly positive relationship with the establishment of these friendships (Bowman 2012b; Fischer 2008). As a result, the attainment of a racially diverse student population may have increasing benefits for intergroup interactions, which then may have increasing benefits for many student outcomes.

The best way to achieve heterogeneity within the student body is to engage in practices that increase the number of applications, acceptances, and enrollments of students from diverse backgrounds. Such efforts can include recruiting from high schools whose predominant student populations are underrepresented in higher education; using admissions processes that are conscious of race, social class, geography, and other factors; and offering additional grants and scholarships to targeted groups of students. Each step of the enrollment management process is critical for campus diversification, because increasing the number of applicants from underrepresented backgrounds is virtually meaningless if these students are not admitted, and accepting underrepresented students does not help if these students choose not to enroll.

Second, as Gurin and others have argued (e.g., Gurin 1999; Gurin et al. 2002), the presence of racially diverse peers is a necessary—but not a sufficient—condition for interracial interactions to occur. College diversity interactions are also a function of incoming student characteristics (e.g., students' own demographics, precollege exposure to difference, openness to diversity), other college experiences (e.g., curricular and co-curricular diversity engagement, Greek organization membership, overall time spent socializing), and the campus climate for diversity (Bowman 2012a; Chang et al. 2004;

Jayakumar 2008; Levin et al. 2003; Milem et al. 2004; Saenz 2010). Indeed, some students have frequent interracial interactions at very homogeneous schools, whereas others have only occasional interracial interactions (at best) on heterogeneous campuses (Chang et al. 2004). Although structural diversity is strongly related to the prevalence of intergroup interactions (Pike and Kuh 2006), there is no level of structural diversity that guarantees all students within a particular institution will have frequent intergroup interactions. Therefore, institutions should also work to promote interpersonal diversity interactions directly as well as the experiences and positive climate that are associated with increased diversity interactions. Many constituents on college campuses should play a role in these efforts, as diversity interactions and their precursors can occur through the curriculum (e.g., diversity coursework and active learning strategies), co-curriculum (e.g., diversity workshops and leadership training programs), and informal contexts (e.g., residence halls and the student union).

Of course, considering race within college admissions processes—and even within on-campus programs that serve current students—remains a controversial practice that has been challenged numerous times at the state and federal levels. Some people suggest that race-conscious admissions should be replaced with other approaches, such as class-conscious admissions or admitting a certain percentage of students from each high school (e.g., Kahlenberg 1997, 2012). However, if promoting a high-quality diverse learning environment is the goal of such policies, then achieving a racially diverse student body is crucial for a number of reasons. According to a meta-analysis of the link between college diversity experiences and cognitive outcomes (Bowman 2010a), interracial interactions are more strongly related to cognitive growth than are interactions with several forms of diversity. Similarly, within the current study, the only non-significant relationship between diversity interactions and outcomes was for the broader diversity measure (not the interracial measure), and the curvilinear effect was also significant in more analyses for interracial than for overall diversity interactions. In addition, as indicated by the strong evidence for a single factor solution in this study, interracial interactions are strongly related to interactions across various forms of difference (also see Hu and Kuh 2003). The racial diversity of the student body is positively related to both variation in student opinions within an institution (Chang 2002, as cited in Milem et al. 2005) and the frequency of cross-class interactions (Park et al. in press), so racial diversity may help drive other meaningful forms of diversity. A person's race is often visible, so students are more likely to be aware that they are interacting across this form of difference than across socioeconomic status, religion, or political affiliation. According to the theoretical frameworks presented earlier (Crisp and Turner 2011; Gurin et al. 2002), awareness that an interpersonal interaction is, in fact, an intergroup encounter is necessary to foster diversity-related outcomes. For all of these reasons, ignoring race in recruiting, admissions, and campus programs runs the risk of ultimately diminishing student growth.

Future research should further explore potential curvilinear effects of college diversity experiences, because this line of inquiry is essential to determining how much diversity is needed to effect change in student outcomes. The results of the current and subsequent findings can inform not only the decisions of college administrators who incorporate diversity-related practices, but also the consideration of legal challenges to the use of race in college admissions and other domains of higher education. Efforts to understand and promote college students' diversity-related engagement and skills are critical for shaping graduates who will thrive within a heterogeneous and globalized society.

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References

Allison, P. D. (2002). *Missing data*. Thousand Oaks: Sage.

Allport, G. W. (1954). *The nature of prejudice*. Reading: Addison-Wesley.

Antonio, A. L. (2001a). Diversity and the influence of friendship groups in college. *Review of Higher Education, 25*, 63–89.

Antonio, A. L. (2001b). The role of interracial interaction in the development of leadership skills and cultural knowledge and understanding. *Research in Higher Education, 42*, 593–617.

Astin, A. W. (1993). Diversity and multiculturalism on the campus: How are students affected? *Change, 25*(2), 44–49.

Bernsden, M., Spears, R., Pligt, J., & McGarty, C. (2002). Illusory correlation and stereotype formation: Making sense of group differences and cognitive biases. In C. McGarty, V. Y. Yzerbyt, & R. Spears (Eds.), *Stereotypes as explanations: The formation of meaningful beliefs about social groups* (pp. 90–110). Cambridge: Cambridge University Press.

Bethlehem, J. G. (2002). Weighting nonresponse adjustments based on auxiliary information. In R. M. Groves, D. A. Dillman, J. L. Eltinge, & R. J. A. Little (Eds.), *Survey nonresponse* (pp. 275–288). New York: Wiley.

Bowman, N. A. (2010a). College diversity experiences and cognitive development: A meta-analysis. *Review of Educational Research, 80*, 4–33.

Bowman, N. A. (2010b). The development of psychological well-being among first-year college students. *Journal of College Student Development, 51*, 180–200.

Bowman, N. A. (2010c). Dissonance and resolution: The non-linear effects of diversity courses on well-being and orientations toward diversity. *Review of Higher Education, 33*, 543–568.

Bowman, N. A. (2011). Promoting participation in a diverse democracy: A meta-analysis of college diversity experiences and civic engagement. *Review of Educational Research, 81*, 29–68.

Bowman, N. A. (2012a). Promoting sustained engagement with diversity: The reciprocal relationships between informal and formal college diversity experiences. *Review of Higher Education, 36*, 1–24.

Bowman, N. A. (2012b). Structural diversity and close interracial relationships in college. *Educational Researcher, 41*, 133–135.

Bowman, N. A. (2013). The conditional effects of interracial interactions on college student outcomes. *Journal of College Student Development, 54*, 322–328.

Bowman, N. A., & Brandenberger, J. W. (2012). Experiencing the unexpected: Toward a model of college diversity experiences and attitude change. *Review of Higher Education, 35*, 179–205.

Bowman, N. A., & Denson, N. (2012). What's past is prologue: How precollege exposure to diversity shapes the impact of college diversity experiences. *Research in Higher Education, 53*, 406–425.

Bowman, N. A., & Griffin, T. M. (2012). Secondary transfer effects of interracial contact: The moderating role of social status. *Cultural Diversity and Ethnic Minority Psychology, 18*, 35–44.

Cacioppo, J., Petty, R., Feinstein, J., & Jarvis, W. (1996). Dispositional differences in cognitive motivation: The life and times of individuals varying in need for cognition. *Psychological Bulletin, 119*, 197–253.

Chang, M. J. (1999). Does racial diversity matter? The educational impact of a racially diverse undergraduate population. *Journal of College Student Development, 40*, 377–395.

Chang, M. J. (2011). *Quality matters: Achieving benefits associated with racial diversity*. Columbus: Kirwin Institute for the Study of Race and Ethnicity, The Ohio State University.

Chang, M. J., Astin, A. W., & Kim, D. (2004). Cross-racial interaction among undergraduates: Some consequences, causes, and patterns. *Research in Higher Education, 45*, 529–553.

Chang, M. J., Denson, N., Saenz, V., & Misa, K. (2006). The educational benefits of sustaining cross-racial interaction among undergraduates. *Journal of Higher Education, 77*, 430–455.

Cohen, J., Cohen, P., West, S. G., & Aiken, L. S. (2003). *Applied multiple regression/correlation analysis for the behavioral sciences* (3rd ed.). Mahwah: Lawrence Erlbaum.

Crisp, R. J., & Turner, R. N. (2011). Cognitive adaptation to the experience of social and cultural diversity. *Psychological Bulletin, 137*, 242–266.

Dasgupta, N., & Asgari, S. (2004). Seeing is believing: Exposure to counterstereotypic women leaders and its effect on the malleability of automatic gender stereotyping. *Journal of Experimental Social Psychology, 40*, 642–658.

Davies, K., Tropp, L. R., Aron, A., Pettigrew, T. F., & Wright, S. C. (2011). Cross-group friendships and intergroup attitudes: A meta-analytic review. *Personality and Social Psychology Review, 15*, 332–351.

Denson, N. (2009). Do curricular and co-curricular diversity activities influence racial bias? A meta-analysis. *Review of Educational Research, 79*, 805–838.

Denson, N., & Bowman, N.A. (in press). University diversity and preparation for a global society: The role of diversity in shaping intergroup attitudes and civic outcomes. *Studies in Higher Education*.

Denson, N., & Chang, M. J. (2009). Racial diversity matters: The impact of diversity-related student engagement and institutional context. *American Educational Research Journal, 46*, 322–353.

Denson, N., & Chang, M. J. (2010). *Maximizing the benefits of diversity: Exploring moderators of cross-racial interaction among undergraduates*. Paper presented at the annual meeting of the Association for the Study of Higher Education, Indianapolis, IN.

Denson, N., & Zhang, S. (2010). The impact of student experiences with diversity on developing graduate attributes. *Studies in Higher Education, 35*, 529–543.

Dugan, J. (2006). Explorations using the social change model: Leadership development among college men and women. *Journal of College Student Development, 47*, 217–225.

Engberg, M. E. (2007). Educating the workforce for the 21st century: A cross-disciplinary analysis of the impact of the undergraduate experience on students' development of a pluralistic orientation. *Research in Higher Education, 48*, 283–317.

Fischer, M. J. (2008). Does campus diversity promote friendship diversity? A look at interracial friendships in college. *Social Science Quarterly, 89*, 631–655.

Fisher v. University of Texas at Austin (2008) Civ. Act. No. 1:08-cv-00263-SS (W.D. Texas, 2008).

Fuertes, J., Miville, M., Mohr, J., Sedlacek, W., & Gretchen, D. (2000). Factor structure and short form of the Miville-Guzman Universality-Diversity Scale. *Measurement and Evaluation in Counseling and Development, 33*, 157–169.

Gibson, C., & Jung, K. (2006). *Historical census statistics on the foreign-born population of the United States: 1850 to 2000* (population division, working paper no. 81). Washington, DC: U.S. Census Bureau.

Gratz v. Bollinger (2003) 539 U.S. 244.

Grutter v. Bollinger (2003) 539 U.S. 306.

Groves, R. M., Fowler, F. J, Jr, Couper, M. P., Lepkowski, J. M., Singer, E., & Tourangeau, R. (2009). *Survey methodology* (2nd ed.). Hoboken: Wiley.

Gurin, P. (1999). Expert report. "Gratz et al. v. Bollinger, et al." No. 97-75321 (E.D. Mich.); "Grutter, et al. v. Bollinger, et al." No. 97-75928 (E.D. Mich.). *Equity & Excellence in Education, 32*(2), 36–62.

Gurin, P., Dey, E. L., Hurtado, S., & Gurin, G. (2002). Diversity and higher education: Theory and impact on educational outcomes. *Harvard Educational Review, 72*, 330–366.

Heck, R. H., & Thomas, S. L. (2008). *An introduction to multilevel modeling techniques* (2nd ed.). New York: Routledge.

Hewstone, M., & Brown, R. (1986). Contact is not enough: An intergroup perspective. In M. Hewstone & R. Brown (Eds.), *Contact and conflict in intergroup encounters* (pp. 1–44). Oxford: Basil Blackwell.

Hewstone, M., & Lord, C. G. (1998). Changing intergroup cognitions and intergroup behavior: The role of typicality. In C. Sedikides, J. Schopler, & C. A. Insko (Eds.), *Intergroup cognition and intergroup behavior* (pp. 367–392). Mahwah: Lawrence Erlbaum.

Hu, S., & Kuh, G. D. (2003). Diversity experiences and college student learning and personal development. *Journal of College Student Development, 44*, 320–334.

Humes, K. R., Jones, N. A., & Ramirez, R. R. (2011). *Overview of race and Hispanic origin: 2010 (2010 Census Briefs, C2010BR-02)*. Washington: U.S. Census Bureau.

Hurtado, S. (2005). The next generation of diversity and intergroup relations research. *Journal of Social Issues, 61*, 595–610.

Hurtado, S., & Ruiz, A. (2012). *The climate for underrepresented groups and diversity on campus (HERI research in brief)*. Los Angeles: Higher Education Research Institute, University of California, Los Angeles.

Jaccard, J., & Turrisi, R. (2003). *Interaction effects in multiple regression*. Newbury Park: Sage.

Jayakumar, U. M. (2008). Can higher education meet the needs of an increasingly diverse and global society? Campus diversity and cross-cultural workforce competencies. *Harvard Educational Review, 78*, 615–651.

Kahlenberg, R. D. (1997). *The remedy: Class, race, and affirmative action*. New York: Basic Books.

Kahlenberg, R. D., & Potter, H. (2012). *A better affirmative action: State universities that created alternatives to racial preferences*. New York: The Century Foundation.
Kuh, G. D. (2008). *High-impact educational practices: What they are, who has access to them, and why they matter*. Washington: Association of American Colleges & Universities.
Levin, S., van Laar, C., & Sidanius, J. (2003). The effects of ingroup and outgroup friendships on ethnic attitudes in college: A longitudinal study. *Group Processes and Intergroup Relations, 6*, 76–92.
Little, R. J. A., & Rubin, D. B. (2002). *Statistical analysis with missing data* (2nd ed.). New York: Wiley.
Locks, A. M., Hurtado, S., Bowman, N. A., & Oseguera, L. (2008). Extending notions of campus climate and diversity to students' transition to college. *Review of Higher Education, 31*, 257–285.
Luke, D. A. (2004). *Multilevel modeling*. Thousand Oaks: Sage.
Milem, J. F., Umbach, P. D., & Liang, C. T. H. (2004). Exploring the perpetuation hypothesis: The role of colleges and universities in desegregating society. *Journal of College Student Development, 45*, 688–700.
Milem, J. F., Chang, M. J., & Antonio, A. L. (2005). *Making diversity work on campus: A research-based perspective*. Washington: Association of American Colleges and Universities.
Miville, M., Gelso, C., Pannu, R., Liu, W., Touradji, P., Holloway, P., et al. (1999). Appreciating similarities and valuing differences: The Miville-Guzman Universality-Diversity Scale. *Journal of Counseling Psychology, 46*, 291–307.
Nelson Laird, T. F. (2005). College students' experiences with diversity and their effects on academic self-confidence, social agency, and disposition toward critical thinking. *Research in Higher Education, 46*, 365–387.
Orfield, G. (2009). *Reviving the goal of an integrated society: A 21st century challenge*. Los Angeles: The Civil Rights Project/Proyecto Derechos Civiles at UCLA.
Park, J. J., Denson, N., & Bowman, N. A. (in press). Does socioeconomic diversity make a difference? Examining the effects of racial and socioeconomic diversity on the campus climate for diversity. *American Educational Research Journal*.
Pettigrew, T. F. (1998). Intergroup contact theory. *Annual Review of Psychology, 49*, 65–85.
Pettigrew, T. F., & Tropp, L. R. (2006). A meta-analytic test of intergroup contact theory. *Journal of Personality and Social Psychology, 90*, 751–783.
Pettigrew, T. F., & Tropp, L. R. (2008). How does intergroup contact reduce prejudice? Meta-analytic tests of three mediators. *European Journal of Social Psychology, 38*, 922–934.
Pike, G. R., & Kuh, G. D. (2006). Relationships among structural diversity, informal peer interactions and perceptions of the campus environment. *The Review of Higher Education, 29*, 425–450.
Pike, G. R., Kuh, G. D., & Gonyea, R. M. (2007). Evaluating the rationale for affirmative action in college admissions: Direct and indirect relationships between campus diversity and gains in understanding diverse groups. *Journal of College Student Development, 48*, 166–182.
Pryor, J. H., Hurtado, S., Saenz, V. B., Santos, J. L., & Korn, W. S. (2007). *The American freshman: Forty year trends*. Los Angeles: Higher Education Research Institute, University of California, Los Angeles.
Radford, A. W., Berkner, L., Wheeless, S. C., & Shepherd, B. (2010). *Persistence and attainment of 2003–04 beginning postsecondary students: After 6 years (NCES 2011–151)*. Washington: U.S. Department of Education, National Center for Education Statistics.
Raudenbush, S. W., & Bryk, A. S. (2002). *Hierarchical linear models: Applications and data analysis methods* (2nd ed.). Newbury Park: Sage.
Regents of the University of California v. Bakke (1978) 438 U.S. 265.
Ryff, C. D. (1989a). Beyond Ponce de Leon and life satisfaction: New directions in quest of successful ageing. *International Journal of Behavioral Development, 12*, 35–55.
Ryff, C. D. (1989b). Happiness is everything, or is it? Explorations on the meaning of psychological well-being. *Journal of Personality and Social Psychology, 57*, 1069–1081.
Ryff, C. D., & Keyes, C. L. M. (1995). The structure of psychological well-being revisited. *Journal of Personality and Social Psychology, 69*, 719–727.
Saenz, V. B. (2010). Breaking the segregation cycle: Examining students' precollege racial environments and college diversity experiences. *The Review of Higher Education, 34*, 1–37.
Saenz, V. B., Ngai, H. N., & Hurtado, S. (2007). Factors influencing positive interactions across race for African American, Asian American, Latino, and White college students. *Research in Higher Education, 48*, 1–38.
Sekaquaptewa, D., Espinoza, P., Thompson, M., Vargas, P., & von Hippel, W. (2003). Stereotypic explanatory bias: Implicit stereotyping as a predictor of discrimination. *Journal of Experimental Social Psychology, 39*, 75–82.

Seta, J. J., Seta, C. E., & McElroy, T. (2003). Attributional biases in the service of stereotype maintenance: A schema-maintenance through compensation analysis. *Personality and Social Psychology Bulletin, 29*, 151–163.

Stroessner, S. J., & Plaks, J. E. (2001). Illusory correlation and stereotype formation: Tracing the arc of research over a quarter century. In G. B. Moskowitz (Ed.), *Cognitive social psychology: The Princeton symposium on the legacy and future of social cognition* (pp. 247–259). Mahwah: Lawrence Erlbaum.

Tausch, N., Hewstone, M., Kenworthy, J. B., Psaltis, C., Schmid, K., Popan, J. R., et al. (2010). Secondary transfer effects of intergroup contact: Alternative accounts and underlying processes. *Journal of Personality and Social Psychology, 99*, 282–302.

Terenzini, P. T., Cabrera, A. F., Colbeck, C. L., Bjorklund, S. A., & Parente, J. M. (2001). Racial and ethnic diversity in the classroom: Does it promote student learning? *The Journal of Higher Education, 72*, 509–531.

The Chronicle of Higher Education (2011). Almanac issue 2011–12.

Thomas, S. L., & Heck, R. H. (2001). Analysis of large-scale secondary data in higher education research: Potential perils associated with complex sampling designs. *Research in Higher Education, 42*, 517–540.

Tropp, L. R., & Pettigrew, T. F. (2005). Relationships between intergroup contact and prejudice among minority and majority status groups. *Psychological Science, 16*, 951–957.

Tyree, T. (1998). *Designing an instrument to measure socially responsible leadership using the social change model of leadership development*. Unpublished doctoral dissertation, University of Maryland-College Park.

Umbach, P. D., & Kuh, G. D. (2006). Student experiences with diversity at liberal arts colleges: Another claim for distinctiveness. *Journal of Higher Education, 77*, 169–192.

University of Michigan. (2003). *Why Michigan's former admissions systems comply with* Bakke *and are not quotas*. http://www.vpcomm.umich.edu/admissions/archivedocs/comply.html. Accessed 11 May 2012.

van Laar, C., Levin, S., Sinclair, S., & Sidanius, J. (2005). The effect of university roommate contact on ethnic attitudes and behavior. *Journal of Experimental Social Psychology, 41*, 329–345.

Wilder, D. A., Simon, A. F., & Faith, M. (1996). Enhancing the impact of counterstereotypic information: Dispositional attributions for deviance. *Journal of Personality and Social Psychology, 71*, 276–287.

Woo, S. E., Harms, P. D., & Kuncel, N. R. (2007). Integrating personality and intelligence: Typical intellectual engagement and need for cognition. *Personality and Individual Differences, 43*, 1635–1639.