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Testing Intergroup Contact Theory Through a Natural Experiment of Randomized College Roommate Assignments in the United States

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Many colleges and universities seek to leverage the promise of intergroup contact theory by adopting housing policies that randomly assign first-year students to roommates, with the goal of increasing intergroup contact. Yet, it is unclear whether random roommate assignment policies increase cross-race contact, whether this (potentially involuntary, but sanctioned by authorities) contact improves racial attitudes or behaviors, or how these effects may differ for racial majority and minority students. The present studies used a natural experiment of random roommate assignment to directly test roommate relationship, attitudinal, and behavioral changes based on roommate race. Across three samples drawn from two student cohorts, the random assignment policy increased the likelihood that students had a cross-race roommate because without the policy, students tended to self-segregate by race. Moreover, selecting (Study 1) or being randomly assigned (Study 2) a cross-race roommate was associated with having more racial outgroup friends and demonstrating more positive verbal and nonverbal behavior during a novel cross-race interaction (Study 3). There were no roommate group (same vs. cross-race roommates) differences in relationship quality, and the results were largely independent of participant race. These findings suggest randomized roommate assignment is a promising avenue for universities to promote cross-race contact amid persistent racial segregation on college campuses with limited negative consequences for relationship quality.

Keywords: intergroup contact, roommates, random assignment, friendship, cross-race

Supplemental materials: <https://doi.org/10.1037/pspa0000393.supp>

Statement of Limitations

These studies only measured the effects of having a cross-race roommate at one time point, so it is not clear how this may change over time, especially after roommates potentially stop living together. Additionally, the friendship network effects provide additional cross-race contact, which could lead to other attitudinal effects that were not measured in these data. Relatedly, we do not have causal evidence that randomized roommate assignment increased friendship diversity. Lastly, because some measures included only one item, they could be unreliable, or participants' responses could be idiosyncratic to characteristics of the item rather than true measures of the construct. Especially in Studies 1 and 2, the university limited the number of questions participants could be asked, which led to a small number of questions measuring racial cognition directly.

Intergroup contact theory describes the benefits derived from contact between people of different racial backgrounds, including reduced prejudice toward racial outgroup members (Allport, 1954). According to intergroup contact theory, parameters that can reduce prejudice and increase positive relations when members of outgroups interact include being given equal status, sharing a common goal, having an opportunity to achieve intergroup cooperation, and having support from authorities (Allport, 1954). Colleges and universities are seeking to leverage the promise of intergroup contact theory by adopting housing policies that randomly assign roommates to first-year students, with the goal of increasing intergroup contact. Roommate relationships often involve long-term, sustained contact, which offers the possibility for friendship (West & Dovidio, 2012; White et al., 2021), and a randomized policy could signal that cross-race contact is sanctioned by authorities. Duke University, New York

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Data for Studies 1 and 2 are not publicly available due to Family Educational Rights and Privacy Act protections of university data. Studies 1 and 2 were not preregistered. Study 3's analysis plan and hypotheses were preregistered (see <https://osf.io/8fxjk/>). The materials (all studies), analysis code (Study 3), and

data (Study 3) are found at <https://osf.io/e92yx/>.

Analía F. Albuja played a lead role in formal analysis, validation, and writing-original draft and an equal role in data curation. Sarah E. Gaither played a lead role in conceptualization, methodology, project administration, and supervision and an equal role in funding acquisition and writing-review and editing. Diana T. Sanchez played a supporting role in writing-review and editing and an equal role in funding acquisition. Jaelyn Nixon played a supporting role in writing-original draft and an equal role in data curation.

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University, Tufts University, and Colgate University are among the growing list of universities to apply such policies (Fosnacht et al., 2020). Yet, it is unclear whether random assignment policies increase cross-race contact, whether this (potentially involuntary, but supported by authorities) contact improves racial attitudes or behaviors, or how these effects differ for racial majority and minority students. The present studies used a natural experiment of randomized roommate assignment to directly test students' friendship diversity, relationship quality, and attitudinal and behavioral changes based on roommate race. These studies apply an existing theory to a novel phenomenon by testing a roommate assignment policy change in a real-world setting, extending intergroup roommate contact research to racially minoritized students, and measuring whether intergroup roommate contact impacts relationship quality and can lead to behavioral changes during a novel cross-race interaction. This work extends intergroup contact theory research's traditional focus on attitudes as the primary dependent variable to also measure friendship diversity, relationship quality, and future social behavior.

Intergroup Contact via Roommate Assignment

Attending college offers students a unique opportunity to be submerged in a more diverse environment than what they have previously been exposed to (Hurtado et al., 2003). Yet, students self-report fewer cross-race interactions than expected based on a university's racial demographics (Carey et al., 2022). Indeed, students who choose their own roommates tend to select people who share many characteristics with them (Bauer-Wolf, 2018; Fosnacht et al., 2020), lessening their chances of living with someone who is different during this meaningful developmental period of transitioning to college. Thus, randomly assigning first-year roommates may be a key avenue to offer students the opportunity for greater cross-race contact.

However, research investigating cross-race contact via college roommates has shown mixed findings. Some work has demonstrated positive effects (Boisjoly et al., 2006; Gaither & Sommers, 2013). For example, students randomly assigned (or assigned though not randomly; Mark & Harris, 2012) more cross-race roommates reported increased positive affect toward Black, Latinx, and Asian Americans, more egalitarian racial ideologies, and more racially diverse friendship networks (Camargo et al., 2010; Shook et al., 2016; Stearns et al., 2009; Van Laar et al., 2005). Similarly, White students with a randomly assigned cross-race roommate self-reported more positive implicit racial attitudes and decreased cross-race anxiety compared to White students with a same-race roommate (Shook & Fazio, 2008a). Last, racially minoritized students randomly assigned to a White roommate self-reported a greater sense of belonging and higher grade point average than those randomly assigned to a same-race or cross-race racially minoritized roommate (Shook & Clay, 2012). Yet, past research has also demonstrated negative outcomes from cross-race roommates. For example, students with randomly assigned cross-race roommates reported lower relationship satisfaction (Phelps et al., 1998) and fewer positive emotions in their daily interactions with their roommate (Trail et al., 2009) and were more likely to change roommates (Shook & Fazio, 2008b; Towles-Schwen & Fazio, 2006) than students with same-race roommates. Similarly, Asian American students randomly assigned a White roommate reported greater concerns about being stereotyped as highly intelligent and

desires to change to fit in with their roommate compared to Asian American students randomly assigned a same-race or cross-race racial minority roommate (Son & Shelton, 2011). Last, some work has demonstrated null effects, such as a study that did not find a relationship between being randomly assigned a cross-race roommate and Black and White students' email contact with racial outgroup members (Marmaros & Sacerdote, 2006). Thus, the current literature on cross-race contact via college roommates has shown mixed effects on attitudes and behaviors.

Notably, most existing research has focused only or primarily on White students, and less is known about the effect of cross-race roommates on racially minoritized students. This is an important gap because intergroup contact has a stronger effect on reducing prejudice among majority group members than minority group members (Tropp & Pettigrew, 2005; though see van Assche et al., 2023, for a similar effect among majority and minority group members). Moreover, cross-race contact may be qualitatively different for majority and minoritized group members because each group has distinct concerns—majority group members are typically concerned with being perceived as prejudiced, while minoritized group members are typically concerned with being targets of prejudice (Tropp & Pettigrew, 2005). Moreover, given numerical underrepresentation at primarily White institutions (PWIs), minoritized group members likely have cross-race interactions with majority group members more frequently than the reverse. Therefore, the experience of cross-race roommate contact may be qualitatively different for majority and minoritized students because of different levels of previous cross-race experience.

Additionally, past studies have primarily used self-report data which introduces the possibility of students providing socially desirable answers (Perinelli & Gremigni, 2016). This could overestimate the positive effects of cross-race contact if participants are motivated to report more positive racial attitudes and behaviors because of the research design. This concern may be assuaged through behavioral measures. To date, one study has examined behavioral outcomes of cross-race roommate assignment, finding that White students assigned a cross-race roommate reported more positive racial attitudes and demonstrated more positive verbal and nonverbal behavior during a cross-race interaction than students assigned a same-race roommate (Gaither & Sommers, 2013). Open questions remain surrounding the behavioral outcomes of cross-race roommates for racially minoritized students, and the effectiveness of random assignment in increasing cross-race roommate pairings. Thus, the present studies address these gaps by testing the role of roommate race and roommate assignment on White and racially minoritized students' friendship networks (Studies 1–3), relationship quality (Studies 1–2), racial attitudes (Study 3), and behavior in a novel dyadic cross-race interaction (Study 3). This extends existing intergroup contact research and theorizing by replicating Gaither and Sommers' (2013) test on novel cross-race interactions with racial minorities and by measuring the effects of intergroup contact on constructs beyond prejudice.

Further, given the implementation of a policy change mandating random roommate assignment, these studies also test the policy's effectiveness in increasing cross-race roommate pairings—a test of forced intergroup contact in a real-world setting. This provides an important theoretical test of the effect of contact sanctioned by authorities. Random roommate assignment also provides the opportunity to experimentally test the effects of intergroup contact

(Levy Paluck et al., 2019; Van Laar et al., 2005). This is an important advancement, as nonexperimental findings of intergroup contact are often confounded because low prejudiced individuals are likely to self-select into cross-race contact (Levy Paluck et al., 2019).

The Present Studies

We tested whether random roommate assignment increases the number of cross-race roommates and leads to more positive racial attitudes and behaviors. Study 1 reports data from the 2017 to 2018 cohort of students at Duke University preceding a policy change mandating random roommate assignment. Study 2 reports data from the subsequent Duke University cohort (2018–2019), where all students were randomly assigned a roommate based on a university policy change. Last, Study 3 reports an additional study with a subset of students from Studies 1 and 2 (from both the 2017 to 2018 and 2018 to 2019 cohorts) who participated in an in-lab dyadic cross-race interaction to test for behavioral effects stemming from their roommate contact.

Transparency and Openness

Sample size was not predetermined. In Studies 1 (2017–2018 cohort) and 2 (2018–2019 cohort), the university invited all students in the first-year class to participate and collected data from all respondents. In Study 3, all students who had completed this university survey in Fall 2017 ($N = 858$) or Fall 2018 ($N = 779$) and opted into being contacted for future studies were invited to participate. We report all data exclusions, manipulations, and measures collected, and we follow the Journal Article Reporting Standards (Appelbaum et al., 2018). Design and analysis of Studies 1 and 2 were not preregistered. Analysis and hypotheses of Study 3 were preregistered (Albuja et al., 2021; <https://osf.io/8fxjk/>). Deviations from this preregistered plan evolved from the review process to address concerns raised about increasing parsimony and reliability. We denote these deviations below and report all measures and results as preregistered in the Supplemental Materials. The materials (all studies), analysis code (Study 3), and data (Study 3) can be found at <https://osf.io/e92yx/> (Albuja et al., 2021; data for Studies 1 and 2 are not publicly available due to Family Educational Rights and Privacy Act protections of university data). Data were analyzed using RStudio 2022.12.0+353 and the package tidyverse, Version 2.0.0 (Wickham et al., 2019). The studies were approved by the institutional review board. The key variables are reported here, and additional variables and results, including analyses covarying how well participants knew their roommate before coming to campus, analyses further disaggregating the cross-race roommate variable to compare White and racially minoritized cross-race roommates separately for racially minoritized participants, and analyses only examining White and Asian participants and roommates (given their large representation in the sample) can be found in the Supplemental Materials.

Study 1

Study 1 reports data from the 2017–2018 cohort, which allowed students to either select their own roommate or be randomly assigned a roommate by the university. Data were collected during the Spring

2018 semester, between May 14, 2018 and May 31, 2018. This study measured participants' roommate relationship quality, the diversity of their friends, and conflict with their roommate through self-reported surveys sent out by the university. We expected students randomly assigned a roommate to be more likely to have a cross-race roommate than those who selected their roommate. Additionally, we expected White students who had a cross-race roommate to report greater racial outgroup friends. We did not have specific hypotheses for minoritized students because past work shows a smaller effect of intergroup contact for racially minoritized students than White students and because data were collected from a PWI campus (meaning the possibility for minoritized students' outgroup contact may be high regardless of roommate race, though this is an open empirical question). Following prior work (Gaither & Sommers, 2013), we also did not have predictions regarding roommate relationship quality or conflict as quality is often high at small, private universities.

Method

Participants and Procedure

The university invited first-year students from the 2017 to 2018 cohort to complete a general housing questionnaire online in Spring 2018 (their second semester on campus). At the end, students could opt into an additional short survey for a chance to win a raffle for one of 10 \$50 Amazon gift cards. The data reported here are drawn from the additional survey to the general housing questionnaire. To balance the breadth of available research questions with university restrictions on how many questions could be asked in this additional survey to not overburden the students, some single-item measurements were included. Based on the results of factor analyses, items were combined into more reliable multi-item scales. Though 578 participants began the study, 111 did not report their roommate's race and were excluded. An attrition analysis found no differences between participants who were included and excluded on any study or demographic variable (see Supplemental Materials). The final sample included 467 participants (see Table 1 for participant demographics and comparative student body demographic information provided by the university; the university did not record age). Participants had either a cross-race ($n = 237$; "My roommate is [racial group] and I am not") or same-race ($n = 230$; "My roommate and I are the same race") roommate, who was either chosen ($n = 241$) or assigned ($n = 226$). Roommates were assigned in the Fall semester, and the university considered students' smoking and sleep schedule preferences for assignments. A sensitivity power analysis indicates this study was 80% powered to detect a minimum effect of $\eta_p^2 = .017$ for the analysis of variance (ANOVA).

Measures

Relationship Quality. Participants completed an eight-item scale measuring their relationship quality with their roommate using a scale of 1 (*not at all*) to 7 (*very much*). They also reported what percentage of their time they spend with their roommate on a scale of 0% to 100%, how well they know their roommate currently using a scale of 0 (*not at all*) to 7 (*very well*), their perceived overlap with their roommate using one of seven increasingly overlapping circles, which were scored such that higher numbers indicate greater

Table 1
Participant Demographics for Study 1 and Study 2

Demographic variable	Study 1		Study 2		Study 3
	Participant sample <i>M (SD)</i> or %	Incoming 2017–2018 class %	Participant sample <i>M (SD)</i> or %	Incoming 2018–2019 class %	Participant sample <i>M (SD)</i> or %
Race					
White American	50%	46%	43%	44%	40%
Asian American	25%	22%	36%	21%	31%
Biracial American	10%	0%	12%	0%	12%
Black American	8%	10%	5%	10%	11%
Hispanic/Latinx American	6%	8%	4%	9%	4%
American Indian	.4%	0%	<1%	0%	<1%
Not listed/unknown/other	.4%	4%	<1%	5%	<1%
Gender					
Women	61%	51%	67%	52%	65%
Men	39%		33%		34%
Political orientation	5.0 (1.4)		5.2 (1.2)		5.2 (1.3)
Sexual orientation					
Heterosexual	88%		89%		84%
Homosexual	3%		4%		6%
Bisexual	7%		4%		6%
Other/unknown	2%		3%		4%

Note. The incoming 2017–2018 class race percentages do not add up to 100% because the university also included a 10% “Foreign” category that did not include racial information (Duke Facts, 2018). The incoming 2018–2019 class race percentages only added up to 98%, even when including the 9% “Foreign” category that did not include racial information (Duke Facts, 2019). The incoming 2017–2018 and 2018–2019 class gender percentages did not include genders other than women. Political orientation was measured on a scale from 1 (*very conservative*) to 7 (*very liberal*). Participants in Study 3 were a subset of students from both cohorts (2017–2018 and 2018–2019).

perceived overlap with their roommate (modified inclusion of other in the self scale; Aron et al., 1992), and how much they discussed and were exposed to controversial topics by their roommate using a scale of 1 (*not at all*) to 7 (*very much*). These items were *z*-scored and subjected to a factor analysis. After loading onto one factor, they were averaged to create a reliable scale ($\alpha = .95$; see Supplemental Materials for factor analysis results).

Racial Outgroup Friends. Participants reported what percentage of their friends identify with racial groups other than their own on a scale of 0% to 100%.

Conflict With Roommate Race. Participants reported how much conflict their roommate’s race has caused on a scale of 1 (*not at all*) to 7 (*very much*).

Results and Discussion

Effect of Roommate Race, Roommate Assignment, and Participant Race

We first examined the distribution of cross-race roommates by roommate assignment and participant race to test the effectiveness of roommate assignment through a logistic regression. In a logistic regression predicting roommate race (0 = same-race, 1 = cross-race) from participant race (0 = White, 1 = racial minority) and roommate assignment (0 = chosen, 1 = assigned), racially minoritized participants, *OR* (odds ratio) = 1.65, $p < .001$, and participants who were assigned their roommate, *OR* = 1.82, $p < .001$, were more likely to have a cross-race roommate. There was a significant interaction between participant race and roommate assignment, $p = .036$. For White participants, the odds of having a cross-race roommate was 1.81 higher for assigned roommates relative to chosen roommates. For racially minoritized participants, the odds of

having a cross-race roommate was 2.04 higher for assigned relative to chosen roommates. This suggests the randomized roommate policy more effectively created cross-race pairings among racially minoritized students than among White students. Therefore, we next explored whether the effects of roommate race differed based on whether the roommate was chosen or assigned, and on participant race. Specifically, we tested the effect of roommate race, roommate assignment, participant race, and their interactions for each variable using three-way ANOVAs (see Table 2 for descriptive statistics, Table 3 for inferential statistics, and Table 4 for correlations by roommate race).

Participants reported higher quality relationships with chosen compared to assigned roommates, and this main effect was qualified by a three-way interaction between roommate race, participant race, and roommate assignment (see Figure 1). White participants reported higher quality relationships with chosen than assigned roommates, $F(1, 229) = 39.70$, $p < .001$, and among White participants, there was no main effect of roommate race, $F(1, 229) = 0.26$, $p = .610$, or interaction between roommate race and assignment, $F(1, 229) = 3.66$, $p = .057$. Among racially minoritized participants, there was an interaction between roommate race and assignment, $F(1, 228) = 5.66$, $p = .018$. Racially minoritized participants reported higher quality relationships with chosen cross-race than same-race roommates, $F(1, 119) = 4.85$, $p = .030$, while racially minoritized participants who were assigned a roommate did not report differing relationship quality with same-race compared to cross-race roommates, $F(1, 109) = 1.75$, $p = .189$.

Racially minoritized participants and participants who had a cross-race roommate reported more racial outgroup friends than White participants and participants who had a same-race roommate. There was also an interaction between roommate race and roommate assignment. Among participants who chose their roommate, those

Table 2*Study 1: Descriptive Statistics by Participant Race, Roommate Race, and Roommate Assignment*

Variable	Racially minoritized participant				White participant			
	Same-race roommate		Cross-race roommate		Same-race roommate		Cross-race roommate	
	Assigned	Chosen	Assigned	Chosen	Assigned	Chosen	Assigned	Chosen
	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)
Relationship quality	-0.01 (0.7)	0.1 (0.7)	-0.2 (0.8)	0.4 (0.7)	-0.5 (0.8)	0.4 (0.7)	-0.2 (0.8)	0.2 (0.7)
Racial outgroup friends	55.5 (26.7)	41.6 (22.5)	58.2 (28.1)	72.5 (22.9)	42.8 (21.1)	33.6 (21.9)	50.0 (25.8)	52.2 (21.9)
Conflict with roommate	1.0 (0.0)	1.2 (0.7)	1.2 (0.8)	1.3 (1.0)	1.0 (0.1)	1.2 (0.9)	1.1 (0.3)	1.0 (0.0)

with a cross-race roommate reported more outgroup friends, $t(453) = 7.60$, $p < .001$, while among participants who were assigned their roommate, there was no effect of roommate race on racial outgroup friends, $t(453) = 1.36$, $p = .175$. Participants who chose a cross-race roommate reported 24% more racial outgroup friends than participants who chose a same-race roommate. There were no other significant effects or interactions.

For conflict with roommates, there were no significant effects.

Participants were more likely to have cross-race roommates if they were assigned a roommate rather than chose a roommate, and this effect was stronger among racially minoritized participants than White participants. It is important to note that this effect may be driven by students' tendency to self-segregate by race on college campuses (Carey et al., 2022). Moreover, participants reported more racial outgroup friends if they had a cross-race compared to same-race roommate, though this effect was driven by participants who chose their cross-race roommate and was not seen among participants who opted into random assignment. This differs from a meta-analytic finding that intergroup contact has a stronger effect on intergroup relations (e.g., prejudice) when there was no choice rather than when intergroup contact was chosen (Pettigrew & Tropp, 2006). Intergroup contact choice in a college context may be especially relevant to friendship diversity outcomes rather than attitudinal change. While students who opted into random assignment also exercised choice, they chose the possibility of intergroup contact, rather than the certainty of it, compared to students who chose a cross-race roommate. Further, there may be unaccounted for characteristics of students who opt into random assignment that would clarify why there was no effect among this subpopulation.

In addition, there may be important differences between chosen versus assigned cross-race roommates. For example, those who chose

a roommate had some prior contact through the selection process. As a result, those who were assigned a roommate had to engage in more interpersonal effort to form a new roommate relationship than those in chosen roommate relationships. These differential contexts and the elective roommate selection process are important to recognize in the interpretation of the results. We cannot rule out that participants who have a more diverse friendship network are more likely to select a cross-race roommate, or that a third variable, such as openness to experience or low prejudice, could account for this relationship. While these possibilities could not be tested in this study, they provide fruitful directions for future research. Further, both racially minoritized and White participants reported higher quality relationships with chosen than assigned roommates, but among racially minoritized participants this was driven by those who chose a cross-race compared to same-race roommate. There were no effects on conflict with roommates. Next, to test for generalizability of results, Study 2 measured similar outcomes under a new randomized roommate policy—a policy where all students were assigned roommates randomly. This provides an important test of the effect of roommate race with less concern about self-selection.

Study 2

Study 2 reports data from the 2018–2019 cohort, among whom a new university policy required all roommates to be randomly assigned. As in Study 1, these studies measured participants' roommate relationship quality, the diversity of their friends, and conflict with their roommate. We expected that White students randomly assigned a cross-race roommate would show increased diversity within their friend networks. We had no predictions for racially minoritized students because the PWI campus created unequal opportunities for

Table 3*Study 1: Three-Way Analyses of Variance by Roommate Race, Roommate Assignment, and Participant Race*

Effect	Relationship quality			Racial outgroup friends			Conflict with roommate		
	<i>F</i> (1, 457)	<i>p</i>	η_p^2	<i>F</i> (1, 453)	<i>p</i>	η_p^2	<i>F</i> (1, 440)	<i>p</i>	η_p^2
Roommate race	0.24	.628	.001	36.86	<.001	.075	0.55	.458	.001
Roommate assignment	47.92	<.001	.090	0.46	.499	.001	2.09	.149	.005
Participant race	2.42	.120	.01	25.35	<.001	.053	3.23	.073	.007
Roommate Race × Roommate Assignment	0.16	.685	.0003	16.33	<.001	.035	1.23	.269	.003
Roommate Race × Participant Race	0.05	.828	.0001	0.63	.427	.001	3.01	.084	.007
Roommate Assignment × Participant Race	3.03	.082	.01	0.59	.442	.001	0.49	.482	.001
Roommate Race × Roommate Assignment × Participant Race	9.21	.003	.02	2.92	.088	.006	0.15	.694	.0003

Table 4
Study 1: Correlations by Roommate Race

Variable	1	2	3
1. Relationship quality	—	.22**	-.15*
2. Racial outgroup friends	-.13	—	.03
3. Conflict with roommate	-.11	.06	—

Note. Correlations below the diagonal were calculated among participants who had a same-race roommate. Correlations above the diagonal were calculated among participants who had a cross-race roommate.

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

outgroup contact between majority and minority students. We tested the effect of roommate race, participant race, and their interactions for each variable using two-way ANOVAs (see Table 5 for descriptive statistics, Table 6 for inferential statistics, and Table 7 for correlations by roommate race). All students in Study 2 were randomly assigned their roommate.

Method

Participants and Procedure

First-year students from 2018 to 2019 cohort—the first year of the new randomized roommate policy—were invited in the Spring 2019 semester (their second semester on campus) to complete an online questionnaire after a general housing questionnaire, as in Study 1. This additional questionnaire was optional after a university-sponsored survey on housing. Data were collected between May 20, 2019 and June 15, 2019. Though 432 participants began the survey,

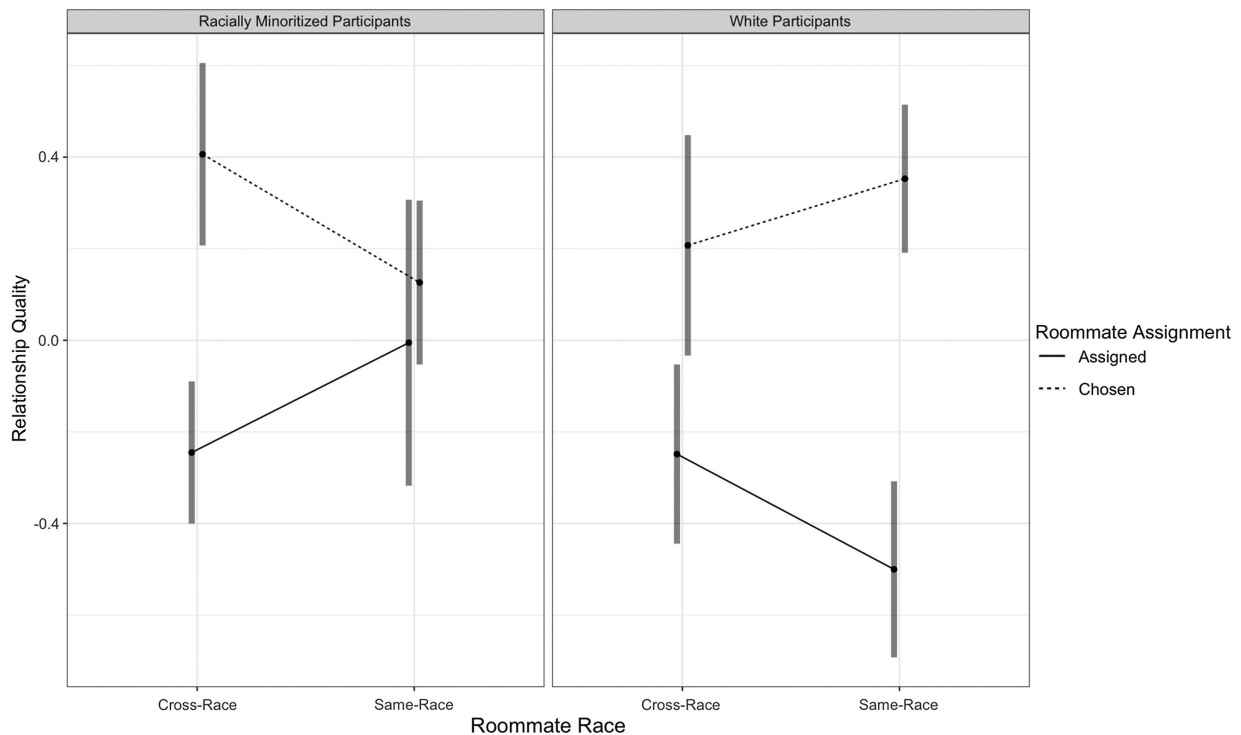
76 did not report their roommate's race and were excluded. An attrition analysis indicated men were more likely than women to be excluded, $\chi^2(2, N = 432) = 6.50, p = .039$, and sexual minority participants were more likely to be excluded than heterosexual participants, $\chi^2(4, N = 432) = 15.49, p = .004$. There were no other differences on study or demographic variables (see Supplemental Materials). The final sample included 356 participants (see Table 1 for participant demographics; the university did not record age). Participants had either a cross-race ($n = 212$) or same-race ($n = 144$) roommate, all of whom were assigned by the university. A sensitivity power analysis indicates this study was 80% powered to detect a minimum effect of $\eta_p^2 = .023$ for the ANOVAs. The key variables are reported here, and additional variables and results, including analyses covarying how well participants knew their roommate before coming to campus, analyses further disaggregating the cross-race roommate variable to compare White and racially minoritized cross-race roommates separately for minoritized participants, and analyses only examining White and Asian participants and roommates, can be found in the Supplemental Materials.

Measures

Relationship Quality. Participants completed the same items from Study 1. These items were z-scored and subjected to a factor analysis. After loading onto one factor, they were averaged to create a reliable scale ($\alpha = .94$; see Supplemental Materials for factor analysis results).

Racial Outgroup Friends. Participants reported what percentage of their friends identify with racial groups other than their own on a scale of 0% to 100%.

Figure 1
Study 1: Three-Way ANOVA Testing Relationship Quality



Note. ANOVA = analysis of variance.

Table 5
Study 2: Descriptive Statistics by Participant Race and Roommate Race

Variable	Racially minoritized participant		White participant	
	Same-race roommate	Cross-race roommate	Same-race roommate	Cross-race roommate
	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>
Relationship quality	-0.1 (0.7)	-0.02 (0.8)	0.1 (0.7)	-0.03 (0.8)
Racial outgroup friends	51.3 (25.5)	61.2 (25.2)	36.5 (18.7)	48.1 (24.5)
Conflict with roommate	1.1 (0.5)	1.4 (1.1)	1.0 (0.2)	1.1 (0.6)

Conflict With Roommate Race. Participants reported how much conflict their roommate's race has caused on a scale of 1 (*not at all*) to 7 (*very much*).

Results and Discussion

For relationship quality and conflict, there were no significant effects.

Participants who had a cross-race roommate reported more racial outgroup friends than participants who had a same-race roommate. There was also a main effect of participant race such that racially minoritized participants reported more racial outgroup friends than White participants. There was no interaction between roommate race and participant race.

Participants who had a cross-race roommate reported more racial outgroup friends, but there were no differences in relationship quality or conflict. This finding was inconsistent with Study 1, which found an increase in racially diverse friends only among participants who chose cross-race roommates, and not among participants who opted into random assignment and received a cross-race roommate. When issues of self-selection into roommate assignment were removed, the results of Study 2 were more consistent with contact theory such that mandatory random assignment to a cross-race roommate was associated with greater racial outgroup friendships than mandatory random assignment to a same-race roommate. Moreover, there were no interactions with participant race, suggesting the findings are largely similar across participant race. However, Studies 1 and 2 both relied on participant self-report which has been shown to be susceptible to social desirability bias. Thus, Study 3 tested whether roommate race shifts behavior in a novel cross-race interaction.

Study 3

Study 3 reports on a subset of students from both cohorts (2017–2018 and 2018–2019) who participated in an in-lab dyadic cross-race interaction. This is a replication and extension of Gaither and Sommers (2013), as Study 3 measured racial attitudes, intergroup contact, self-reported liking and affect after a cross-race interaction,

and verbal and nonverbal behavior during the cross-race interaction. We hypothesized that participants who had a cross-race roommate would report more positive attitudes toward racial outgroups, greater outgroup contact, greater percentage of racial outgroup friends, and show more positive verbal and nonverbal behaviors, and more eye contact compared to participants who had a same-race roommate. We also hypothesized that participants who had a cross-race roommate would report more positive affect after the interaction, would like the confederate more, report more positive metaperceptions of being liked by the confederate, and report more self-expression than participants who had a same-race roommate.

We expected randomly assigned roommates to be more likely to be cross-race than chosen roommates. We also anticipated an interaction between roommate race and roommate assignment on the dependent variables. We anticipated that participants who chose a same-race roommate would report less positive attitudes toward racial outgroups, lower outgroup contact, lower percent of racial outgroup friends, less positive verbal and nonverbal behaviors, and less eye contact compared to the participants who were assigned or chose a cross-race roommate. We did not anticipate differences between participants who were assigned or who chose a cross-race roommate because the cross-race contact should be associated with the predicted outcomes.

Last, given previous meta-analytic findings showing weaker intergroup contact effects for racial minority participants (Pettigrew & Tropp, 2006), we anticipated an interaction between roommate race and participant race, such that the effects are stronger for White students with a cross-race roommate compared to racially minoritized students with a cross-race roommate, or White or racially minoritized students with a same-race roommate.

Method

Participants

First-year students who had completed a fall residential survey in either Fall 2017 ($N = 858$) or Fall 2018 ($N = 779$) and opted into being contacted for future study opportunities ($n = 707$) were invited

Table 6
Study 2: Two-Way Analyses of Variance by Roommate Race and Participant Race

Effect	Relationship quality			Racial outgroup friends			Conflict with roommate		
	<i>F</i> (1, 351)	<i>p</i>	η_p^2	<i>F</i> (1, 346)	<i>p</i>	η_p^2	<i>F</i> (1, 323)	<i>p</i>	η_p^2
Roommate race	0.22	.642	0.001	16.39	<.001	0.045	1.57	.210	0.01
Participant race	0.89	.345	0.003	27.72	<.001	0.074	2.37	.125	0.01
Roommate Race \times Participant Race	1.14	.286	0.003	0.10	.757	0.0002	0.59	.443	0.002

Table 7*Study 2: Correlations by Roommate Race*

Variable	1	2	3
1. Relationship quality	—	.19**	-.27***
2. Racial outgroup friends	-.16	—	.03
3. Conflict with roommate	-.01	-.03	—

Note. Correlations below the diagonal were calculated among participants who had a same-race roommate. Correlations above the diagonal were calculated among participants who had a cross-race roommate.

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

in early spring of the following semester (Spring 2018 and Spring 2019) to complete a social interaction study in exchange for \$25. Some students did not provide reliable contact information due to typos and were thus not invited ($n = 57$). Though 274 participants began the study, one duplicate participant, seven participants who failed the attention check, and 18 participants who did not provide roommate race information were excluded. An attrition analysis indicated no differences on the key study or demographic variables (see Supplemental Materials). The final sample included 248 participants (see Table 1 for demographics; average age was 19.5 years, $SD = 1.3$ years). Participants had either a cross-race ($n = 112$) or same-race ($n = 136$) roommate, who was either chosen ($n = 151$) or assigned ($n = 95$; roommate assignment was missing for two participants). A sensitivity power analysis indicates this study was 80% powered to detect a minimum effect of $\eta_p^2 = .029$ for the ANOVAs.

Procedure

All participants completed the study with either a White or Asian experimenter. A gender-matched other-race confederate posing as the second participant entered the room after the participant. White participants interacted with a Black confederate, in line with the most commonly studied cross-race context; Asian, Black, Hispanic, and Multiracial participants interacted with a White confederate as the dominant outgroup. It is important to note there is not a perfect comparison cross-race interaction for minoritized students on a predominately White campus because minoritized students likely have more cross-race encounters with White students than White students do with Black students. After giving informed consent, the experimenter told the participant and the confederate they would be engaging in a conversation about campus issues that would be video recorded. Participants and confederates drew a slip from a bowl to determine whether they would be the interviewee or interviewer. Unbeknownst to the participant, the confederate was always the interviewer and the participant the interviewee through a rigged drawing. Participants then drew a slip from another bowl labeled "discussion topics" where the topic was always "Affirmative Action." Once the interaction began, the confederate read from a list of prepared interview questions (e.g., "What do you think about diversity on campus?" "Do you think affirmative action is needed on our campus? Why or why not?") and was trained to only read the questions and not respond to the participant's answers. After 5 min of interaction, the experimenter returned to end the interview. The experimenter asked the confederate to go to another room where there was a second computer to use while the participant stayed in

the interaction room to complete a postinteraction survey on the one computer present. They completed measures of their racial attitudes and beliefs, as well as their impressions of the interaction and the confederate.

A team of 10 research assistants (five women, five men; three Multiracial, three Black, two Asian, and two White) coded every video recording. There was high interrater reliability, with Cronbach's α s above .61 (ranging between .62 and .89).

Measures

Study measures were preregistered (Albuja et al., 2021; <https://osf.io/8fxjk/>). Given a high number of variables, and corresponding statistical tests, we conducted additional factor analyses not included in the preregistration to create composite variables as requested during the review process. The factor analyses, as well as the analyses with the variables as preregistered, are reported in the Supplemental Materials.

Participant Verbal and Nonverbal Behavior During the Cross-Race Interaction. Research assistants coded for verbal and nonverbal participant behaviors during the interaction. Specifically, research assistants rated how comfortable, confident, interested, enthusiastic, smiling, engaged, anxious, and tense the participant appeared, and how comfortable, confident, and anxious the participant sounded on a scale of 1 (*not at all*) to 7 (*extremely*). The negative ratings were reverse scored. Research assistants also completed a two-item scale which measured participants' level of support for affirmative action and diversity. Research assistants responded to the following questions, "How anti- or pro-affirmative action do they sound?," and "How anti- or pro-diversity do they sound?" Items were rated on a scale of 1 (*antiaffirmative action*), 4 (*neutral*), 7 (*pro-affirmative action*). All items were subjected to a factor analysis. After loading onto one factor, they were averaged into a reliable scale ($\alpha = .89$; see Supplemental Materials for results of factor analysis).

Participant Eye Contact. Research assistants completed one item which measured how frequently participants made eye contact with the confederates. This item was rated on a scale from 1 (*none*) to 7 (*a great deal*). This item was examined separately because it did not load onto the behavioral factor (see Supplemental Materials).

Self-Report After Cross-Race Interaction.

Participant Affect. Participants completed nine items measuring their affect during the interaction. Using a scale of 1 (*not at all*) to 7 (*extremely*), participants reported how well items such as "enthusiastic," "anxious," and "resentful" demonstrated how they felt during the interaction. The negative items were reverse-scored, and the items were averaged to create an index such that higher scores represent more positive participant affect ($\alpha = .79$).

Participant Liking and Metaperceptions of Liking. Participants completed three items measuring how much they liked the confederate and three items measuring how much they thought the confederate liked them. Using a scale of 1 (*not at all*) to 7 (*extremely*), participants responded to items such as, "How much did you like getting to know your partner?" and "How much did your partner like getting to know you?" The items were subjected to a factor analysis. After loading onto one factor, they were averaged into a reliable scale ($\alpha = .91$; see Supplemental Materials for results of factor analysis).

Participant Self-Expression. Participants indicated how much they felt they could express themselves during the interaction

through three items. Using a scale of 1 (*strongly disagree*) to 7 (*strongly agree*), participants responded to items such as, "I felt I had to change myself to fit in with my partner during the interaction." The items were averaged into a reliable scale ($\alpha = .74$).

Participant Racial Attitudes and Intergroup Contact.

Racial Intergroup Contact. Participants reported the amount of intergroup contact they have with White, Black, Asian, Latino/a, Middle Eastern, and biracial people. Participants responded using a scale of 1 (*very little*) to 7 (*a great deal*) and contact with racial outgroup members was averaged to create an index of cross-race contact (e.g., for White participants this was the average of their contact with Black, Asian, Latino/a, Middle Eastern, and biracial people; for Black participants this was their contact with White, Asian, Latino/a, Middle Eastern, and biracial people; $\alpha_{\text{Asian participants}} = .79$, $\alpha_{\text{Black participants}} = .71$, $\alpha_{\text{Latino participants}} = .58$, $\alpha_{\text{White participants}} = .79$, $\alpha_{\text{biracial participants}} = .54$, and $\alpha_{\text{other race participants}} = .70$).

Racial Outgroup Friends. Participants reported what percentage of their friends identify with racial groups other than their own on a scale of 0% to 100%.

Racial Attitudes. Participants completed feeling thermometers which measured how positively they felt towards White, Black, Asian, Latino/a, Middle Eastern, and biracial people. Participants responded using a scale of 1 (*not very positive*) to 7 (*very positive*), and the attitudes toward racial outgroups were averaged to create an index of racial attitudes (e.g., for White participants this was the average of their rating toward Black, Asian, Latino/a, Middle Eastern, and biracial people; for Black participants this was the average of their rating toward White, Asian, Latino/a, Middle Eastern, and biracial people; $\alpha_{\text{Asian participants}} = .92$, $\alpha_{\text{Black participants}} = .92$, $\alpha_{\text{Latino participants}} = .73$, $\alpha_{\text{White participants}} = .98$, $\alpha_{\text{biracial participants}} = .98$, and $\alpha_{\text{other race participants}} = .95$).

Analytic Plan

Analyses were preregistered at <https://osf.io/8fxjk/> (Albuja et al., 2021). As preregistered, we first report the distribution of cross-race roommates by roommate assignment. Although not preregistered (see the Transparency and Openness section for more details), we next report three-way ANOVAs testing the effects of roommate race, participant race, and roommate assignment, as suggested during the review process (See Table 8 for descriptive statistics, Table 9 for inferential statistics, and Table 10 for correlations by

roommate race). This contains all the relevant tests in a single analysis and allows for comparison of the effects across studies, rather than requiring the two separate analyses included in the preregistration. Given low power, we only report and interpret the main effects and the 2 two-way interactions of interest (the interaction between roommate race and roommate assignment, and the interaction between roommate race and participant race) in these ANOVAs. In the Supplemental Materials, we report the preregistered two-way ANOVAs testing the effect of roommate race, roommate assignment, and their interactions, and two-way ANOVAs testing the effect of roommate race, participant race, and their interactions for each variable.

Results and Discussion

A preregistered chi-squared test indicated that participants who were randomly assigned were more likely to have a cross-race roommate ($n = 55$) than a same-race roommate ($n = 40$), and those who chose their roommates were more likely to have a same-race ($n = 96$) roommate than a cross-race roommate ($n = 55$), $\chi^2(1, N = 248) = 10.87$, $p = .001$. In an exploratory logistic regression predicting roommate race (0 = same-race, 1 = cross-race) from participant race (0 = White, 1 = racial minority) and roommate assignment (0 = chosen, 1 = assigned), there was only a significant main effect of roommate assignment, $p = .002$. The odds ratio of having a cross-race roommate for assigned relative to chosen roommates was 1.56. The effect of participant race ($p = .296$) and the interaction between participant race and roommate assignment were not significant ($p = .879$). Next, we explored whether the effects of roommate race on racial attitudes and behavior differed based on whether the roommate was chosen or assigned, and on participant race.

There was a main effect of roommate race on participants' verbal and nonverbal behavior such that participants who had a cross-race roommate demonstrated more positive behavior during an interracial interaction than participants who had a same-race roommate. There was also a main effect of roommate assignment such that participants who chose their roommates demonstrated more positive behavior during an interracial interaction than participants who were assigned their roommates. There were no interactions between roommate race and roommate assignment or between roommate race and participant race.

Table 8

Study 3: Descriptive Statistics by Participant Race, Roommate Race, and Roommate Assignment

Variable	Racially minoritized participant				White participant			
	Same-race roommate		Cross-race roommate		Same-race roommate		Cross-race roommate	
	Assigned	Chosen	Assigned	Chosen	Assigned	Chosen	Assigned	Chosen
	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)
Behavior	4.3 (0.8)	4.5 (0.7)	4.4 (0.7)	4.7 (0.9)	4.3 (0.7)	4.3 (0.6)	4.5 (0.8)	5.0 (0.9)
Eye contact	4.0 (1.1)	4.0 (1.0)	3.9 (0.9)	4.1 (1.2)	4.3 (1.2)	4.2 (1.1)	3.8 (1.0)	4.1 (1.2)
Affect	4.6 (0.9)	4.8 (0.9)	4.4 (0.9)	4.7 (0.8)	4.3 (0.9)	4.4 (0.8)	4.5 (0.9)	4.4 (0.9)
Liking and metaliking	4.3 (1.0)	4.6 (1.0)	4.9 (0.9)	4.5 (0.9)	4.9 (0.9)	4.5 (0.9)	4.7 (1.1)	4.7 (0.8)
Self-expression	5.4 (1.2)	5.3 (1.2)	5.3 (1.1)	5.6 (1.1)	5.1 (1.3)	5.2 (1.1)	5.1 (1.1)	5.5 (0.9)
Intergroup racial contact	5.3 (0.9)	4.9 (1.2)	5.1 (1.0)	5.4 (0.9)	4.8 (1.3)	5.0 (0.9)	5.2 (1.1)	5.3 (0.9)
Racial outgroup friends	55.8 (24.7)	48.6 (26.2)	60.0 (22.9)	67.2 (21.7)	43.3 (21.6)	38.0 (18.5)	48.8 (24.5)	59.5 (21.5)
Racial attitudes	5.6 (1.1)	5.2 (0.9)	5.5 (1.0)	5.6 (1.0)	5.5 (1.2)	5.7 (1.0)	5.7 (1.3)	5.5 (1.2)

Table 9
Study 3: Two-Way Analyses of Variance Testing Roommate Race and Roommate Assignment

Effect	Verbal and nonverbal behavior			Eye contact			Affect			Liking and metaperceptions of liking			Self-expression			Racial intergroup contact			Outgroup friend			Racial attitude		
	<i>F</i> (1, 219)	<i>p</i>	η^2_p	<i>F</i> (1, 236)	<i>p</i>	η^2_p	<i>F</i> (1, 235)	<i>p</i>	η^2_p	<i>F</i> (1, 235)	<i>p</i>	η^2_p	<i>F</i> (1, 235)	<i>p</i>	η^2_p	<i>F</i> (1, 236)	<i>p</i>	η^2_p	<i>F</i> (1, 236)	<i>p</i>	η^2_p	<i>F</i> (1, 236)	<i>p</i>	η^2_p
Roommate race	6.21	.013	0.03	0.90	.345	0.004	0.004	9.48	<0.001	0.47	.492	0.002	0.35	.556	0.001	3.43	.065	0.01	15.21	<.001	0.06	0.30	.585	0.001
Roommate assignment	7.05	.009	0.03	0.26	.610	0.001	1.32	.252	0.01	1.15	.286	0.005	0.95	.331	0.004	0.12	.728	0.001	0.18	.674	0.001	0.46	.497	0.002
Participant race	0.32	.571	0.001	0.68	.410	0.003	2.97	.086	0.01	0.95	.330	0.004	1.18	.279	0.005	0.73	.393	0.003	10.81	.001	0.04	1.04	.310	0.004
Roommate Race × Roommate Assignment	1.50	.222	0.01	0.81	.370	0.004	0.03	.865	0.0001	0.46	.499	0.002	1.05	.306	0.004	0.87	.353	0.004	5.69	.018	0.02	0.03	.853	<0.001
Roommate Assignment × Participant Race	2.02	.156	0.01	0.74	.390	0.003	1.16	.282	0.004	0.41	.522	0.002	0.05	.829	0.0002	0.75	.386	0.003	0.11	.736	0.0004	0.46	.497	0.002
Roommate Race × Roommate Assignment × Participant Race	0.00	.992	<0.001	0.00	.975	<0.001	1.17	.280	0.004	0.30	.583	0.001	0.34	.558	0.001	0.39	.534	0.002	0.18	.672	0.001	0.06	.802	<0.001
Roommate Assignment × Participant Race	1.33	.250	0.01	0.16	.690	0.001	0.05	.818	0.0002	5.34	.022	0.02	0.02	.904	0.0001	1.82	.178	0.01	0.02	.896	0.0001	2.69	.102	0.01

For racial outgroup friends, there was a main effect of roommate race, such that participants who had a cross-race roommate reported more racial outgroup friends than participants who had a same-race roommate. There was also a main effect of participant race such that minoritized students reported more racial outgroup friends than White students. There was a significant interaction between roommate race and roommate assignment, such that among participants who had a chosen roommate, those with a cross-race roommate reported more racial outgroup friends than those with a same-race roommate, $t(236) = -5.10, p < .001$. Among participants who had an assigned roommate, there was no effect of roommate race, $t(236) = -0.96, p = .338$. There was no interaction between roommate race and participant race.

There were no significant effects for all remaining variables (eye contact, participant affect, participants' liking of the confederate and perceptions of how much the confederate liked them, participant self-expression, racial intergroup contact, and racial attitudes).

Participants were more likely to have a cross-race roommate if they were randomly assigned. As in Study 1, participants who chose a cross-race roommate reported more racially diverse friendship networks than participants who chose a same-race roommate, and this effect was not found among participants who were randomly assigned a roommate. While consistent with Study 1 results, this is inconsistent with Study 2 results, which did find an effect of roommate race among participants who were randomly assigned a roommate. Further, this effect did not differ by participant race (see Supplemental Materials for equivalence tests). Additionally, participants who had a cross-race roommate demonstrated more positive verbal and nonverbal behaviors during a novel cross-race interaction than participants who had a same-race roommate. However, there were null effects on measures of participants' experience during the cross-race interaction and on their racial attitudes. These results may be due to social desirability bias, as participants may be reluctant to report negative intergroup attitudes or unfavorable ratings of interracial interactions. Finally, the limited interactions between roommate race and participant race suggest the effects of racial intergroup contact through roommates may be similar across racial majority and minoritized students. Yet, it is important to note that cross-race interactions with a White confederate are not necessarily comparable to those with a Black confederate, especially because these interactions occurred on a predominately White campus.

General Discussion

The present studies tested intergroup contact theory through a natural experiment of randomized roommate assignment that included samples of White and racially minoritized students and a novel cross-race interaction. Across three samples drawn from two student cohorts, having a cross-race roommate was associated with a more diverse friendship network, demonstrating support for the broadening effects of intergroup contact theory. This finding is consistent with previous cross-race roommate research which has found that students with cross-race roommates report more racially diverse friendship networks, and extends this work by finding similar results among both White and minoritized students (Mark & Harris, 2012; Shook et al., 2016; Stearns et al., 2009; Van Laar et al., 2005). However, there are important methodological and empirical differences across the study designs and results that qualify these conclusions. In Studies 1 and 3, some participants opted into random

Table 10
Study 3: Correlations by Roommate Race

Variable	1	2	3	4	5	6	7	8
1. Verbal and nonverbal behavior	—	.39***	.25**	.09	.16	.04	-.10	.19*
2. Eye contact	.30***	—	.20*	.01	.14	-.03	-.13	.15
3. Affect	.25**	.23*	—	.23*	.57***	.002	.10	.13
4. Liking and metaperceptions of liking	.25**	.24**	.33***	—	.21*	.02	.14	.29**
5. Self-expression	.03	.03	.54***	.18*	—	.18	.23*	.14
6. Racial intergroup contact	-.03	-.03	-.01	-.06	-.05	—	.29**	.32***
7. Racial outgroup friends	-.03	-.10	.04	.05	.01	.27**	—	.03
8. Racial attitudes	.06	.15	.03	.15	.07	.25**	.03	—

Note. Correlations below the diagonal were calculated among participants who had a same-race roommate. Correlations above the diagonal were calculated among participants who had a cross-race roommate.

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

roommate assignment, while others chose a roommate, and only those who chose their roommate demonstrated the cross-race contact effect of greater friendship diversity. Because students opted into random assignment, this design limited causal conclusions. In Study 2, random roommate assignment was compulsory, and participants with a randomly assigned cross-race roommate reported more racially diverse friends than participants with a randomly assigned same-race roommate. This suggests the effects of cross-race roommates on friendship diversity may occur under specific conditions such as when random room assignment is mandatory rather than elective. Students who voluntarily opt into random assignment may be more open to new experiences or could have greater cross-race contact before college. Such pre-existing differences could account for this effect, though this remains an untested possibility since we do not have data on motivations for roommate choice. Future research would also benefit from longitudinal studies that track the longer-term consequences of having more racially diverse friendship networks. It may be that through these extended friend networks, participants are able to maintain intergroup contact and may demonstrate later changes in racial attitudes, rather than directly through a cross-race roommate.

In contrast to past studies that found negative effects of cross-race roommates on relationship quality (Shook & Fazio, 2008a), in the present studies relationship quality did not differ by roommate race (see Supplemental Materials for equivalence testing in support of these conclusions). This suggests cross-race roommate relationships may not be a detriment to relationship quality, though limited variability in relationship quality prevented a strong test of this effect. While participants consistently reported a more racially diverse friendship network when they had cross-race roommates, there were few additional effects detected. These mixed findings on the effect of intergroup contact via roommates demonstrate the real-world variation that occurs outside of controlled lab experiments, which are often limited to very few interactions.

Effects of Random Assignment Policy

Additionally, these studies evaluated the effectiveness of a randomized roommate assignment policy on rates of cross-race roommate pairings. The random assignment policy increased the likelihood that students had a cross-race roommate, replicating a similar finding of random assignment in a previous study (Van Laar et al., 2005). Racial segregation persists in universities to a greater

extent than may be expected based on racial representation in the student body, suggesting at baseline, students are likely to self-select into same-race rooms (Carey et al., 2022). These data are consistent with this interpretation, showing that without randomized roommate assignment, students were more likely to select same-race roommates than would be expected by chance. Given this default, the randomized roommate policy increased cross-race pairings. Thus, without the randomized roommate policy, roommate pairings were more likely to be same-race than cross-race, which reflects a broader tendency to self-segregate in college. This is an important finding because friendships are often segregated by race, and more diverse friendship networks are associated with greater involvement in collective action (Carter et al., 2019). Moreover, given the lack of differences in relationship quality, this suggests there may be few drawbacks to a randomized roommate policy based on the measures in the present studies. Relatedly, there were no increases in the number of roommate transfer requests during the transition to a randomized roommate policy (4% among the 2017–2018 cohort vs. 3% among the 2018–2019 cohort). This suggests contact sanctioned by authorities (through assignment) may not differ in relationship quality from self-selected contact.

Effects on Behavior in a Novel Cross-Race Interaction

Study 3 presented an important extension on previous work by testing the effects of intergroup racial contact on participants' behavior in a novel cross-race interaction. Participants who had a cross-race roommate demonstrated more positive verbal and nonverbal behavior during a novel cross-race interaction than participants who had a same-race roommate (though there was no difference in participants' amount of eye contact). This is consistent with previous work showing that intergroup contact reduces intergroup anxiety (Stephan, 2014). This also highlights positive secondary transfer effects stemming from contact with one cross-race roommate to contact with a new cross-race social interaction partner, often across racial outgroup lines since not all participants had a roommate of the same background as their interaction partner (Pettigrew, 2009; Tausch et al., 2010).

However, Study 3 did not fully replicate Gaither and Sommers' (2013) findings of the positive consequences of cross-race roommates on a novel cross-race interaction (i.e., eye contact, confederate report as reported in the Supplemental Materials). The original study focused only on White students, and most of those White students came from predominately White states (e.g., Maine,

Vermont with 93% White populations), whereas students in the present set of studies most commonly came from more racially diverse states, for example, North Carolina, with 69% White population; New York, 52%; California, 70%; Florida, 56%; see Supplemental Materials, for full participant state information; State Population 2024 (Demographics, Maps, Graphs) (n.d.); U.S. Census Bureau QuickFacts: California, (n.d.). Thus, it is possible that the effects of cross-race roommate contact differ for students who have had greater cross-race contact before coming to college. Though past work has shown that among White students, lower high-school diversity is associated with fewer cross-race interactions in college (Bowman & Park, 2014; Stearns et al., 2009), it remains an empirical question whether the effects of cross-race contact via a randomized roommate differ based on the amount of previous cross-race contact. At a minimum, it is difficult to know how novel the interracial interaction in the present study was for this sample of students compared to Gaither and Sommers (2013).

Limitations and Future Directions

Despite being one of the few studies to test components of intergroup contact in a real-world setting, these studies were limited in the measures included in Studies 1–2, resulting in some single-item

measures. Importantly, we created as many composites of items as possible to increase reliability of our findings, as suggested through the review process. Relatedly, our sample did not include enough racially minoritized participants to maintain power to disaggregate race beyond Asian and White participants and roommates (see Supplemental Materials). Future research should examine the specific racial background of both participants and roommates to understand how intergroup contact may operate differently for specific groups. See Table 11 for additional descriptions of study limitations.

Conclusions

The present studies advance intergroup contact theory through a natural experiment among college roommates. The results suggest that without a randomized roommate policy, students self-select into same-race roommate pairings more often than expected by chance. There were few differences in the quality of relationships by roommate race, suggesting a randomized roommate policy does not appear to have adverse consequences. Further, students who had a cross-race roommate reported having more outgroup friends and showed more positive verbal and nonverbal behaviors in a novel cross-race interaction. There were largely no effects on attitudinal measures, which are the traditional outcomes measured in intergroup

Table 11
Study Limitations

Point of uncertainty	Constraint on reproducibility and generalizability
Cross-sectional data	The results do not show how long-lasting the effects of cross-race roommates are, or how these effects may change over time. Participants were first-year students who had lived with their roommate for one academic year, so the results presented here may not generalize to later time points. Further, we are unable to measure the longitudinal effects of the additional cross-race contact facilitated by the greater friendship diversity following from a cross-race roommate.
Private university setting	The sample was recruited from one private university in the United States South. It is likely that college students' cross-race contact varies as a function of the university demographics and university setting. Within these different contexts, cross-race roommates may have a different effect on students.
Limited measures available	Because Studies 1 and 2 were part of a larger data collection effort by the university, those studies include limited attitudinal measures. This limits our understanding of how cross-race roommates impact participants' racial attitudes and behaviors with the larger samples. Last, the psychometric properties of the novel single-item measures (racial outgroup friends, conflict with roommate) cannot be measured, and these items may be unreliable.
Clarifying primary versus secondary behavioral transfer effects	Although all White participants interacted with a Black confederate, only $n = 9$ participants had a Black cross-race roommate. Therefore, we are unable to test whether there is a difference in the effect of contact on interactions with the contacted group (i.e., primary contact) and interactions with a noncontacted cross-race group (i.e., secondary contact) for White participants. Yet, this provides support for secondary transfer effects. Future studies may pursue a more balanced design and include an additional condition with a same-race confederate as a control comparison. A larger sample size of racial minority participants would also allow for a higher powered test of this question.
Limited data to understand roommate choice	The present studies do not have relevant data to understand why students chose to opt into random assignment or selected their own roommate. For example, openness to experience or knowing fewer people on campus could help explain why students opted into random assignment, and why the friendship diversity effects were not found among these students. Individual differences in who opts into randomized roommate assignment have been understudied and future research would benefit from systematically understanding these important factors.

contact studies. Yet, the consistent finding on friendship diversity suggests more research may be necessary to understand downstream consequences stemming from more diverse friendship networks that were not captured here. In conclusion, a randomized roommate assignment policy may be a promising avenue for greater cross-race contact and friendships among college students.

References

- Albuja, A., Gaither, S., Sanchez, D., & Nixon, J. (2021). *RIST*. <https://osf.io/e92yx/>
- Allport, G. (1954). *The nature of prejudice*. Addison-Wesley.
- Appelbaum, M., Cooper, H., Kline, R. B., Mayo-Wilson, E., Nezu, A. M., & Rao, S. M. (2018). Journal article reporting standards for quantitative research in psychology: The APA Publications and Communications Board task force report. *American Psychologist*, *73*(1), 3–25. <https://doi.org/10.1037/amp0000191>
- Aron, A., Aron, E. N., & Smollan, D. (1992). Inclusion of Other in the Self Scale and the structure of interpersonal closeness. *Journal of Personality and Social Psychology*, *63*(4), 596–612. <https://doi.org/10.1037/0022-3514.63.4.596>
- Bauer-Wolf, J. (2018, March 2). *Random roommates only*. Inside Higher Ed. <https://www.insidehighered.com/news/2018/03/02/duke-university-blocks-students-picking-their-roommates-freshman-year>
- Boisjoly, J., Duncan, G. J., Kremer, M., Levy, D. M., & Eccles, J. (2006). Empathy or antipathy? The impact of diversity. *The American Economic Review*, *96*(5), 1890–1905. <https://doi.org/10.1257/aer.96.5.1890>
- Bowman, N. A., & Park, J. J. (2014). Interracial contact on college campuses: Comparing and contrasting predictors of cross-racial interaction and interracial friendship. *Journal of Higher Education*, *85*(5), 660–690. <https://doi.org/10.1353/jhe.2014.0029>
- Camargo, B., Stinebrickner, R., & Stinebrickner, T. (2010). Interracial friendships in college. *Journal of Labor Economics*, *28*(4), 861–892. <https://doi.org/10.1086/653831>
- Carey, R. M., Stephens, N. M., Townsend, S. S. M., & Hamedani, M. G. (2022). Is diversity enough? Cross-race and cross-class interactions in college occur less often than expected, but benefit members of lower status groups when they occur. *Journal of Personality and Social Psychology*, *123*(5), 889–908. <https://doi.org/10.1037/pspa0000302>
- Carter, E. R., Brady, S. T., Murdock-perriera, L. A., Kawakami Gilbertson, M., Ablorh, T., & Murphy, M. C. (2019). The racial composition of students' friendship networks predicts perceptions of injustice and involvement in collective action. *Journal of Theoretical Social Psychology*, *3*(1), 49–61. <https://doi.org/10.1002/jts.27>
- Duke Facts. (2018, June 27). *Duke undergrads' top five*. <https://web.archive.org/web/20180627172542/https://facts.duke.edu/>
- Duke Facts. (2019, January 16). *Duke undergrads' top five*. <https://web.archive.org/web/20190116234249/https://facts.duke.edu/>
- Fosnacht, K., Gonyea, R. M., & Graham, P. A. (2020). The relationship of first-year residence hall roommate assignment policy with interactional diversity and perceptions of the campus environment. *The Journal of Higher Education*, *91*(5), 781–804. <https://doi.org/10.1080/00221546.2019.1689483>
- Gaither, S. E., & Sommers, S. R. (2013). Living with an other-race roommate shapes Whites' behavior in subsequent diverse settings. *Journal of Experimental Social Psychology*, *49*(2), 272–276. <https://doi.org/10.1016/j.jesp.2012.10.020>
- Hurtado, S., Dey, E. L., Gurin, P. Y., & Gurin, G. (2003). College environments, diversity, and student learning. In J. C. Smart (Ed.), *Higher education: Handbook of theory and research* (pp. 145–189). Springer. https://doi.org/10.1007/978-94-010-0137-3_3
- Levy Paluck, E., Green, S. A., & Green, D. P. (2019). The contact hypothesis re-evaluated. *Behavioural Public Policy*, *3*(2), 129–158. <https://doi.org/10.1017/bpp.2018.25>
- Mark, N. P., & Harris, D. R. (2012). Roommate's race and the racial composition of white college students' ego networks. *Social Science Research*, *41*(2), 331–342. <https://doi.org/10.1016/j.ssresearch.2011.11.012>
- Marmaros, D., & Sacerdote, B. (2006). How do friendships form? *The Quarterly Journal of Economics*, *121*(1), 79–119. <https://doi.org/10.1093/qje/121.1.79>
- Perinelli, E., & Gremigni, P. (2016). Use of social desirability scales in clinical psychology: A systematic review. *Journal of Clinical Psychology*, *72*(6), 534–551. <https://doi.org/10.1002/jclp.22284>
- Pettigrew, T. F. (2009). Secondary transfer effect of contact: Do intergroup contact effects spread to noncontacted outgroups? *Social Psychology*, *40*(2), 55–65. <https://doi.org/10.1027/1864-9335.40.2.55>
- Pettigrew, T. F., & Tropp, L. R. (2006). A meta-analytic test of intergroup contact theory. *Journal of Personality and Social Psychology*, *90*(5), 751–783. <https://doi.org/10.1037/0022-3514.90.5.751>
- Phelps, R. E., Altschul, D. B., Wisenbaker, J. M., Day, J. F., Cooper, D., & Potter, C. G. (1998). Roommate satisfaction and ethnic identity in mixed-race and White university roommate dyads. *Journal of College Student Development*, *39*, 194–203.
- Shook, N. J., & Clay, R. (2012). Interracial roommate relationships: A mechanism for promoting sense of belonging at university and academic performance. *Journal of Experimental Social Psychology*, *48*(5), 1168–1172. <https://doi.org/10.1016/j.jesp.2012.05.005>
- Shook, N. J., & Fazio, R. H. (2008a). Interracial roommate relationships: An experimental field test of the contact hypothesis. *Psychological Science*, *19*(7), 717–723. <https://doi.org/10.1111/j.1467-9280.2008.02147.x>
- Shook, N. J., & Fazio, R. H. (2008b). Roommate relationships: A comparison of interracial and same-race living situations. *Group Processes & Intergroup Relations*, *11*(4), 425–437. <https://doi.org/10.1177/1368430208095398>
- Shook, N. J., Hopkins, P. D., & Koech, J. M. (2016). The effect of intergroup contact on secondary group attitudes and social dominance orientation. *Group Processes & Intergroup Relations*, *19*(3), 328–342. <https://doi.org/10.1177/1368430215572266>
- Son, D., & Shelton, J. N. (2011). Stigma consciousness among Asian Americans: Impact of positive stereotypes in interracial roommate relationships. *Asian American Journal of Psychology*, *2*(1), 51–60. <https://doi.org/10.1037/a0022651>
- State Population 2024 (Demographics, Maps, Graphs). (n.d.). *Vermont population 2024*. Retrieved February 29, 2024, from <https://worldpopulationreview.com/states/vermont-population>
- Stearns, E., Buchmann, C., & Bonneau, K. (2009). Interracial friendships in the transition to college: Do birds of a feather flock together once they leave the nest? *Sociology of Education*, *82*(2), 173–195. <https://doi.org/10.1177/003804070908200204>
- Stephan, W. G. (2014). Intergroup anxiety: Theory, research, and practice. *Personality and Social Psychology Review*, *18*(3), 239–255. <https://doi.org/10.1177/1088868314530518>
- Tausch, N., Hewstone, M., Kenworthy, J. B., Psaltis, C., Schmid, K., Popan, J. R., Cairns, E., & Hughes, J. (2010). Secondary transfer effects of intergroup contact: Alternative accounts and underlying processes. *Journal of Personality and Social Psychology*, *99*(2), 282–302. <https://doi.org/10.1037/a0018553>
- Towles-Schwen, T., & Fazio, R. H. (2006). Automatically activated racial attitudes as predictors of the success of interracial roommate relationships. *Journal of Experimental Social Psychology*, *42*(5), 698–705. <https://doi.org/10.1016/j.jesp.2005.11.003>

- Trail, T. E., Shelton, J. N., & West, T. V. (2009). Interracial roommate relationships: Negotiating daily interactions. *Personality and Social Psychology Bulletin*, *35*(6), 671–684. <https://doi.org/10.1177/0146167209332741>
- Tropp, L. R., & Pettigrew, T. F. (2005). Relationships between intergroup contact and prejudice among minority and majority status groups. *Psychological Science*, *16*(12), 951–957. <https://doi.org/10.1111/j.1467-9280.2005.01643.x>
- U.S. Census Bureau QuickFacts: California. (n.d.). *QuickFacts California*. Retrieved February 29, 2024, from <https://www.census.gov/quickfacts/fa/ct/table/CA/PST045223>
- van Assche, J., Swart, H., Schmid, K., Dhont, K., Al Ramiah, A., Christ, O., Kauff, M., Rothmann, S., Savelkoul, M., Tausch, N., Wölfer, R., Zahreddine, S., Saleem, M., & Hewstone, M. (2023). Intergroup contact is reliably associated with reduced prejudice, even in the face of group threat and discrimination. *American Psychologist*, *78*(6), 761–774. <https://doi.org/10.1037/amp0001144>
- 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*(4), 329–345. <https://doi.org/10.1016/j.jesp.2004.08.002>
- West, T. V., & Dovidio, J. F. (2012). Intergroup contact across time: Beyond initial contact. In G. Hodson, & M. Hewstone (Eds.), *Advances in intergroup contact* (pp. 152–175). Psychology Press.
- White, S., Schroeder, J., & Risen, J. L. (2021). When “enemies” become close: Relationship formation among Palestinians and Jewish Israelis at a youth camp. *Journal of Personality and Social Psychology*, *121*(1), 76–94. <https://doi.org/10.1037/pspi0000331>
- Wickham, H., Averick, M., Bryan, J., Chang, W., McGowan, L., François, R., Golemund, G., Hayes, A., Henry, L., Hester, J., Kuhn, M., Pedersen, T., Miller, E., Bache, S., Müller, K., Ooms, J., Robinson, D., Seidel, D., Spinu, V., ... Yutani, H. (2019). Welcome to the Tidyverse. *Journal of Open Source Software*, *4*(43), Article 1686. <https://doi.org/10.21105/joss.01686>

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