

The effect of university roommate contact on ethnic attitudes and behavior

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Abstract

This study examined the effect of living with White, Asian American, Latino, or African American roommates on affective, cognitive, and behavioral indicators of prejudice among university students. We used a five-wave panel study with approximately 2000 students to examine the effect of roommate contact in two ways: First, through a field experimental test by examining prejudice as a function of living with randomly assigned roommates during the first year of university. Second, net of pre-existing attitudes, we examined the effects of voluntary roommate contact during the second and third year of university on fourth year prejudice. Consistent with contact theory, both randomly assigned and voluntary contact decreased prejudice. Also, there was generalization to other outgroups, particularly from Black roommates to Latinos, and vice versa. Finally, an interesting exception was found for contact with Asian American roommates, whether randomly assigned or voluntary, which tended to make attitudes towards other groups more negative. Potential explanations for this result are discussed.

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Since first articulated by Williams (1947) and later refined by Allport (1954), contact theory has inspired a great deal of research and public policy (see Amir, 1969; Brewer & Brown, 1998; Hewstone & Brown, 1986; Pettigrew, 1998; Stephan, 1987 for reviews). Despite the volume of work on this theory, and its far-reaching influence, there is surprisingly little evidence that intergroup contact actually *causes* reductions in prejudice. Experimental or longitudinal designs are necessary to definitively show this causal relationship; however, such designs are rarely used in research on contact theory. In addition, extant research on this theory often limits its focus to interactions between two groups. This strategy prevents exploration of interesting questions

regarding the effect of interaction partners' group membership on the outcome of contact. In response to these shortcomings, the current research employs data from a five-wave panel study to examine the impact of living with an outgroup roommate on affective, cognitive, and behavioral indicators of prejudice among students at a multi-ethnic university. Because most of the students were randomly assigned to their roommate situation during their first year, findings for these students constitute an experimental test of the prejudice-reducing effects of long-term contact.

According to Allport's (1954) formulation, intergroup contact reduces prejudice when: (1) participants in the contact situation have equal status, (2) these individuals are pursuing common goals, (3) participants in the contact situation are interdependent or work cooperatively, and (4) relevant authorities are thought to

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sanction contact. In addition, subsequent research has identified a number of conditions that facilitate prejudice reduction as a function of contact (see Stephan, 1987; Pettigrew, 1986, 1998 for reviews). Perhaps most prominent of these conditions is acquaintance potential (Cook, 1962, 1978). This condition seems to be comprised of two elements: affective ties and the opportunity to learn about outgroup members. That is, contact is thought to reduce prejudice when it generates positive affect, empathy, and/or friendship among participating individuals (e.g., Batson et al., 1997; Herek & Capitano, 1996; Pettigrew, 1997, 1998). Contact is also thought to reduce prejudice when it affords participating individuals the opportunity to discover previously unnoticed similarities (e.g., Cook, 1984) and the chance to see counter-stereotypic characteristics and behaviors in one another (e.g., Rothbart & John, 1985).

Although there is controversy as to which of these conditions are necessary, rather than sufficient, to reduce prejudice (Pettigrew, 1986), the notion that intergroup contact is *associated* with improved intergroup attitudes is well substantiated (e.g., Brewer & Brown, 1998; Pettigrew, 1998; Pettigrew & Tropp, 2000). For example, one early study with White housing project residents found that contact with Black neighbors was negatively associated with prejudice toward African Americans (Deutsch & Collins, 1951). More recently, White children's contact with ethnic minority classmates was found to be negatively associated with prejudice and positively associated with learning (e.g., Aronson & Gonzalez, 1988; Aronson & Patnoe, 1997).

Despite the wealth of research showing that intergroup contact and prejudice covary, there is little research definitively demonstrating the direction of this relationship (Pettigrew, 1998). It may be the case that intergroup contact reduces prejudice, as contact theory predicts. On the other hand, individuals who are low in prejudice may select to engage in more intergroup contact. Although studying environments in which self-selection is minimized and using non-recursive statistical techniques provide some leverage against this causal sequence problem, experimental and longitudinal research are the most effective means of overcoming causal uncertainty. Unfortunately, these designs are infrequently employed in contact theory research, particularly examinations of long-term contact with high acquaintance potential (Pettigrew, 1998).

Another shortcoming of existing research on contact theory is that it has tended to focus on contact between two groups. While this strategy has the virtue of simplifying the phenomena under study, examination of contact between multiple groups raises at least three questions that deserve further investigation. First, do the characteristics of involved groups influence the outcome of contact? The limited research available on this question suggests that both respondents' group member-

ship, and the group memberships of people they come into contact with, may influence the degree of prejudice reduction. For example, in a recent meta-analysis, Pettigrew and Tropp (2000) found that contact had a stronger impact on intergroup attitudes of individuals from high-status majority groups than on individuals from low-status minority groups.

Second, does contact with members of one outgroup affect prejudice towards other outgroups? Although few researchers have examined whether the beneficial effects of contact with one outgroup generalize to other outgroups, extant findings suggest that such generalization is possible (Pettigrew & Tropp, 2000). For example, Pettigrew (1997) found that the number of outgroup friends people reported was negatively related both to prejudice toward ethnic groups with whom respondents were likely to interact (i.e., those found in their country) and to prejudice toward ethnic groups with whom respondents were unlikely to interact (i.e., those not found in their country). This finding suggests that the positive effects of contact generalized from local outgroups to distant outgroups.

Third, does contact with ingroup members increase prejudice? In multi-ethnic contexts, extended contact with ingroup members may decrease opportunities for interaction with outgroup members. Contact with fellow ingroup members may also serve to instantiate biased ingroup norms (e.g., Blanchard, Lilly, & Vaughn, 1991; Turner, 1991). Although these possibilities speak to the importance of examining the independent effects of ingroup and outgroup contact, this is infrequently done. In a notable exception, an experiment conducted by Wilder and Thompson (1980) found a negative relationship between outgroup contact and prejudice but a positive relationship between ingroup contact and prejudice. Levin, Van Laar, and Sidanius (2003) also found in their longitudinal analyses of friendship formation in the sample examined in the current study that students with more outgroup friendships and fewer ingroup friendships during their second and third years of university showed less prejudice at the end of university, controlling for their prejudice levels as first-year students, pre-university friendships, and a variety of background variables. Also using this longitudinal dataset, Sidanius, Van Laar, Levin, and Sinclair (2004) found that contact with ingroup members through segregated fraternities and sororities increased levels of social distance to ethnic "others," increased the sense of ethnic victimization, and decreased the perception of social inclusiveness.

The current study

The current study uses data from this five-wave, four-year panel study to examine the effect of living with a member of a different ethnic group on university students' ethnic attitudes. Roommate arrangements are

ideally suited to tests of contact theory because they meet many of the conditions thought to facilitate prejudice reduction via intergroup contact. First, although differences in ethnic group status are evident within society at large (Smith, 1991), within the university setting, and a given living situation, members of different ethnic groups are likely to have *equal status*. Furthermore, even though university students are often required to compete over grades in the classroom, those who live together must *work cooperatively* to achieve the *common goal* of maintaining a home environment that is mutually satisfactory. Roommate situations are also characterized by high *acquaintance potential*. The familiarity and mere exposure afforded by living together is likely to generate positive affective ties between roommates (e.g., Festinger, Schachter, & Back, 1950). Also, the wide range of activities that roommates may share (e.g., studying, talking, and eating) provide them with the opportunity to discover previously unnoticed similarities or counter-stereotypic thoughts, characteristics or behaviors on the part of an outgroup roommate. Finally, a consistent body of research has shown that universities are egalitarian socializing environments (e.g., Bobo & Licari, 1989; Lipset, 1983; McClintock & Turner, 1962; but see also Jackman, 1978; Jackman & Muha, 1984). For this reason, it is highly likely that students in this environment will perceive *relevant authorities to be supportive* of cross-ethnic contact, thus providing the remaining condition for beneficial contact postulated by Allport (1954).

The design of this study allows us to contribute to the literature on contact theory by examining whether intergroup contact *causes* reductions in prejudice in two ways. First, because most students are randomly assigned to their roommate situation in their first year, examination of first-year students' ethnic attitudes as a function of their roommate situation constitutes a field experimental test of contact theory. To our knowledge, there are only three experimental examinations of residential contact and these examined effects of residence hall contact in general, as opposed to close extended contact between roommates or examined only interactions between White and African American roommates (Nesdale & Todd, 1998, 2000; and see upcoming work by Towles-Schwen, 2003; Towles-Schwen & Fazio, 2002). Second, we utilized a longitudinal design to examine the effect of choosing to live with an outgroup roommate during second and third year on changes in intergroup attitudes from first to fourth year. Both of these methodological strategies give us substantial leverage against the causal sequence problem.

Commensurate with the three elements of an attitude, we examined the effects of contact on affective, cognitive, and behavioral indicators of prejudice. Meta-analyses indicate that affective measures are more susceptible to the benefits of contact than cognitive measures (Pettigrew & Tropp, 2000). Negative feeling toward members

of other ethnic groups and intergroup anxiety (feelings of unease and lack of competence when interacting with members of other ethnic groups) constituted the affective indicators of prejudice. Stephan and Stephan (1985) contend that individuals may feel personally threatened in intergroup encounters by the possibility of being embarrassed or rejected. Intergroup anxiety may both reduce the initial likelihood of intergroup interactions and decrease as a result of favorable contact with outgroup members (Stephan & Stephan, 2000). As cognitive indicators of prejudice, we examined symbolic racism, social dominance orientation and anti-miscegenation attitudes.¹ Finally, heterogeneity of friends and dating partners provided behavioral indicators of prejudice. The behavioral indicators of prejudice used in this study are of interest because they allow us to determine whether contact begets contact, thus creating a ripple effect of prejudice reduction.

In essence, the current study allows us to test two hypotheses derived from contact theory. Individuals randomly assigned to live with an outgroup roommate should show improved intergroup attitudes as a function of this contact (Hypothesis 1). Individuals who volunteer to live with an outgroup roommate should also show improved intergroup attitudes as a function of this contact (Hypothesis 2). In addition, the multi-ethnic nature of our sample enables exploration of three additional and important questions: (a) whether roommates' ethnic group memberships moderate the relationship between contact and prejudice, (b) whether the positive effects of contact with one ethnic outgroup also create more positive attitudes toward other ethnic outgroups, and (c) whether contact with one's own ethnic group actually increases prejudice.

Method

Participants and procedure

Data were collected as part of a five-year longitudinal study among university students beginning their first year of university at the University of California, Los Angeles (UCLA) in 1996. The incoming first-year class was composed of 3877 students. Of these students, 32% were White, 36% Asian American, 18% Latino, 6% African American, and 8% were of another ethnicity or did not report their ethnicity. Data were collected during five different time periods between 1996 and 2000: in the summer before university entry (1996), and during the spring

¹ There is considerable research showing opposition to interethnic marriage and dating to be an important subcomponent of ethnic prejudice, e.g., see Brigham, Woodmansee, and Cook (1976), Fang et al. (1998), Sidanius (1993), Sones and Holston (1988); see also Pettigrew and Tropp (2000).

quarter in each subsequent academic year (1997–2000). The first wave of data was collected through the mass administration of a survey at the beginning of the summer orientation program. Subsequent data collection was through telephone surveys during the spring quarter of each academic year. These interviews averaged 20 minutes in length and were conducted using the Computer-Assisted Telephone Interview (CATI) system run by the Institute for Social Science Research at UCLA. Response rates were as follows: 78% at the pre-university wave ($N = 2156$), 82% at the end of Year 1 ($N = 2016$), 82% at the end of the Year 2 ($N = 1667$), 66% at the end of Year 3 ($N = 1360$), and 59% at the end of Year 4 ($N = 1215$). Only members of the four major ethnic groups (i.e., Whites, Asian Americans, Latinos, and African Americans) were selected for analysis in the current study.² The ethnic and gender breakdowns of the White, Asian American, Latino, and African American participants in each year of data collection can be found in Levin et al. (2003). The percent of females in the study ranged from 44% in the pre-university wave to 56% in the last wave. The number of Whites ranged from 748 in the pre-university wave to 311 at the end of Year 4. Comparable numbers for Asian Americans were 753 and 389. Sixty-eight African Americans and 255 Latinos participated in the pre-university wave. To increase the size of these two groups, additional Blacks and Latinos were surveyed at the end of Year 1, and the number of participants in this wave rose to 430 for Latinos and 130 for Blacks. At the end of Year 4, 252 Latinos and 67 Blacks participated in the study.³

² The majority of Latino students at UCLA in the sample are of Mexican American origin (76.5%), with Central American (10.6%), South American (7.8%), and other Latino (5.1%) being represented in lower numbers. The majority of Asian American students in the sample are of Chinese origin (42.6%), with Korean (17.8%), Filipino (12.2%), South East Asian (11%), East Indian (6.8%), Japanese (6.6%), and Pacific Islanders (0.5%) being represented in lower numbers.

³ Our sampling frame during the pre-university wave consisted of the 2749 summer orientation attendees who were at least 18 years of age or who had written parental consent to participate in the study. Our sampling frame at the end of first year consisted of all the students who returned the summer survey, with two exceptions. We excluded 179 White and Asian American students with incomplete data and/or missing contact information, and added 471 Black and Latino students due to the under-representation of these groups in the summer orientation and therefore in our pre-university wave of data collection. Latino and Black students present in the sample at the pre-university wave differed significantly from those added at the end of first year on a number of demographic variables. For example, there were significantly more males among the Latino and Black students added at the end of first year than among those who participated in the pre-university wave. However, this sampling bias did not influence our results because we did not exclude the non-participants in the pre-university wave from our longitudinal analyses. Rather, our sampling frames at the end of the second through fourth years consisted of all the students who completed the interview at the end of first year (in addition to 51 Black and biracial students who were added at the end of the third year).

Measures

To determine the extent and nature of respondents' roommate contact, we measured whether their roommates were self-selected or randomly assigned, and computed two measures of intergroup contact based on the self-reported ethnic composition of their current living situation: roommate heterogeneity and number of roommates from specific ethnic groups. Respondents also completed affective, cognitive, and behavioral indicators of prejudice: affect toward each of the four major ethnic groups, intergroup anxiety, symbolic racism, social dominance orientation, anti-miscegenation attitudes, ethnic heterogeneity of friendships, and the degree of interethnic dating. Each construct was assessed in all five waves of data collection.

Nature of roommate selection. Respondents were asked a number of questions about their roommates. They were instructed to consider persons in the dormitories with whom they shared their room as their roommates, and if they lived in a room, house or apartment off-campus to consider persons with whom they shared their residence as their roommates. The range of the number of roommates indicated by respondents was zero to more than three. Most of the students in our sample spent their first year in a dormitory (85%). Another 11% lived at home, and 4% lived in off-campus housing. In the dormitories, students tended to share their room with one (58%) or two (32%) and occasionally three (4%) or more (5%) other first-year students. During the first year at UCLA, university policy dictates that roommates are randomly assigned to students (the only restriction being that roommates must share the same gender). Students can obtain a non-random roommate if they specify that they want to share a room with a particular person. As such, most of the students in our sample who lived in the dorms their first year had a randomly assigned roommate (78%), whilst 20% lived with a self-selected roommate. After the first year at UCLA, many students either choose their roommates within the dormitories or move out of the dormitories. For example, in their second year 52% of students lived in a dormitory, whereas (31%) spent their second year living in off-campus housing. Another 14% lived at home. In off-campus housing, students tended to have one (28%), two (21%) or three roommates (32%) and occasionally zero (6%), four (7%), or more than four (6%) roommates (i.e., persons with whom they shared their residence). In order to check whether a person's roommate or roommates were randomly assigned or self-selected in the first year, respondents were asked "Did you choose your roommate or roommates, or were they randomly chosen for you?" Potential responses were "1—I chose my roommate/s," "2—My roommate/s was/were randomly chosen for me," "3—Both," or "4—I don't have a roommate."

Roommate heterogeneity. This contact variable constituted the major independent variable in this study and consisted of the number of roommates who were members of outgroups. Respondents were asked to identify the ethnicity of all the people they were living with. The answers were recoded such that who was considered a member of an ethnic outgroup depended on student ethnicity: Thus for White students, Whites were considered ingroup roommates whereas all other roommates were considered outgroup roommates; for Latino students, Latino roommates were considered ingroup roommates whereas all others were considered outgroup roommates; for Asian American students, Asian American roommates were considered ingroup roommates whereas all others were considered outgroup roommates; and so on. Roommate heterogeneity in a given year was calculated as $(1 - (\text{number of ingroup roommates} / \text{total number of roommates}))$. The correlations between the total number of roommates indicated and roommate heterogeneity were $r = .23, p < .001$ at the end of the first year of university, $r = .25, p = .001$ at the end of the second year, $r = .34, p < .001$ at the end of the third year, and $r = .35, p = .001$ at the end of the fourth year.

Number of roommates from specific ethnic groups. Besides examining the overall degree to which one was exposed to roommates from different ethnic groups, we also explored the effects of being exposed to roommates from specific ethnic groups. For each year, we asked each respondent to indicate the number of roommates they had who were either: White, Asian American, Latino, or Black. The numbers provided in each category for each year then constituted the independent variables.

Group affect. Affect toward different ethnic groups was measured by the stem question: “How positively or negatively do you feel towards the following groups?” on a scale of “1—very negatively” to “7—very positively.” The individual groups of interest were “Caucasians/Whites,” “Latinos/Hispanics,” “Asians/Asian Americans,” and “African Americans/Blacks.”

Intergroup unease and multicultural competence. Intergroup unease was measured by the item: “I feel uneasy being around people of different ethnicities” (1—strongly disagree, 7—strongly agree). Multicultural competence was measured by the item: “I feel competent interacting with people from different ethnic groups” (1—strongly disagree, 7—strongly agree).

Symbolic racism. This variable was measured using a four-item scale. Participants rated the degree to which they agreed or disagreed with the following statements on a scale of “1—strongly disagree” to “7—strongly agree”: (1) “Blacks are getting too demanding in their push for equal rights,” (2) “Over the past few years, Blacks have gotten less economically than they deserve” (reverse-coded), (3) “The Irish, Italians, Jews, and many other minorities overcame prejudice and worked their

way up. Blacks should do the same without special favors,” and (4) “Blacks get less attention from the government than they deserve” (reverse-coded; average α across five waves of data = .65).

Social dominance orientation. This construct was measured by use of four items from the standard SDO₆ Scale (see Sidanius & Pratto, 1999). Participants rated the degree to which they agreed or disagreed with the following four statements on a scale of “1—strongly disagree” to “7—strongly agree”: (1) “It is probably a good thing that certain groups are at the top and other groups are at the bottom,” (2) “Inferior groups should stay in their place,” (3) “We should do what we can to equalize conditions for different groups” (reverse-coded), and (4) “We should increase social equality” (reverse-coded; average α across five waves of data = .74).

Anti-miscegenation attitudes. These attitudes were measured using a two-item scale. Participants were asked to rate the degree to which they agreed or disagreed with the following statements on a scale of “1—strongly disagree” to “7—strongly agree”: (1) “Inter-ethnic dating should be avoided” and (2) “Inter-ethnic marriage should be avoided” (average α across five waves of data = .95).

Friendship heterogeneity. This variable was first assessed by asking students how many of their closest friends belonged to each of the four ethnic groups: African American, Latino, Asian American, and White. The students’ responses were given on a five-point scale ranging from: “1—None,” “2—Few,” “3—Many,” “4—Most,” and “5—All.” These responses were then transformed into three-category scales such that responses of 1 and 5 were coded as “0”, 2 and 4 were coded as “1” and 3 was coded as “2.” Each of these responses was then weighted by the inverse proportion of a given ethnic group on campus (i.e., 36% Asian Americans, 32% Whites, 18% Latinos, and 6% Blacks). Thus, being friends with an African American (a relatively small ethnic group on campus) was given more weight than being a friend with an Asian American (a relatively large ethnic group on campus). The final friendship heterogeneity index was then simply the sum of these recoded and weighted indices across the three ethnic outgroups. As was the case in the roommate heterogeneity variable, for White students, Latinos, Asian Americans and African Americans were considered members of outgroups whereas Whites were considered ingroup members and so on. As such, a very high score indicates having close friends from many different ethnic outgroups while a low score indicates having very few friends from many different ethnic outgroups (or having ingroup friends only).

Interethnic dating. Ethnicity of dating partners was measured by asking the respondents if they had dated anyone who was White, Asian American, Latino, or Black within the last year. The responses were coded

as “0” if “no,” or “1” if “yes.” The final outgroup dating measure indexed the number of different outgroups they had dated within a given year. As a result, for any given year the score could range from “0” to “3.” If the respondent did not date anyone, he or she was given a missing data code.

Results

Preliminary analyses

Prior to conducting the main analyses, we wanted to assure ourselves that university assignment to a dormitory roommate during the first year was, indeed, random. We accomplished this in two ways. First, we examined whether participants’ pre-university attitudes related to first-year roommate heterogeneity separately among those who reported having randomly assigned roommates versus self-selected roommates in a dormitory. Eighty-five percent of the students in our sample reported living in the dorms during their first year. Of those respondents who reported living in the dorms during their first year, 292 reported having a self-selected roommate (20%), while 1130 reported having a randomly assigned roommate (78%). Among those who reported selecting their own roommates, it is likely that pre-university attitudes will be related to the ethnic heterogeneity of roommates such that students who felt, for example, less at ease with people from different ethnic groups would be less likely to choose “ethnic others” as roommates. At the same time, if random assignment to roommate situation was achieved among those who reported having their roommates assigned to them, these participants’ pre-university ethnic attitudes should be unrelated to the ethnic heterogeneity of their roommates.

To examine whether this was indeed the case, we regressed degree of first-year roommate heterogeneity on the indices of intergroup attitudes and behaviors assessed prior to university entry.⁴ These regressions were conducted separately for respondents who lived in a dormitory and reported choosing their own roommates and those who reported having randomly assigned roommates in a dormitory.⁵ As shown in Table 1, as expected, there were no significant relationships between roommate heterogeneity during the first year and pre-

university ethnic attitudes and behaviors among respondents whose roommates were randomly assigned. In contrast, those who reported having self-selected roommates during the first year of university showed more roommate heterogeneity as they showed: (a) less unease being around people of other ethnic groups ($b = -.06$, $p = .006$, semi-partial $r^2 = .03$), (b) more competence interacting with people from other ethnic groups ($b = .04$, $p = .009$, semi-partial $r^2 = .03$), and (c) more ethnic heterogeneity among their friendship circle prior to university ($b = .01$, $p = .03$, semi-partial $r^2 = .02$), with these being small size effects (Cohen, 1988). Simple slopes analyses (see Aiken & West, 1991) showed that when regressing first-year roommate heterogeneity on pre-university attitudes and behaviors for self-selected roommates versus randomly assigned roommates, the slopes tended to be larger in the self-selected category in one case and were significantly larger in the self-selected category in the other two cases (i.e., Unease around other groups: $b = -.06$ vs. $b = -.01$, $t = 1.96$, $p = .05$, $R^2_{\text{change for interaction}} = .003$; Ethnic competence: $b = .04$ vs. $b = .00$, $t = 2.22$, $p = .03$, $R^2_{\text{change for interaction}} = .004$; Ethnic heterogeneity of friends: $b = .01$ vs. $b = .00$, $t = 2.23$, $p = .03$, $R^2_{\text{change for interaction}} = .003$). Other results in Table 1 show that neither students who reported self-selecting a roommate nor those who reported having a roommate randomly assigned to them showed any relationship between roommate heterogeneity and their symbolic racism, social dominance orientation, and opposition to intergroup dating and marriage.

Second, to provide converging evidence that university assignment to roommate situation was truly random, and to inspect possible changes in roommate heterogeneity when previously randomized students were no longer under constraint, we conducted a 4×2 mixed effects ANOVA with university tenure (years 1–4) as the within-subjects factor and first-year roommate selection (self-selected vs. randomly assigned) as the between-subjects factor. As one would expect if random assignment was truly random, at the end of the first year, roommate heterogeneity was significantly higher among students with randomly assigned roommates ($M = .67$, $SD = .43$) than among students with self-selected roommates ($M = .33$, $SD = .44$; $t(520) = -7.07$, $p < .001$; $\eta_p^2 = .09$, a medium size effect). Moreover, given that all students in their second year and beyond were free to choose their own roommates, we also expected to see and found a sharper decline in the degree of roommate heterogeneity between first and second year for students with randomly assigned roommates than students with self-selected roommates. As shown in Fig. 1, this is exactly what the data showed (interaction effect between first and second years: $F(1, 520) = 13.07$, $p < .001$; $\eta_p^2 = .03$, a small size effect). So, when the university randomly assigned roommates,

⁴ We were not able to run this analysis on the group affect variables as we would have had to run the analyses within each ethnic group separately, creating very small sample sizes.

⁵ Respondents who lived in a dormitory and answered that they had both chosen and randomly selected roommates (2.8%) and those dormitory residents who answered that they had no roommates during the first year (in fact there were no students who indicated this) were left out of these analyses.

Table 1

Relationships between pre-university ethnic attitudes and behaviors and roommate heterogeneity during the first year of university among those with self-selected and randomly assigned roommates

Ethnic attitudes and behaviors prior to university entry	Ethnic heterogeneity among first-year students with self-selected roommates ($n = 292$)	Ethnic heterogeneity among first-year students with randomly assigned roommates ($n = 1130$)	t Value of significance of slope difference between self-selected and randomly assigned roommates
Intergroup unease	-.06**(-.18**)	-.01(-.03)	1.96 ⁺
Intergroup competence	.04**(.17**)	.00(.01)	2.22*
Friendship heterogeneity	.01.13	.00(-.01)	2.23*
Symbolic racism	.02(.04)	-.08(-.02)	n.s.
SDO	.02(.05)	-.02(-.04)	n.s.
Anti-miscegenation	-.01(-.03)	-.02(-.05)	n.s.

Entries are unstandardized regressions coefficients (with product-moment correlations in parentheses).

* $p < .05$.

** $p < .01$.

⁺ $p < .10$.

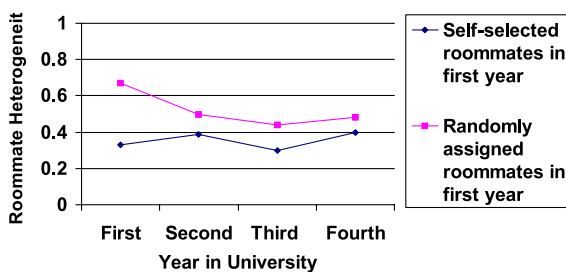


Fig. 1. Roommate heterogeneity over the university years for those with randomly assigned and self-selected roommates during the first year.

students had more ethnically heterogeneous living situations. However, when these students were given a choice of roommate in their second year, they selected roommates with significantly less ethnic heterogeneity. Thus by the fourth year, there was only a small difference in roommate heterogeneity between those students who originally chose their own roommates and those students who were randomly assigned roommates, and this difference did not quite reach the conventional significance level ($M = .40$, $SD = .46$; versus $M = .48$, $SD = .45$; $t(520) = -1.70$, $p = .09$; $\eta_p^2 = .01$, a small size effect).

Together, the results of these analyses lead us to believe that among those students who were randomly assigned roommates by the university, heterogeneity of roommates reflects actual variation in exposure to ethnic diversity that is independent of respondents' previous ethnic attitudes and behaviors.

The effect of randomly assigned roommate contact on prejudice: An experimental test

Having established that university random roommate assignment showed all the signs of being truly random, we then took advantage of this fact to explore the major question motivating this research. Namely, whether or

not exposure to roommates of different ethnic outgroups changes the intergroup attitudes and behaviors of students. Since there were no self-selection effects among students who were randomly assigned to first-year roommates, restricting the analyses to this subsample represents an experimental test of contact theory.

Using only those respondents who were randomly assigned roommates at the beginning of their first year, we conducted 11 hierarchical regression analyses with degree of roommate heterogeneity and number of roommates from each of the four major ethnic groups (i.e., Whites, Asian Americans, Latinos, and Blacks) as the independent variables and each of the 11 ethnic attitudes and behaviors as the dependent variables.

As can be seen in Table 2, the results showed a significant relationship between the dependent variable and either roommate heterogeneity or the number of roommates from a particular ethnic group for six of the 11 dependent variables; another two of these relationships were consistent with the direction of the hypothesis but did not quite reach statistical significance. As in other studies on the effects of intergroup contact, the effects sizes tended to be small (see Pettigrew & Tropp, 2000 for the most extensive meta-analysis of the effects of contact), indicating that the random roommate experiences explain a small portion of the variance in the intergroup attitudes and behaviors (Cohen, 1988). Of the five independent variables, roommate heterogeneity had the strongest and most consistent effects on the dependent variables, with seven of the 11 dependent variables yielding statistically significant results or results that were consistent with the direction of the hypothesis but not statistically significant at the designated alpha level. For example, Table 2 shows that greater ethnic heterogeneity of one's roommates during the first year caused more positive affect toward Whites, Asian Americans, Latinos, and Blacks (the coefficient for affect towards Whites is consistent with the hypothesis, but not statistically significant at the designated alpha level). Roommate heterogeneity was also found to

Table 2

Ethnic attitudes and behaviors at the end of the first year of university as functions of roommate heterogeneity and the number of roommates from specific ethnic groups among students with randomly assigned roommates during the first year

Intergroup attitudes and behaviors	Roommate heterogeneity	# of White roommates	# of Asian American roommates	# of Latino roommates	# of Black roommates	R ²
Affect towards Whites	.06 ⁺	.01	.00	.02	.00	.00
Affect towards Asian Americans	.08 [*]	.00	.07 [*]	.01	.03	.01 [*]
Affect towards Latinos	.12 ^{***}	.01	.02	.05	.06 ⁺	.02 ^{***}
Affect towards Blacks	.09 ^{**}	.01	.00	.07 [*]	.08 ^{**}	.02 ^{***}
Intergroup competence	.07 [*]	.02	.01	.01	.01	.01
Intergroup unease	-.03	.01	.03	-.04	-.01	.00
Symbolic racism	-.06 ⁺	.01	.04	-.04	-.06 ⁺	.01 [*]
SDO	-.04	-.04	.01	.00	-.04	.01
Anti-miscegenation	-.08 ^{**}	.00	-.03	.00	.02	.01
Friendship heterogeneity	.03	-.02	-.01	.01	.07 [*]	.01
Degree of outgroup dating	.02	-.06	.00	-.02	.01	.01

Entries in columns 2–6 are standardized multiple regression coefficients.

^{*} $p < .05$.

^{**} $p < .01$.

^{***} $p < .001$.

⁺ $p < .10$.

increase one's sense of competence in dealing with people from different ethnic groups, decrease symbolic racism (consistent with the direction of the hypothesis but not statistically significant at the designated alpha level), and decrease opposition to interracial dating and marriage.

Over and above the effects of roommate heterogeneity, exposure to roommates from specific ethnic groups also reduced various indicators of ethnic prejudice. As shown in Table 2, exposure to Asian American and African American roommates caused more positive affect directed toward that group ($\beta = .07$, $p = .03$, semi-partial $r^2 = .003$ and $\beta = .08$, $p = .007$, semi-partial $r^2 = .01$, respectively). It is also noteworthy that for the two most stigmatized ethnic groups (i.e., Blacks and Latinos), exposure to one stigmatized group resulted in more positive affect toward the other stigmatized group. Thus, having randomly assigned Latino roommates also caused more positive feelings towards Blacks ($\beta = .07$, $p = .02$, semi-partial $r^2 = .01$), and exposure to Blacks tended to result in more positive affect towards Latinos ($\beta = .06$, $p = .054$, semi-partial $r^2 = .004$). Beyond this, exposure to randomly assigned Black roommates increased levels of friendship heterogeneity ($\beta = .07$, $p = .02$, semi-partial $r^2 = .01$) and also tended to decrease levels of symbolic racism ($\beta = -.06$, $p = .059$, semi-partial $r^2 = .004$). It is interesting to note that, with the exception of the relationships between exposure to Black roommates and symbolic racism and friendship heterogeneity already discussed above, the effects of exposure to specific ethnic groups were essentially restricted to affective reactions to these groups, and did not generally extend to the cognitive or behavioral variables (i.e., intergroup competence, unease, SDO, anti-miscegenation, and degree of outgroup dating; see Table 2).

Consideration of both respondent ethnicity and roommate ethnicity (by analyzing the results within each ethnic group separately) revealed that some of the effects of roommate contact depended on the combination of both variables. Again these effects tended to be small, with the exception of Black respondents who tended to show medium size effects of random roommate contact. While there were few overall effects of exposure to Asian American roommates, the impact of exposure to Asian American roommates was pronounced for respondents from particular ethnic groups. Contrary to contact theory, exposure to Asian American roommates generally increased prejudice, especially if the respondent was White: Among White respondents, exposure to randomly assigned Asian American roommates increased uneasiness being around students of other ethnicities ($\beta = .12$, $p = .05$, semi-partial $r^2 = .01$), increased symbolic racism ($\beta = .15$, $p = .01$, semi-partial $r^2 = .01$), increased social dominance orientation ($\beta = .16$, $p = .007$, semi-partial $r^2 = .02$), and tended to increase opposition to interethnic dating and marriage ($\beta = .11$, $p = .08$, semi-partial $r^2 = .01$). These anti-egalitarian effects of exposure to Asian American roommates were not just restricted to Whites; exposure to Asian American roommates also increased symbolic racism among Black respondents ($\beta = .26$, $p = .03$, semi-partial $r^2 = .06$), and even tended to decrease the positive affect Blacks felt towards other Blacks ($\beta = -.23$, $p = .06$, semi-partial $r^2 = .04$).

While exposure to Asian American roommates had the largest number of anti-egalitarian effects on the attitudes of respondents from other groups, this was not the only group to produce such an effect. Exposure to White roommates also increased symbolic racism among Black respondents ($\beta = .27$, $p = .03$, semi-partial $r^2 = .05$), and

tended to increase Black and Latino respondents' sense of unease being around students of other ethnicities ($\beta = .23$, $p = .08$, semi-partial $r^2 = .04$ and $\beta = .18$, $p = .009$, semi-partial $r^2 = .03$ respectively). Furthermore, exposure to White roommates tended to decrease Latinos students' sense of competence interacting with students of other ethnicities ($\beta = -.12$, $p = .08$, semi-partial $r^2 = .01$), tended to increase their opposition to interethnic dating and marriage ($\beta = .12$, $p = .08$, semi-partial $r^2 = .01$), and significantly decreased the heterogeneity of Latino students' friends ($\beta = -.14$, $p = .04$, semi-partial $r^2 = .02$). Among Asian American students, exposure to White roommates increased positive affect toward other Asian American students (their ingroup members; $\beta = .13$, $p = .04$, semi-partial $r^2 = .01$). Exposure to randomly assigned White roommates also had some positive effects, however, in that it decreased social dominance orientation amongst Black students ($\beta = -.29$, $p = .03$, semi-partial $r^2 = .06$) and tended to increase positive affect towards Latinos amongst Asian American students ($\beta = .18$, $p = .095$, semi-partial $r^2 = .01$). Also, exposure to randomly assigned White roommates tended to decrease opposition to intergroup marriage and dating among Black students ($\beta = -.23$, $p = .07$, semi-partial $r^2 = .04$), though these latter two results did not reach statistical significance at the designated alpha level.

The two groups that showed some negative effects on ethnic attitudes, Asian American and White roommates, both showed very positive effects of being randomly assigned to Latino and Black roommates, or heterogeneous roommates more generally: The results show that exposure to heterogeneous roommates increased outgroup dating amongst Asian American students ($\beta = .26$, $p = .04$, semi-partial $r^2 = .02$). Among White students, exposure to heterogeneous roommates increased the sense of interethnic competence and tended to decrease the sense of unease that White students felt being around students of different ethnic groups ($\beta = .19$, $p = .02$, semi-partial $r^2 = .01$ and $\beta = -.14$, $p = .099$, semi-partial $r^2 = .01$, respectively), tended to increase outgroup dating ($\beta = .17$, $p = .08$, semi-partial $r^2 = .01$), and significantly decreased opposition to intergroup dating and marriage ($\beta = -.20$, $p = .02$, semi-partial $r^2 = .01$). Similarly, being exposed to randomly assigned African American roommates lead both Asian American and White students to have more ethnic heterogeneity amongst their closest friends ($\beta = .13$, $p = .01$, semi-partial $r^2 = .01$ and $\beta = .12$, $p = .02$, semi-partial $r^2 = .01$, respectively). Amongst Asian American students, exposure to Latino roommates also tended to increase positive affect towards Latinos ($\beta = .23$, $p = .09$, semi-partial $r^2 = .01$), and decrease their sense of unease being around students of different ethnic groups ($\beta = -.09$, $p = .09$, semi-partial $r^2 = .01$). However, exposure to randomly assigned Latino roommates

amongst White students decreased outgroup dating ($\beta = -.14$, $p = .03$, semi-partial $r^2 = .02$).

Finally, these group-by-group analyses also allowed us to explore the degree to which exposure to ingroup members actually increased prejudice. Inspection of all forty-four relevant analyses revealed only one potential prejudice-inducing effect due to ingroup exposure: specifically, that exposure to randomly assigned Black roommates amongst Black students increased opposition to interethnic marriage and dating ($\beta = .37$, $p = .03$, semi-partial $r^2 = .06$).⁶ Of the three other significant ingroup exposure effects that were found, all three tended to suggest decreased rather than increased prejudice as a function of ingroup exposure. Thus, the more Blacks were exposed to Black roommates, the lower their levels of symbolic racism were ($\beta = -.41$, $p = .01$, semi-partial $r^2 = .07$). Among Whites, increased exposure to White roommates tended to decrease unease in multiethnic contexts ($\beta = -.12$, $p = .07$, semi-partial $r^2 = .01$). Furthermore, Asian American students showed more outgroup dating as they were assigned to more randomly assigned Asian American roommates ($\beta = .23$, $p = .03$, semi-partial $r^2 = .02$).

A number of other group-specific effects were more difficult to interpret: Amongst Black students, exposure to randomly assigned Latino students actually decreased the sense of competence they felt interacting with students of other ethnic groups ($\beta = -.28$, $p = .02$, semi-partial $r^2 = .06$). Also, exposure to randomly assigned heterogeneous roommates tended to increase Black students' opposition to interethnic marriage and dating ($\beta = .33$, $p = .08$, semi-partial $r^2 = .03$). Among Latino students, exposure to randomly assigned heterogeneous roommates decreased outgroup dating ($\beta = -.26$, $p = .005$, semi-partial $r^2 = .05$).

Summary of experimental effects

Overall, individuals randomly assigned to live with outgroup roommates at the start of their first year of university showed improved intergroup attitudes by the end of this year, consistent with contact theory. The results were most consistent for roommate heterogeneity as a whole. However, the effects of intergroup contact also depended on the ethnic group one came into contact with. Relative to exposure to roommates of other ethnic groups, exposure to African American roommates had a particularly positive effect on respondents' intergroup attitudes, increasing positive affect

⁶ While one could argue that this is a prejudice inducing effect, some would of course argue that such a group oriented response amongst Black students is essential to reach equality for Blacks in American society (Boen & Vanbeselaere, 1998; Burstein, 1989; Swanson, 1992; Taylor & McKirnan, 1984; Van Laar, Sidanius, & Levin, 2004; Wright, Taylor, & Moggaddam, 1990).

towards Blacks, lowering symbolic racism and increasing ethnic heterogeneity of one's friendship circle. Moreover, the beneficial effects of exposure to African American roommates generalized beyond affect toward this group to influence affect toward Latinos as well, and exposure to Latino roommates generalized beyond affect toward this group to influence affect toward African Americans as well. Finally, contrary to contact theory, exposure to Asian American roommates increased certain indicators of prejudice among White and Black respondents. Similar effects were sometimes seen as a response to exposure to White roommates. However, Asian American and White students were themselves positively affected by exposure to Black and Latino roommates, and heterogeneous roommates more generally. Exposure to ingroup roommates had few negative effects amongst respondents.

The effect of voluntary roommate contact on prejudice: A longitudinal test

Because students were allowed to choose their own roommates after the first year, any efforts to assess the effects of interethnic roommate experiences after this point must control for self-selection effects. We controlled for possible self-selection effects by use of hierarchical regression analysis. In all these analyses an indicator of prejudice in the fourth year served as the dependent variable and the first independent variable entered into the analysis was that same indicator of prejudice assessed during the first year. At step 2, average degree of roommate heterogeneity during second and third years and the average number of roommates one had from the four largest ethnic groups during the sec-

ond and third years were entered into the equation in order to see if they could account for a significant amount of change in the dependent variable between the first and fourth years. As shown in Table 3, these results were generally consistent with the expectations of contact theory, and with the experimental results, and again the effect sizes tended to be small (see Cohen, 1988).

Although the effects of overall roommate heterogeneity were not as widespread as they were in the first-year experimental analyses, all statistically significant relationships were consistent with contact theory. Even after controlling for baseline levels of the dependent variables, the ethnic heterogeneity of one's roommates was associated with increased interethnic competence, decreased interethnic unease, decreased symbolic racism, decreased social dominance orientation, and increased degree of interethnic dating.

In contrast to the effects of overall roommate heterogeneity, exposure to roommates from specific ethnic groups had more widespread effects in these analyses than in the first-year experimental test (compare Tables 2 and 3). With one noteworthy exception, these effects were consistent with the expectations of contact theory and generally consistent with the first-year experimental test. Greater exposure to White, Latino and Black roommates during second and third years was associated with more positive affect towards those groups measured in the fourth year (e.g., voluntary exposure to Latino roommates improved affect towards Latinos), as in the experimental analyses. There was evidence of the same generalization effect with respect to Latinos and Blacks found in the first-year experimental analyses. Namely, greater exposure to Black roommates was associated with more positive affect toward Latinos ($\beta = .06$,

Table 3

Ethnic attitudes and behaviors during the fourth year of university as functions of roommate heterogeneity and the number of roommates from specific ethnic groups during the second and third years controlling for first year ethnic attitudes and behaviors

Intergroup attitudes and behaviors during fourth year	Effect of first year attitude/behavior	Roommate variables					R^2 change for roommate variables
		Roommate heterogeneity	# White roommates	# Asian American roommates	# Latino roommates	# Black roommates	
Affect towards Whites	.46***	-.01	.10**	-.02	.01	-.02	.01*
Affect towards Asian Americans	.41***	.05	.04	-.03	.04	-.01	.01n.s.
Affect towards Latinos	.45***	.01	.06 ⁺	-.10**	.08*	.06*	.03***
Affect towards Blacks	.45***	.02	.05	-.09*	.08*	.07*	.03***
Intergroup competence	.27***	.08*	.03	-.05	-.09*	.05	.02**
Intergroup unease	.21***	-.08*	-.00	.11**	.04	-.05	.02**
Symbolic racism	.53***	-.07*	-.06 ⁺	.05 ⁺	-.09**	-.08**	.03***
SDO	.48***	-.08**	-.03	.06 ⁺	-.09**	-.06 ⁺	.03***
Anti-miscegenation	.43***	-.02	.02	.06	-.06 ⁺	.02	.01n.s.
Friendship heterogeneity	.44***	-.05	.10**	-.07*	-.04	-.02	.02***
Degree of outgroup dating	.44***	.10*	.00	-.05	-.05	.04	.02n.s.

Entries in columns 2–7 are standardized multiple regression coefficients.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

⁺ $p < .10$.

$p = .047$, semi-partial $r^2 = .004$), and greater exposure to Latino roommates was associated with more positive affect toward Blacks ($\beta = .08$, $p = .02$, semi-partial $r^2 = .01$). In addition, increased exposure to Latino and Black roommates was associated with decreased levels of symbolic racism ($\beta = -.09$, $p = .005$, semi-partial $r^2 = .01$ and $\beta = -.08$, $p = .005$, semi-partial $r^2 = .01$), and SDO ($\beta = -.09$, $p = .004$, semi-partial $r^2 = .01$ and $\beta = -.06$, $p = .05$, semi-partial $r^2 = .004$, respectively). Increased exposure to White roommates also tended to be associated with decreased levels of symbolic racism, although this coefficient did not reach conventional levels of significance ($\beta = -.06$, $p = .08$, semi-partial $r^2 = .003$). Also, exposure to White roommates was associated with increased levels of friendship heterogeneity ($\beta = .10$, $p = .003$, semi-partial $r^2 = .01$). Unexpectedly, exposure to Latino roommates was associated with a decreased sense of intergroup competence ($\beta = -.09$, $p = .02$, semi-partial $r^2 = .01$).

However, while the bulk of these findings are consistent with contact theory, there is one consistent set of findings that is quite inconsistent with contact theory. Namely, as in the experimental data, the voluntary contact data show that exposure to Asian American roommates had a clear and consistent tendency to increase various forms of prejudice, especially prejudice toward Latinos and Blacks. Specifically, as shown in Table 3, increased exposure to Asian American roommates was associated with: (a) increased unease in intergroup situations ($\beta = .11$, $p = .003$, semi-partial $r^2 = .01$), (b) increased negative affect towards Latinos and Blacks ($\beta = -.10$, $p = .006$, semi-partial $r^2 = .01$ and $\beta = -.09$, $p = .01$, semi-partial $r^2 = .01$, respectively), and (c) decreased ethnic heterogeneity of one's friendships ($\beta = -.07$, $p = .03$, semi-partial $r^2 = .004$). Such exposure also tended to be associated with (d) increased levels of SDO ($\beta = .06$, $p = .06$, semi-partial $r^2 = .004$), and (e) increased symbolic racism ($\beta = .05$, $p = .09$, semi-partial $r^2 = .003$). Thus, the prejudice-inducing effects of exposure to Asian American roommates found in the experimental data were found more consistently in these longitudinal data.

Inspection of these relationships separately within each ethnic group indicated that the relationships between exposure to roommates of a specific group and ethnic attitudes and behaviors were essentially the same regardless of respondents' ethnic group. The size of the relations varied between small, medium and large, with the larger size effects of roommate contact tending to occur for African American and Latino respondents. Thus, as with the analyses for students regardless of ethnic group, we found that overall roommate heterogeneity had very positive effects on students. Among Latino students, increased roommate heterogeneity was associated with lower SDO ($\beta = -.25$, $p = .03$, semi-partial $r^2 = .03$) and increased positive affect towards Latinos,

African Americans, and Asian Americans ($\beta = .24$, $p = .03$, semi-partial $r^2 = .02$; $\beta = .26$, $p = .02$, semi-partial $r^2 = .03$; $\beta = .26$, $p = .02$, semi-partial $r^2 = .05$, respectively). Among Black students, increased roommate heterogeneity was associated with increased outgroup dating ($\beta = .58$, $p = .002$, semi-partial $r^2 = .15$). Also, for Asian American students, increased exposure to heterogeneous roommates was associated with increased competence in interacting with members of different ethnic groups, although the coefficient did not reach conventional levels of significance ($\beta = .13$, $p = .06$, semi-partial $r^2 = .01$).

Again, as with the results for students overall, exposure to White, Latino and Black roommates tended to be associated with positive intergroup attitudes. Thus, among Asian American students, increased exposure to White roommates was associated with decreased symbolic racism ($\beta = -.15$, $p = .006$, semi-partial $r^2 = .01$). Also, for Asian American students, increased exposure to Black roommates was associated with increased outgroup dating ($\beta = .30$, $p < .001$, semi-partial $r^2 = .08$) and increased positive affect toward African Americans, Latinos and Asian Americans ($\beta = .11$, $p = .03$, semi-partial $r^2 = .01$; $\beta = .13$, $p = .009$, semi-partial $r^2 = .02$; and $\beta = .12$, $p = .01$, semi-partial $r^2 = .01$, respectively). For White students, increased exposure to Black roommates was associated with increased outgroup dating ($\beta = .15$, $p = .006$, semi-partial $r^2 = .02$). For White students, increased exposure to Latino students tended to be associated with decreased opposition to interracial dating and marriage, although the coefficient did not reach conventional levels of significance ($\beta = -.10$, $p = .07$, semi-partial $r^2 = .01$). For Asian American students, increased exposure to Latino roommates increased heterogeneity of friends, although the coefficient did not reach conventional levels of significance ($\beta = .09$, $p = .06$, semi-partial $r^2 = .01$). Asian American students who were exposed to Black roommates showed increased positive affect towards Whites, although the coefficient did not reach conventional levels of significance ($\beta = .09$, $p = .08$, semi-partial $r^2 = .01$).

There were some exceptions again to these positive effects. As in the results for students overall, we found that among Asian American students, increased exposure to Latino roommates was associated with increased uneasiness around members of different ethnic groups ($\beta = .12$, $p = .04$, semi-partial $r^2 = .01$). Among Latino students, increased exposure to Black roommates was associated with lowered positive affect towards Whites ($\beta = -.16$, $p = .02$, semi-partial $r^2 = .02$).

We also again found evidence for negative effects of exposure to Asian American roommates. Thus for White students, increased exposure to Asian American students tended to be associated with decreased positive affect towards Latinos, although the coefficient did not

reach conventional levels of significance ($\beta = -.13$, $p = .05$, semi-partial $r^2 = .01$).

These group-by-group analyses also allowed us to examine whether exposure to roommates of one's own ethnic group increased prejudice. Once again, there was little support for this expectation. Ingroup contact effects, to the extent that they existed at all, were almost exclusively associated with decreased rather than increased prejudice, especially among members of the two low-status groups (i.e., Blacks and Latinos). For example, among Latinos, exposure to Latino roommates was associated with: (a) decreased levels of SDO ($\beta = -.22$, $p = .02$, semi-partial $r^2 = .03$) and (b) increased positive affect towards Latinos, Asian Americans, and Blacks ($\beta = .26$, $p = .007$, semi-partial $r^2 = .04$; $\beta = .22$, $p = .03$, semi-partial $r^2 = .03$; $\beta = .28$, $p = .004$, semi-partial $r^2 = .04$, respectively). Similarly, for Blacks, increased exposure to Black roommates was associated with increased positive affect towards Latinos, although the coefficient did not reach conventional levels of significance ($\beta = .30$, $p = .06$, semi-partial $r^2 = .06$). There were only two exceptions to this general trend: Among Whites, increased exposure to White roommates was associated with increased opposition to interracial dating and marriage ($\beta = .12$, $p = .04$, semi-partial $r^2 = .01$), and among Black students, increased exposure to Black and to Latino roommates was associated with decreased outgroup dating ($\beta = -.34$, $p = .03$, semi-partial $r^2 = .07$ and $\beta = -.42$, $p = .005$, semi-partial $r^2 = .13$, respectively).

Why does contact with Asian Americans increase prejudice?

What could be causing the increased prejudice as a result of intensified random and voluntary contact with Asian American students? One obvious possible answer

to this question is peer socialization. Specifically, peer socialization studies indicate that students are likely to modify their attitudes and behaviors to be consistent with those of their peers (Feldman & Newcomb, 1969). If Asian American students have significantly higher levels of prejudice than other students, increased prejudice as a function of contact with them could be the result of an attitude shift in the direction of their higher levels of racism and ethnocentrism. To explore the plausibility of this explanation, we simply calculated average prejudice scores for the students across all five waves—from pre-university to the end of the fourth year. We then conducted a series of planned contrasts using these prejudice scores and contrasted the Asian American students against students from the other three major ethnic groups (i.e., Whites, Latinos, and Blacks; see Table 4). These comparisons were done with respect to seven attitudinal measures of prejudice: (1) interethnic unease, (2) interethnic competence, (3) symbolic racism, (4) social dominance orientation, (5) anti-miscegenation attitudes, (6) affect towards Latinos, and (7) affect towards Blacks. Twenty of the 21 contrasts found Asian American students to have significantly higher prejudice scores than the other major groups. As shown in Table 4, the size of these effects varied between small, medium and large, with the largest differences between Asian American and other students occurring between Asian American and Latino students with regard to affect towards Latinos and between Asian American and Black students with regard to symbolic racism, social dominance orientation and affect towards Black students (Cohen, 1977). Therefore, it seems reasonable to conclude that increasing prejudice as a function of increasing exposure to Asian American roommates is due to students accommodating to the values and attitudes of their more prejudiced Asian American roommates.

Table 4
Contrasts in prejudice measures between Asian Americans vs. Whites, Latinos and Blacks

Prejudice Indices	Asian Americans vs. Whites	Asian Americans vs. Latinos	Asian Americans vs. Blacks
Intergroup unease	.48*** (.51)	.29*** (.31)	.38*** (.40)
Intergroup competence	-.47*** (.39)	-.33*** (.28)	-.48*** (.40)
Symbolic racism	.24*** (.27)	.55*** (.61)	1.28*** (1.42)
SDO	.21*** (.25)	.53*** (.64)	.85*** (1.03)
Anti-miscegenation	.28*** (.29)	.39*** (.41)	.15 (.16)
Affect towards Blacks	-.58*** (.59)	-.71*** (.73)	-1.03*** (1.06)
Affect towards Latinos	-.58*** (.59)	-1.03*** (1.06)	-.70*** (.72)

Entries are mean differences between groups (i.e., the mean for Asian Americans minus the mean for the other group). Entries in parentheses are the absolute values for Cohen's d-coefficient (Cohen, 1977).

*** $p < .001$.

Discussion

The current study examined the effects of living with roommates from ethnic outgroups on affective, cognitive, and behavioral indicators of prejudice among students at a multi-ethnic university. Although there is ample evidence that intergroup contact is associated with prejudice reduction, there is little research definitively demonstrating the direction of this relationship (Pettigrew, 1998; Pettigrew & Tropp, 2000; but see upcoming work by Towles-Schwen, 2003 and Towles-Schwen & Fazio, 2002). This relationship may occur because intergroup contact reduces prejudice, as contact theory predicts. Or it may occur because individuals who are low in prejudice select to engage in more intergroup contact. For this reason, we employed an experimental and a longitudinal design to provide stringent tests of the causal sequence proposed by contact theory. Given that interactions between university roommates are characterized by the conditions thought to facilitate prejudice reduction via intergroup contact (Allport, 1954), we predicted that living with outgroup roommates would reduce prejudice. Overall, the findings tended to support this prediction. However, we also found that the effect of inter-ethnic contact on prejudice depended on the specific ethnic groups that interact.

Most students at the university in which these data were collected were randomly assigned to roommates in their first year. We took advantage of the natural experimental conditions this policy enabled to examine the causal relationship between roommate ethnicity and intergroup attitudes within the first year. The findings indicated that inter-ethnic roommate contact did, indeed, cause reductions in ethnic prejudice. Overall ethnic heterogeneity of roommate contact, or being exposed to a range of different ethnic groups, increased positive affect toward all four ethnic groups that were examined, increased perceived competence in inter-ethnic interactions, somewhat decreased symbolic racism (consistent with the direction of the hypothesis but not statistically significant at the designated alpha level), and significantly decreased anti-miscegenation attitudes.

Over and above these effects, exposure to persons from specific ethnic groups also made independent contributions to prejudice reduction as well. Results from the field experimental test showed that prejudice reduction as a function of roommate contact was most consistent with regard to positive feelings directed toward the ethnic group one's roommate belonged to. Specifically, individuals assigned to live with more roommates of Asian descent had more positive feelings toward Asian Americans, and individuals assigned to live with more African American roommates had more positive feelings toward African Americans.

Since all students were allowed to select their own roommates from the second year onward, responses

provided in years two through four allowed us to test the effect of voluntary long-term contact on prejudice longitudinally. Specifically, we examined the effect of selecting an outgroup roommate in one's second and third year on fourth year intergroup attitudes and behaviors. We controlled for pre-existing attitudes to allow examination of the net effects of living with outgroup roommates. Findings from these analyses also tended to support the predictions of contact theory. Ethnic heterogeneity of one's roommates was associated with increased interethnic competence, decreased interethnic unease, decreased symbolic racism, decreased social dominance orientation, and increased outgroup dating. Roommate contact with members of specific ethnic groups again made independent contributions over and above these effects. With the exception of Asian American roommates, these analyses showed that roommate contact was consistently associated with increased positive feelings directed toward the ethnic group one's roommate belonged to, similar to the experimental test. Choosing to live with more African American or Latino roommates was also associated with lower levels of symbolic racism and social dominance orientation, and again there were cross-over effects between exposure to African American and Latino roommates and affect toward the other group.

As such, both the field experimental and longitudinal tests of contact theory enable us to make stronger claims regarding causality than much existing research on this topic and, therefore, these results represent an important contribution to this literature. Furthermore, the fact that the results from these two different analytic strategies were generally consistent with one another provides further confidence in the assertions of contact theory. These results were found despite the substantial stability of ethnic and racial attitudes, and the use of a very subtle independent variable of roommate contact examined over a period of five years in which students are exposed to many other influences. We thus believe that these effects are very meaningful indeed. As this study has indicated, and as suggested by considerable research in social psychology, small differences in ethnic attitudes and behaviors can have profound influences on the behavioral choices individuals make, and these experiences are likely to further alter ethnic attitudes and behaviors in the direction of the initial leaning (see also Abelson, 1985; Eagly, 1996; Martell, Lane, & Emrich, 1996). Moreover, the sizes of these effects are equivalent to those generally found in other studies of intergroup contact (see Pettigrew & Tropp, 2000 for the most extensive meta-analysis of intergroup contact effects). In the results reported here, the effect sizes varied from small for the experimental effects of contact, to small and medium for changes in ethnic attitudes and behaviors as a result of exposure to self-selected roommates. In their 746 tests of intergroup contact effects, Pettigrew

and Tropp found an average Cohen's d of $-.36$, which qualifies as small and is equivalent to an R^2 of $.03$. Moreover, the subgroup of studies included by Pettigrew and Tropp that involved intergroup contact in housing settings yielded an average Cohen's d of $-.30$. Pettigrew and Tropp found effects of intergroup contact to be generally smaller for minority respondents (mean effect size of $-.29$) than for majority respondents (mean effect size of $-.45$). In contrast, in the analyses we conducted by ethnic group, we found medium and large effects of roommate contact for Black and Latino respondents, whilst the effect sizes for Asian American and White respondents tended to be smaller. Perhaps these strong effects for African American and Latino students occur precisely because in contrast to other kinds of contacts that these minority students have, roommate contacts tend to meet many of the conditions thought to facilitate prejudice reduction via intergroup contact (Allport, 1954): Roommates have equal status, must work cooperatively and have the common goal of maintaining a home environment that is mutually satisfactory. Roommate situations have high acquaintance potential, and the familiarity and mere exposure afforded by living together is likely to generate positive affective ties between roommates. Also, the wide range of activities that roommates share (e.g., studying, talking, and eating) provide them with the opportunity to discover similarities or counter-stereotypic characteristics and behaviors on the part of an outgroup roommate. Finally, it is highly likely that students in this environment will perceive relevant authorities to be supportive of cross-ethnic contact. To the degree that these conditions are harder to satisfy in other intergroup interactions that members of minority groups may have, roommate interactions may be particularly effective forms of contact for minority students.

These results may also suggest some limiting conditions for contact theory. Consistent with the findings of the recent meta-analysis by Pettigrew and Tropp (2000), although roommate contact tended to consistently improve feelings toward involved outgroups, thoughts and behaviors directed toward these groups showed less change (e.g., friendship heterogeneity and miscegenation attitudes). Several factors may have contributed to this limitation. Ironically, living with a member of an outgroup may be too personalized to influence cognitions and behaviors toward that group (Hewstone & Brown, 1986). Our own findings on the effects of White fraternities and sororities indicate that more group level contact may be necessary (Sidanius et al., 2004). While the substantial interdependence required of roommates can be thought to improve the ability of roommate contact to reduce prejudice by instigating common goals and cooperation, it may also inspire attribute-based, rather than group-based processing of one's roommate (Fiske & Depret, 1996; Fiske &

Neuberg, 1990). In addition, students on a university campus may perceive outgroup roommates as exceptions to the stereotypes that guide their thoughts and behaviors toward the group as a whole (Weber & Crocker, 1983). It is only when the individual outgroup members one comes into contact with are thought to be typical members of that group, that thoughts about the group as a whole will change (e.g., Johnston & Hewstone, 1992; Rothbart & John, 1985; Wilder, 1984; but see Hamburger, 1994).

In addition, the findings of this study suggest that while there is a clear tendency for intergroup contact to decrease various kinds of ethnic prejudice, contact with Asian Americans represents an exception to this general trend. The longitudinal analyses showed that exposure to an Asian American roommate was associated with decreased positive affect towards both Latinos and Blacks, increased intergroup unease, increased levels of symbolic racism and social dominance orientation, and decreased ethnic heterogeneity of one's friendships. Similar prejudice augmentation effects of living with an Asian American roommate were hinted at in the experimental tests by ethnic group. These analyses gave indications that exposure to Asian American roommates increased prejudice among White and Black respondents.

Exposure to Asian American roommates may increase prejudice for several reasons. First, because Asian Americans are considered a "model minority" and have achieved intermediate ethnic group status in the United States (Sidanius & Pratto, 1999; Smith, 1991), exposure to members of this ethnic group may increase the likelihood of negative social comparisons between Asian Americans and ethnic groups with lower social status (i.e., African Americans and Latinos; Smith, 1991). Second, the prejudice-inducing effects of exposure to Asian American roommates may also be a matter of peer socialization, social tuning or shared reality processes. As we showed, Asian Americans have significantly higher levels of racial prejudice than the other groups examined, and therefore this prejudice-induction effect may be a matter of accommodating oneself to the attitudes and values of one's Asian American roommates (Feldman & Newcomb, 1969; Hardin & Conley, 2001; Hardin & Higgins, 1996; Higgins & Rholes, 1978; McCann & Hancock, 1983; Lowery, Hardin, & Sinclair, 2001). Although our data do not allow us to examine the origin of these more negative ethnic attitudes and behaviors among Asian American students, they do allow us to eliminate the explanation that these more negative attitudes and behaviors are the result of being recent immigrants and perhaps coming from cultures that have not confronted the history and context of American race relations: Only 3.9% of the Asian American students in the sample had lived in the USA less than five years when they started their first year in the university.

Over and above providing a basic evaluation of contact theory, this study was able to examine several additional questions relevant to contact in a multi-ethnic environment. One such question was whether contact with a member of a given ethnic group also reduced prejudice directed toward other ethnic groups. The current study found evidence of cross-group generalization between Latinos and African Americans. That is, in both the experimental and longitudinal analyses, contact with Latino roommates tended to improve affect toward African Americans and contact with African American roommates tended to improve attitudes toward Latinos. Perhaps generalization was limited to these groups because they were the only two ethnic groups with the same general level of social status that we examined (Smith, 1991). New insights brought about by contact with one low-status group may have influenced understanding of the other low-status group. It also may be the case that friendship patterns among Latinos and African Americans can account for this effect. African Americans are more likely to have Latino friends, and Latinos are more likely to have African American friends, than Asian Americans and Caucasians are (see e.g., Levin et al., 2003). So positive feelings toward the non-roommate group may be brought about by contact with members of that group through repeated visits, parties, etc. Moreover, simply knowing that someone who is close to you has a friend of a particular ethnicity may improve attitudes toward that ethnic group (Wright, Aron, McLaughlin-Volpe, & Ropp, 1997). So knowing that one's Latino roommate has close friends who are African American may be all one needs to experience improved attitudes toward African Americans in general.

Another such question is whether contact with in-group members increases prejudice. An experiment conducted by Wilder and Thompson (1980) found a negative relationship between outgroup contact and prejudice but a positive relationship between ingroup contact and prejudice, suggesting that it was important to look at these different forms of contact separately. Contrary to their results, the experimental test did not yield any support for the notion that exposure to ingroup members increases prejudice. In fact, the findings leaned slightly in the direction of indicating that increased exposure to one's own ingroup decreased rather than increased intergroup prejudice. The longitudinal analyses also provided little support for the notion that ingroup contact results in augmentation of prejudice. We have, however, found negative effects of ingroup contact in a study of the effects of ethnically segregated fraternities and sororities (Sidanius et al. (2004)) and in a study on the consequences of ingroup friendships (Levin et al., 2003). This suggests that the negative effects of ingroup contact may be more likely to occur when ingroup contact is socially oriented, emphasizes self-dis-

closure and/or consumes the bulk of individuals' discretionary time.

As such, the findings of the current study make a significant contribution to the literature on both outgroup and ingroup contact effects. However, despite the many strengths of this study, it is not without some potential limitations. Most importantly, because we examined a large proportion of the incoming class, it is quite likely that a certain number of the respondents in the study were each other's roommates. This fact could introduce dependencies amongst observations. The regression literature suggests that any nonindependence of observations when using regression analysis could make our inferential tests more likely to yield significant results in our favor, but will not change the size or direction of the regression coefficients or effect sizes (Cohen, Cohen, West, & Aiken, 2003). However, given the nature of our population (i.e., university students on one particular campus) and the distance between the independent variable (roommate heterogeneity) and the measurement of the dependent variables (general ethnic attitudes and behaviors, not attitudes towards roommates), any dependence is in fact likely to be minimal and quite characteristic of studies in a population that is closed to any degree (something typical of all social science populations). Finally, and most importantly, it is difficult to imagine how issues of nonindependence can provide an alternative explanation for the results found.

A second issue is whether the observed shifts in attitudes are in fact "true" internalized attitude changes or simply reflect better monitoring and disguising of true attitudes (Jackman, 1978, 1994; Jackman & Muha, 1984; Wellman, 1977). Although we cannot distinguish these effects in the current study, we do find that the changes in intergroup attitudes and behaviors evidenced among students exposed to outgroup roommates occur both among those who were randomly assigned to roommates and among those who chose their roommates. Furthermore, these attitude changes persisted through to the end of university, suggesting that the positive attitudinal and behavioral changes continue to be expressed, regardless of whether they were truly internalized. Either way, to the degree that behavioral changes occur, for example in the ratio of ingroup to outgroup friends, even attitude change that is initially only conformity may eventually result in true reductions in prejudice through cognitive dissonance (Festinger, 1957) or self-perception effects (Bem, 1972), or through the increased attitude change that results from behavioral change (Pettigrew, 1998). Our data of course do not allow us to distinguish among these alternative processes.

In sum, this study suggests that although long-term, intimate interethnic contact is generally an effective means of reducing prejudice, it is not a panacea.

Although living with an outgroup member on a university campus meets the conditions of contact specified by Allport (1954), and is rife with acquaintance potential, the effects of this situation also clearly depend on whom you come in contact with.

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