

## **Empathy or Antipathy? The Consequences of Racially and Socially Diverse Peers on Attitudes and Behaviors**

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## **Abstract**

Mixing across ethnic and class lines could potentially either spur understanding or inflame tensions between groups. We find that white students at a large state university randomly assigned African-American roommates are more likely to endorse affirmative action policies 1½- 3½ years after college entry. Whites randomly assigned minority roommates are more likely to say they have more personal contact with and interact more comfortably with members of minority groups, and they are just as likely to remain close friends with their roommates beyond their initial year. Students become less supportive of higher taxes for the wealthy when they are assigned roommates from high-income backgrounds, and they appear to be more likely to volunteer when assigned roommates from low-income families. Taken together, these results suggest that students become more empathetic with the social groups to which their roommates belong.

## I. INTRODUCTION

The enormous costs of ethnic and class conflict around the world are depressingly familiar. A growing literature documents the political and economic impact of ethnic heterogeneity (Easterly and Levine, 1997; Goldin and Katz, 1997; Mauro, 1995; Poterba, 1997; Alesina, Baqir, and Easterly, 1999). Much less is known, however, about the impact of various policies designed to ameliorate conflict between groups. Some argue that mixing between members of different groups will break down stereotypes and encourage development of deeper understanding, and with it, more empathetic attitudes toward other groups. This view lies behind much of the emphasis on diversity in schools and workplaces. Others argue that efforts to encourage mixing may actually inflame tensions and exacerbate conflict. The debate becomes particularly contentious in the context of affirmative action policies: Gurin (2002) argues that diversity promotes critical thinking and learning among white students, but Thernstrom and Thernstrom (1997) argue that policies that admit minority students with lower test scores reinforce stereotypes and ultimately hurt minorities.

Much of the evidence on these issues comes from examining empirical associations between individuals' contact with members of other groups and their attitudes toward those groups. However, a major problem with this literature is that those who are more tolerant of other groups are likely to choose to associate more with members of those groups, thus making it difficult to determine the direction of causality. An alternative approach relies on laboratory studies, where assignment to treatment is randomized, thus ruling out the possibility of reverse causality. Evidence from a fascinating set of laboratory experiments suggests that interactions with members of other groups in situations of competition can exacerbate conflict, while interactions in situations designed to reward cooperation can improve relations among groups. Yet it is difficult to assess the policy relevance of these laboratory studies, both because they are typically short-term, and because it is

unclear whether real-world situations resemble either the conflictual or the cooperative environments constructed in laboratory experiments.

This paper addresses this issue in one particular real-world context by examining whether attitudes and behaviors change when people of different races and classes are randomly assigned to live together at the start of their first year of college. We choose this environment both because some students are assigned roommates randomly, thus allowing us to identify causal impacts (as in Sacerdote, 2000 and Kremer and Levy, 2003), and because this context is relevant to policy. The debate over affirmative action in education is intense, and much of the discussion revolves around claims regarding the educational benefits of diversity. The key Supreme Court decision on affirmative action, *Regents of the University of California vs. Bakke*, found that racial preferences in admission were not permissible as a way to rectify current or previous discrimination against minorities, but nonetheless upheld affirmative action programs based on the value of diversity to education. The university we examine has a strong affirmative action policy, and exhibits test-score gaps between white and African-American students of about one standard deviation. If affirmative action indeed stigmatizes minority groups, as Thernstrom and Thernstrom (1997) suggest, this context seems as likely a place as any to see the effect.

We find that white students who are randomly assigned African-American roommates are significantly more likely to endorse affirmative action while white students assigned roommates from any minority group are more likely to continue to interact socially with members of other ethnic groups after their first year. In addition, we find that students assigned roommates from high-income families are more likely to believe that the wealthy should not pay higher taxes, and students assigned roommates from low-income families are more likely to do volunteer work. The results suggest that mixing with members of other groups tends to make individuals more empathetic to these groups.

This paper proceeds as follows: Section II reviews the literature on how mixing affects attitudes and behaviors toward other groups; Section III describes the data and measures used in our analysis; Section IV details our results; and a summary and discussion appear in Section V.

## II. BACKGROUND

As discussed above, the literature on the impact on attitudes of mixing across groups can be divided into two branches, one based on correlations in real-world populations and another based on laboratory experiments.<sup>1</sup>

One strand of the correlational suggests that mixing promotes tolerance. Bowen and Bok (1999) show that whites attending elite colleges with higher black enrollment are more likely to know two or more blacks several years beyond the completion of their undergraduate education. Several other studies have found a correlation between working cooperatively with minority groups and positive changes in race-related attitudes among whites (*e.g.*, Gurin *et al.*, 1999; Khmelkov and Hallinan, 1999; Lopez, Gurin, and Nagda, 1998; Pettigrew, 1997; Pratkanis and Turner, 1999).

Gurin's (2002) testimony in the University of Michigan's affirmative-action lawsuit argues that racial diversity encourages students to become conscious learners and critical thinkers. She argues that students attending universities are at a crucial time in their development when they experiment with different social roles, but that only when educational institutions provide sufficiently novel environments that demand departure from previous routines of thinking does complex thinking occur. She cites data indicating that colleges with higher percentage minority enrollments have more students who report discussing racial/ethnic issues, socializing across racial lines, and having close friends in college from other racial backgrounds. Gurin also reports positive

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<sup>1</sup> Separate literature examines the impact of affirmative action policies on minorities.

correlations between interracial interactions on campus and intellectual and academic skills, both civic and racial/cultural engagement, and post-college interracial interaction.

Yet other evidence suggests that school desegregation may increase rather than decrease prejudice between blacks and whites (Stephan, 1978). Lerner and Nagai (1996), Thernstrom and Thernstrom (1997), and McWhorter (2002) argue that affirmative action in college admissions reinforces rather than breaks down stereotypes. Adherents of this view include Bush appointees to the U.S. Commission on Civil Rights (Johnson, 2002).

Previous studies of student attitudes and racial diversity rely on naturally-occurring variation in cross-university minority enrollment, or on within-university variation in engagement in ethnic-studies courses or racially-diverse social settings. Despite attempts to include control variables, these studies are subject to the criticism that selection bias from still-unmeasured factors is producing the observed correlations. Such biases could arise if, for example, students predisposed to diversity in their friendships or eventual work settings are more likely to choose colleges with higher minority enrollments or, once in college, to take ethnic studies courses or choose racially diverse social settings.

A second set of studies, based on laboratory experiments, is not subject to this selection bias. Social psychology experiments designed specifically to look at relations between groups suggests that contact between groups may lead to either strife or tolerance, depending on how experiments manipulate the setting. This is consistent with the more general finding that people generally like familiar things (Bornstein, 1989; Bornstein *et al.*, 1987; Zajonc *et al.*, 1974), but that familiarity with things presented under unpleasant conditions can lead to dislike (Burgess and Sales, 1971; Zajonc *et al.*, 1974; Swap, 1977).

Sherif *et al.* (1961) designed an experiment in which boys at a summer residence camp were divided into two cabins. Each cabin was assigned a name and competitive activities were set up

between the cabins. During the competitions, cabins were raided, members of the opposing team were called names, and lunchroom scuffles between members of the two groups were frequent. To reverse this growing rivalry, the experimenters set up situations where competition would be detrimental to everyone's interests. For example, the single truck available for getting food in town was found to be "stuck" one day and the boys had to figure out how to dislodge it if they were to eat. The crisis made the boys aware of the need for unified action, and they successfully worked together to dislodge the vehicle. After several other similar situations, the boys began to form friendships and bonds across cabins. One interpretation is that while exposure to other groups in conflictual settings can potentially lead to tension, cooperative activities can successfully create links between different groups.

Of course, it is not clear that educational settings typically offer such cooperative activities. Indeed, Aronson (1975) argues that contact between ethnic groups in the traditional classroom environment tends to foster conflict and tense relations, since students may be competing for the teacher's attention and are pitted against one another, with students who are not called on becoming jealous or resentful of the students who are called on. Aronson argues, however, that with appropriate educational reform, exposure to different ethnic groups in the classroom could improve relations between groups.

In a study designed to document this hypothesis, students in treatment classrooms worked together in a "jigsaw classroom" to master material, while control classrooms continued to operate normally. In the jigsaw classrooms, each student in a team was given part of the information to pass the test, and was then responsible for teaching that information to the rest of his or her team. When tested against classrooms that did not use this method, jigsaw classrooms produced more friendships within working groups, regardless of ethnicity, in addition to improving test scores and

self-esteem (Aronson, 1975; Aronson *et al.*, 1978; Aronson and Patnoe, 1997; Johnson and Johnson, 1983; DeVries and Slavin, 1978; Cook, 1990; Slavin and Cooper, 1999).

Although the experimental studies discussed above are not subject to selection bias, they track outcomes over only a short period of time, and are based on artificial laboratory conditions rather than real-world interactions. It is difficult to know whether real-world interactions closely resemble the cooperation-stimulating or competition-stimulating laboratory conditions established by psychologists.

Our analysis combines elements of each tradition: we address concerns about omitted variable bias by taking advantage of randomization in the student assignment process, but examine a particular real-world context. Our data are taken from students entering an academically strong state university in the fall of 1998, 1999 and 2000.

### **III. ROOMMATE ASSIGNMENT, DATA SOURCES, OUTCOME MEASURES, AND DESCRIPTIVE STATISTICS**

#### *III.A. Roommate Assignment*

Given that our analysis relies on randomness in the roommate assignment process, it is worth reviewing this process in some detail. In the spring before entering university, incoming students submit (by mail) housing applications listing basic housing preferences (smoking/non-smoking room, substance-free housing, single/double/triple occupancy, geographic area of campus, and gender composition of corridor), as well as any requests to live in an enrichment residence hall or to be assigned a specific roommate. For some of these preferences, students could list a first, second, and third choice. Students who met the lottery deadline (usually around the end of April) were randomly assigned to their rooms by a computer unless they elected to live in an enrichment residence hall (in which case they submitted an essay to be considered for admission) or selected a



specific roommate (in which case the housing office honored the request as long as it was mutual). Our analysis thus focuses exclusively on those students who were randomly assigned rooms and roommates as part of the lottery process.

Students in the lottery sample are randomly assigned rooms and roommates conditional on gender, cohort and the combination of housing preferences. Hence these roommate assignments should be random within cells defined by the combination of gender and first, second, and third choices of basic housing preferences. All of our analyses control for the student's combination of first choices of housing preferences, which amounts to fixed-effects regressions in which the unit of observation is the cell (*i.e.* combination of values of housing variables plus gender and cohort). We also discuss selective results from fixed-effects models that control for second and third choices. Standard errors are considerably higher in these cases, but we show that key coefficient point estimates, and therefore our conclusions, are largely unaffected by these extensions.

To verify that the housing assignment process was indeed random within cells, we first spoke with housing officers to understand how the assignment process worked and to understand the computer software used to make the assignments. We then reviewed the documentation of the computer software used to make the assignments for the 1997 and 1998 entering cohorts and checked that it truly randomized within cells. Finally, using techniques discussed more fully in Kremer and Levy (2002), we verified that, controlling for all housing preference choices, initial roommates' background characteristics were not significantly correlated. For students in the entering 1998-2000 cohorts, regressions of entering student characteristics on those of their roommates, controlling for the first choice of housing characteristics yielded only 6 significant coefficients (3 positive and 3 negative) out of 140 variables checked. Only 3 of 140 correlations were in the 5% tail of a simulated distribution of correlations under random assignment.<sup>2</sup> As

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<sup>2</sup> This method does not require assuming normality of the errors.

Kremer and Levy discuss, these checks for random assignment have reasonable power. It therefore seems reasonable to assume that controlling for first choices produces a sample that is close enough to random that residual departures from random assignment in the second and third preferences are unlikely to impart serious bias.

It is important to note that when we use the term “roommate” and “floormate” we are referring to the roommate(s) or floormates *initially* assigned to the student when entering the university. If a student changed roommates or residence hall floors, we do not use the information on the new roommates or floormates because this would raise the possibility of self-selection and possibly bias our results.<sup>3</sup> University policy does not allow roommate changes during the first six weeks of classes except for extreme cases such as those involving violence, and strongly discourages any roommate changes during the first year. Less than 5% of students switch roommates during their first year.

### *III.B. Data Sources*

We draw our data from several sources. The university’s housing office provided data on each student’s housing application and housing occupancy. Racial/ethnic, socioeconomic and attitudinal data on students were gathered from the Cooperative Institutional Research Program’s (CIRP) Entering Student Survey, an annual survey of the American higher-education system that was started in 1966 by the American Council on Education and is now conducted jointly by the Council and the University of California, Los Angeles. In the case of the particular university in our study, entering students fill in the survey at an orientation session occurring before classes begin. The large majority of students filled out this survey over the summer, before meeting their roommates, although a few may have met their roommates first.

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<sup>3</sup> For example, one may expect that a student usually would switch to a roommate who is more similar or compatible than the initial roommate. If this is the case, and we used actual roommate (instead of initial roommate) information in our regressions, our peer-effect estimates could reflect self-selection.

The CIRP's questions are wide-ranging and cover socioeconomic background (parental education and income), positive (*e.g.*, extracurricular activities during the last year of high school) and problem (*e.g.*, drinking, smoking) behavior, attitudes toward a wide range of social policies (including affirmative action), goals students have set for themselves, and activities students plan to conduct in the future. Race and ethnicity were asked in the single question: "Are you (mark all that apply): White/Caucasian, African American/Black, American Indian, Asian American/Asian, Mexican American/Chicano, Puerto Rican, Other Latino, Other." We coded as "white" respondents who marked only the first category, "black" respondents who marked only the second category and "Asian" respondents who marked only the fourth category. For our "Hispanic" designation we included respondents who gave "Mexican American/Chicano," "Puerto Rican," or "Other Latino" and gave no other response. All respondents marking more than one category, marking "American Indian," or marking "Other" fall into our "other" category.<sup>4</sup>

CIRP measures used as control variables in our regressions include both self and average roommate responses to questions about: i) years of father's education; ii) years of mother's education; iii) high school grade point average; and iv) family income collapsed to the intervals of <\$50,000, \$50,000 - \$74,999, \$75,000 - \$149,999 (used as the reference category), \$150,000-\$199,999, and \$200,000 or more. We use CIRP data on affirmative action and other attitudes as baseline controls in our estimates of the effects of roommate assignment on subsequently measured attitudes.

We also controlled for respondents' and roommates' high school test scores. Since some students took only the SAT, others took only the ACT, and some took both, a common admissions test score measure was needed as an academic background variable. We therefore standardized test scores using the ACT scale based on concordance tables (published by both ACT, Inc. and the

College Board), which are used by many admissions offices around the country (including the admissions office of the university used in this study).

Outcome measures in our paper are drawn from a survey we administered to students who entered the university in the falls of 1998, 1999, and 2000 and were randomly assigned roommates. The timing of our survey (winter/spring of 2002) provides us with data when students were more than halfway through their 2nd, 3rd, and 4th years. The survey was administered via the Internet with a follow-up phone call to maximize response rates. The survey repeated many of the attitudinal and behavioral questions asked in the entering student CIRP survey and also asked about how long the student continued to reside with his or her originally assigned roommates as well as the nature of those relationships at the time of the survey.

Of all entering students in the 1998-2000 cohorts, 89-90% completed the CIRP survey. Of the 10,268 CIRP respondents, 2,232 opted to live in enrichment residence halls, 2,029 requested a roommate, 724 requested to live alone during their first year, 4,134 failed to meet the lottery deadline, and 42 otherwise-eligible students were not assigned a roommate, leaving 1,107 students eligible for our lottery sample (see Table 1). 918 of these students designated themselves as “white.” The follow-up survey response rate among this sample was 74% and produced an analysis sample of 682. Missing data on individual survey items reduced this case count further. We return to the issue of possible nonresponse bias below.

Questions on racial attitudes in the survey ask for strong agreement (coded as 4), agreement (3), disagreement (2), or strong disagreement (1) with the following statements: i) “Affirmative action in college admission should be abolished,” ii) “Affirmative action is justified if it ensures a diverse student body on college campuses,” and iii) “Having a diverse student body is essential for

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<sup>4</sup> Some 94 percent of students choosing “African American/Black” gave it as their only response.

high quality education.”<sup>5</sup> The first of these items was also asked with identical wording on the 1999 and 2000 entering-student CIRP survey, but was not included in the CIRP survey administered to the 1998 entering students. Respondents were also asked to specify the number of times per month when “I have personal contact with people from other racial/ethnic groups” and whether “I interact comfortably with people from other racial/ethnic groups.” Finally, we examined responses to endorsement of the imperative of “helping to promote racial understanding.”<sup>6</sup>

On the issue of roommate socioeconomic status, we included as an outcome student endorsement of “Wealthy people should pay more taxes,” which was also asked with identical wording on the entering-student CIRP survey. The follow-up survey also asked how often the respondent did “volunteer work.” In all cases responses were converted to standardized scores through dividing by the sample standard deviation and scaling so the positive scores indicated more “liberal” attitudes and behaviors.

Since a number of these and related questions were included in the entering-student CIRP survey, we include baseline controls for responses (also standardized and scaled in a “liberal” direction) to the following statements: i) “Race discrimination is no longer a problem”; ii) “Colleges should prohibit racist/sexist speech on campus”; iii) “Affirmative action in college admissions should be abolished”; and iv) “Wealthy people should pay more taxes.”

### *III.C. Descriptive statistics*

Table 2 shows descriptive statistics for entering students, and Appendix Table 1 shows comparable data for roommates and floormates as well as follow-up survey-based measures. The affluent nature of the white respondent sample is reflected in the high average levels of paternal

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<sup>5</sup> We explored with factor analysis whether these or any other attitudinal items could be combined into an index, but in no case were the correlations among three items high enough to warrant this.

<sup>6</sup> The responses to this scale consisted of the categories “essential” (coded as 4), “very important” (3), “somewhat important” (2), and “not important” (1).

(16.4 years) and maternal (15.9 years) education and the very small fraction of students coming from families with incomes under \$50,000. Test scores and high school grade-point averages are high. Most entering students agree that racial discrimination is still a problem and do not think that affirmative action policies should be abolished. Attitudes toward redistributive taxation fall in the middle of the scale. As shown by the descriptive statistics for our dependent variables (Appendix Table 1), measured when white students were re-interviewed in our web-based survey, their attitudes had become somewhat more liberal. Cross-racial/ethnic contact and comfort levels are quite high.

Only 21 of the 682 white respondents were randomly assigned black roommates.<sup>7</sup> Corresponding numbers of whites assigned Asian, Hispanic or other race roommates are 45, 21, and 30. This greatly limits the precision of our estimates of roommate impacts. In general, given the small sample size, the statistical precision of our estimates is greatest when we can control for pre-existing variation in attitudes using the CIRP. However, the effects we estimate are sometimes large enough to attain statistical significance at conventional levels.

Differences between students who met the lottery deadline and did not request roommates and the rest of the students in the university should not bias our estimates of peer effects within the lottery sample but could potentially make it difficult to generalize our results to the larger university population. Despite the considerable statistical power, a comparison of white follow-up survey respondents with the much larger sample of white students who failed to meet the lottery criteria reveals few statistically significant differences (columns 1 and 2 of Table 2). Respondents had a slightly higher high school GPA (3.79 vs. 3.77) and were less likely to come from very high-income families (12.8% vs. 17.2%).

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<sup>7</sup> As shown in Table 2, 28 blacks in all were randomly assigned roommates. Not all were assigned to white roommates and not all of the white roommates to whom they were assigned responded to the follow-up survey. Our analysis does not require follow-up survey responses from black roommates.

Columns 4 and 5 show differences in initial characteristics between respondents and non-respondents to the follow-up survey. Respondents come from lower-income and less-educated parental families, have somewhat higher test scores and high school grades, are less likely to endorse the affirmative action item, and somewhat more likely to endorse higher taxes for the wealthy. We explore possible non-response bias below.

The sixth and seventh columns show summary statistics for all blacks in the random-assignment roommate pool, and differences between white and black students. There are no significant socioeconomic differences between white respondents to the follow-up survey and all black students in the random-assignment roommate pool (Columns 1 and 6). However, test scores and high school grade-point averages are more than a standard deviation higher for whites than blacks. There is a large difference in endorsing affirmative action policies, with blacks more than two standard deviations more likely than whites to endorse such policies.

Blacks in the lottery sample were significantly more affluent than the larger group of entering black students not opting for random assignment and they have marginally less positive attitudes toward affirmative action and higher taxes for the wealthy (columns 6, 8, and 9). This raises questions about the extent to which results would generalize to whites rooming with blacks from lower SES backgrounds. The under-representation of blacks in the lottery sample leaves open the possibility that those blacks who opted to participate in the housing lottery were particularly willing to live with a white roommate. The nature of the data does not allow us to avoid this type of selection. It is worth noting, however, that our results have policy relevance despite this element of selection, since they indicate the effect on whites of interacting with black students who are comfortable living with white students. Rarely have policy-makers suggested that students be forced to live with students of other races or ethnicities.

## IV. RESULTS

### *IV.A. Affirmative Action and Racial Integration Attitudes*

Endorsement of affirmative action questions was one half to two-thirds of a standard deviation higher among whites who were randomly assigned black roommates than among whites not assigned black roommates (Table 3). Each column in this table constitutes a separate regression in which the given dependent variable is regressed on the set of respondent, roommate, and floormate measures listed in the rows of the table. Huber-White methods adjust standard errors for the clustered nature of our roommate data. Despite the relatively low statistical power of the sample, all three of these effects were statistically significant at  $p < .06$ .<sup>8</sup> There is also some evidence that greater numbers of black floormates (who are not also roommates) are associated with more liberal attitudes toward affirmative actions policies. The black floormate effect was statistically significant in the case of responses to “affirmative action is justified if it ensures a diverse student body on college campuses” and positive but statistically insignificant for the other two models.<sup>9</sup>

None of the other roommate ethnic classifications was predictive of endorsing affirmative action policies, nor was a single dummy variable combining all non-white ethnic categories (results at the bottom of Table 3). None of the other roommate or floormate characteristic was a consistently significant predictor of affirmative-action attitudes. Roommate high-school-grade-point average was a marginally significant (negative) predictor in the first but not the subsequent two models.

Not unexpectedly, the respondent’s own prior responses to affirmative action and income redistribution questions in the entering-student CIRP questionnaire were significant predictors of

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<sup>8</sup> The p-level of the second item was .055.

<sup>9</sup> We also estimated “threshold” models in which the floormate measure was whether there were any black students on the floor. In two cases the relevant coefficient exceeded its standard error, but in no case was it statistically significant.



affirmative action responses 1½ to 3½ years later. The respondent's own test scores had an inconsistently negative impact on current affirmative action attitudes, while maternal schooling had an inconsistently positive association with them.

Students assigned minority roommates during their first year are significantly more likely to report comfortable interactions and personal contact with members of other racial/ethnic groups in later years (results shown at the bottom of Table 4). Disaggregating roommate minority classification (first four rows of Table 4) produces sizable coefficients for all roommate categories other than Hispanic, and statistically significant coefficients in the case of roommates that were multi-racial or classified themselves as "other race" for both outcomes and for Asian roommates for the "interact comfortably" item.

The pattern of coefficients on the floormate composition variables is generally positive for the Asian and "other race" category but negative for black floormates. The latter result is consistent with research on whites' housing preferences indicating that whites are comfortable with some but not large concentrations of black neighbors (Krysan and Farley, 2002). Another possibility is that the effects of the relatively weak type of exposure associated with floormates differ from that associated with the more intense exposure to roommates. Still another is that there is actually less interaction across racial lines when each racial group is numerous enough to form its own subculture.

Having a black roommate had no substantial association with endorsement of the imperative to "help promote racial understanding" (Table 4). Similar null results (not shown in tables) were found in the case of imperatives regarding "helping others who are in difficulty," "working to eliminate discrimination against people of color," "participating actively in civil rights organizations," and "helping to promote racial understanding."

#### *IV.B. Economic Attitudes*

Respondents with at least one roommate with parental income of \$200,000 or more were about one-third standard deviation less supportive of the statement that "wealthy people should pay more taxes" (Table 3). Having a black roommate has no independent effect on these attitudes, which is not particularly surprising given that the blacks in this sample are almost as affluent as whites. Respondents who themselves came from high-income parental families were nearly half a standard deviation less likely to endorse increased taxation of the wealthy. There were almost no differences across respondents in other family income categories.<sup>10</sup>

There is suggestive evidence that having a low-income roommate increases volunteer work (Table 4). Not shown in Table 4 are comparable regression results for the frequency of "tutored another student." In this regression the coefficient on the low-income category was positive and exceeded its standard error, but was not statistically significant at conventional levels. Having been assigned a black roommate is not predictive of these outcomes.

#### *IV.C. Extensions*

Although roommates were randomly assigned on the basis of their first, second and third choice of housing characteristics, our analysis included fixed-effect controls only for their first choices. We also estimated models with fixed-effect controls for a full set of models with first and second and first, second and third choices. This reduces power dramatically because there are many possible combinations of first, second and third choices of housing characteristics. Key coefficients changed relatively little, but standard errors increased markedly, particularly in the case of controls for categories representing combinations of all three sets of preferences. For example, the coefficient and standard error on having a black roommate for the reverse coded and

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<sup>10</sup> There were very few instances where either respondents or their roommates had incomes below or near the poverty line.

standardized “affirmative action should be abolished” item was .631 (.286). Fixed-effects controls for first and second preferences changed these numbers to .616 (.365), while fixed-effects controls for all three sets of preferences increased them to .713 (.797). Similar patterns emerged for the other affirmative action items. In the case of the “wealthy people should pay more taxes” item, the coefficients and standard error in Table 3 on having a roommate from a high-income background was -.311 (.127). Fixed-effects controls for first and second preferences increased these numbers to -.314 (.185), while fixed-effects controls for all three sets of preferences changed them to -.208 (.373).

Although the power was not very high, we estimated separate models for male and female respondents and failed to find significant gender differences in the coefficients on the key roommate characteristic variables.

Given the much stronger endorsement of affirmative action policies among black first-year students than among white first-year students, it is possible that the apparent race-of-roommate effect on whites’ endorsement of affirmative action policies in the follow-up survey results from merely having been assigned roommates with more positive affirmative action attitudes. We tested for this by including in the first three regressions listed in Table 3 measures of initially-assigned roommates’ CIRP-based attitudes on affirmative action and higher taxes for the wealthy. The key coefficients on roommates’ race increased slightly in size and remained statistically significant, providing no evidence that initial roommates’ attitudes account for the race-of-roommate effect.

We tested for whether the positive impacts on affirmative action attitudes of having black roommates changed over time or over cohorts by interacting “whether black roommates” with cohort. The standard errors on these interactions were quite large. None of the relevant coefficients approach conventional levels of statistical significance, nor was their pattern monotonic across cohorts.

The SES differences between white respondents and non-respondents to our follow-up survey lead us to attempt to adjust for possible non-response bias. We did this in two ways. First, we estimated a Heckman two-step model in which the first stage model predicted response status among the 918 white students eligible for the survey, and the second stage estimated the first three regression listed in Table 3, and the first regression in Table 4. Since it proved impossible to estimate the model with fixed effects based on all possible combinations of first rooming preferences, we instead estimated a model that included the preference variables as a set of additive dummy variables. In no case did the key coefficients on having black roommates change by more than .03. The coefficient on having a roommate from a high-income background fell by .09.

Our second approach to non-response bias was to develop a set of non-response weights and then re-estimate the regressions in Tables 3 and 4 using those weights. To locate sample subgroups that differed maximally in terms of response rates, we used a very flexible search algorithm (the CHAID option in SPSS's ANSWER TREE).<sup>11</sup> Response rates range from 63% for high-income whites to 95% for not-highest-income males who favored higher taxes for the wealthy in the CIRP. We used the inverse of the response rates for the subgroups to weight the regression results in Tables 3 and 4. None of the key coefficients changed by more than .03.

The follow-up survey asked respondents how long they had lived with their roommates, how often they socialized with their initial roommates both during the first year and in the twelve months prior to the follow-up survey, and how friendly they still are with their initial roommates. Unfortunately, these questions were not asked for each specific randomly-assigned roommate, so it was necessary to restrict the sample of white students from the 682 who responded to the follow-up survey to the 613 white students who had only one roommate. The vast majority (525 or 86%) had white roommates; 11 had black roommates, 39 had Asian roommates, 16 had Hispanic roommates

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<sup>11</sup> Details are available from the authors upon request.

and 22 had “other” race roommates. We found statistically significant differences in neither frequency of subsequent interactions with roommates according to the race of roommates nor taking all minority roommates together. For example, 10% of whites with white roommates but 18% of whites with black roommates considered these roommates to be their “best college friend.” Equal fractions (36% and 38%, respectively) were either “not in touch” or “did not get along” with these roommates. Roughly equal fractions (19% and 18%) had socialized more than once a week with their first-year roommates in the past year, while 57% and 46% had socialized more than once a week with their initial roommates during their first year. Keeping in mind the low power for this analysis, there did not appear to be appreciable differences in the duration or nature of friendships white students struck with white and black roommates.

Finally we wondered whether there was any broader evidence that attitudes of upper classmen are influenced by their first year roommates. Correlations between follow-up survey responses and roommates’ initial attitudes are quite low, at .01 for the affirmative action item and .06 for whether the wealthy should be taxed more. Correlations between attitudes of follow-up respondents and their roommates’ freshman responses on criminal rights, legalized abortion, the death penalty, causal sex, legalizing marijuana, legal sanctions against homosexuality, employee drug testing and the legal rights of same-sex couples were also low, ranging from -.01 to .14.

## **V. SUMMARY AND DISCUSSION**

This paper assesses the magnitude of peer effects in the context of living arrangements at a large state university. It addresses an important methodological problem—self-selection—present in most of the existing literature by exploiting a natural experiment in which people are randomly assigned to their peers. We find that white students with African-American roommates express more positive attitudes regarding affirmative action policies 1½- 3½ years after college entry than

white students assigned white roommates. Students assigned roommates from high-income backgrounds are less likely to believe wealthy people should pay more taxes. Roommate characteristics had less certain effects on behaviors. There was some evidence that roommates with diverse racial and ethnic backgrounds influenced whites' subsequent contact and comfort levels with people from other racial/ethnic groups, as well as evidence that students with lower-income roommates are more likely to engage subsequently in volunteer work.

One story that is consistent with these results is that students become more sympathetic to social policies directly related to the social groups to which their roommates belong, with supportive racial attitudes toward affirmative action being most closely associated with roommates' race, and attitudes towards higher taxes for the wealthy more closely associated with roommates' family income. These findings are consistent with the evidence from social psychology that having close personal interactions with people from different groups leads to a greater understanding of, and empathy with, such people (Stephan and Finlay, 1999; Lopez *et al.*, 1998; Pettigrew, 1997). The fact that these effects are stronger for attitudes toward affirmative action rather than values such as a willingness to endorse imperatives of working to eliminate discrimination and helping to promote racial understanding could reflect the fact that university affirmative action policies were being hotly debated while these students were enrolled.

Advocates of integration and affirmative action argue that exposure to minority students promotes racial tolerance among whites. Affirmative action opponents argue that accepting more minority applicants than would be admitted under a purely test-score based process reinforces racial stereotypes and ultimately hurts minorities. Although African-Americans have lower high school grades and standardized test scores in the university we study, our evidence suggests that whites randomly assigned African-American roommates in college become more favorable towards affirmative action. It is worth bearing in mind, however, that we can examine only the effect on

individuals of being randomly assigned a roommate—we can identify neither the general equilibrium effects of affirmative action nor the impacts of affirmative action programs on attitudes.

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Table 1  
Sample Attrition

	1998 to 2000 Total	1998	1999	2000
Response rate on CIRP survey for all entering students		89%	90%	n/a
<b>Number of students responding to CIRP survey</b>	10,268	3,573	3,419	3,276
Of which: students opting to live in enrichment dormitories	2,232	920	633	679
Of which: students requesting a specific roommate.	2,029	755	662	612
Of which: students failing to meet the lottery deadline	4,134	1,166	1,615	1,353
Of which: students living alone during the first year.	724	273	215	236
Of which: students not assigned roommates	42	5	12	25
<b>Total number of students randomly assigned roommates</b>	1,107	454	282	371
<b>Of which:</b>				
Students designated race as "black" only	28	8	8	12
Students designated race as "white" only	918	377	236	305
Students designated race as "Hispanic" (see text)	35	14	7	14
Students designated race as "Asian" (see text)	77	34	19	24
Students with other racial designations	49	21	12	16
<b>Target sample of white students opting for random assignment</b>	918	377	236	305
<b>Of which :</b>				
failed to respond to follow-up survey	236	91	75	70
<b>Final white analysis sample</b>	682	286	161	235

Table 2  
Means and Standard Deviations of Individual, Roommate and Floormate Characteristics (Independent Variables)  
and of White Upperclassmen Attitudes and Behaviors (Dependent Variables)

<i>Independent variables</i>	White respondents to the follow-up survey (all randomly-assigned roommates) (1) Mean	White respondents to CIRP Entering Survey (not randomly-assigned roommates) (2) Mean	p value of (2) minus (1) using t or chi-square test (3)	White randomly assigned roommates who FAILED to respond to the follow-up survey (4) Mean	p value of (4) minus (1) using t or chi-square test (5)	Blacks randomly-assigned roommates (6) Mean	p value of (6) minus (1) using t or chi-square test (7)	Black respondents to CIRP Entering Survey (not randomly-assigned roommates) (8) Mean	p value of (8) minus (6) using t or chi-square test (9)
<b>Respondent (all gathered in entering student survey)</b>									
Race discrimination is no longer a problem (reversed)	3.160 (.719)	3.156 (.728)	.891	3.189 (.752)	.598	3.472 (.633)	.024	3.620 (.632)	.226
Wealthy people should pay more taxes	2.476 (.912)	2.446 (.913)	.413	2.337 (.822)	.039	2.304 (1.117)	.333	2.678 (.879)	.030
Colleges should prohibit racist/sexist speech on campus	2.369 (.923)	2.413 (.943)	.244	2.451 (.918)	.239	2.500 (1.036)	.464	2.839 (.991)	.078
Affirmative action in college admissions should be abolished (reversed)	2.073 (.665)	2.040 (.719)	.250	2.193 (.675)	.018	3.450 (.507)	.000	3.258 (.647)	.122
Father's Education	16.386 (1.975)	16.425 (1.950)	.619	16.651 (1.727)	.067	16.714 (1.584)	.386	15.051 (2.383)	.000
Mother's Education	15.837 (2.033)	15.947 (1.966)	.165	16.115 (1.744)	.061	16.214 (1.950)	.336	15.045 (2.179)	.006
High School Grade Point Average	3.792 (.248)	3.766 (.273)	.017	3.755 (.277)	.056	3.504 (.356)	.000	3.480 (.431)	.772
Test Scores (ACT Scale)	28.391 (2.609)	28.451 (2.844)	.597	27.890 (2.548)	.011	25.367 (2.993)	.000	23.978 (3.579)	.044
Family Income < \$50,000	.094 (.292)	.106 (.308)	.030	.051 (.220)	.007	.071 (.262)	.691	.380 (.486)	.000
Family income \$50,000 to \$74,999	.151 (.358)	.146 (.353)		.144 (.352)		.214 (.418)		.191 (.394)	
Family income is \$75,000 to \$149,999	.400 (.490)	.369 (.483)		.369 (.483)		.393 (.497)		.271 (.445)	
Family income \$150,000 to \$199,999	.113 (.317)	.102 (.303)		.114 (.319)		.107 (.315)		.040 (.195)	
Family income > \$200,000	.128 (.334)	.172 (.378)		.220 (.415)		.179 (.390)		.033 (.179)	
	n=682	n=6842		n=236		n=28		n=606	

Table 3  
 OLS Regression Coefficients and Standard Errors for  
 Individual, Roommate and Floormate Predictors of Attitudes and Behaviors of  
 White Upperclassmen

	Affirmative action in college admission should be abolished (reversed coding)		Affirmative action is justified if it ensures a diverse student body on college campuses		Having a diverse student body is essential for high quality education		Wealthy people should pay more taxes	
<b>ROOMMATES (all gathered in entering student survey)</b>								
Any Black Roommate	.631 **	(.286)	.457 *	(.237)	.647 ***	(.217)	.258	(.302)
Any Asian Roommate	.006	(.209)	.173	(.189)	.205	(.189)	-.058	(.163)
Any Hispanic Roommate	-.090	(.279)	-.058	(.209)	-.038	(.193)	-.432	(.312)
Any Other Race or Multi-Racial Roommate	.072	(.256)	.132	(.245)	-.257	(.244)	-.049	(.238)
Father's Education	.002	(.030)	.012	(.029)	.010	(.026)	-.017	(.027)
Mother's Education	-.013	(.029)	-.010	(.025)	-.010	(.025)	.032	(.024)
Roommates' Average High School Grade Point Average	-.320 *	(.172)	-.149	(.168)	.066	(.165)	.049	(.163)
Roommates' Average Test Scores (ACT Scores)	.002	(.020)	.006	(.020)	-.004	(.019)	.020	(.018)
At least one roommate with family income < \$50,000	.063	(.171)	.003	(.179)	.158	(.145)	.033	(.161)
At least one roommate with family income \$50,000 to \$74,999	-.083	(.148)	.056	(.145)	-.069	(.146)	-.096	(.122)
At least one roommate with family income \$75,000 to \$149,999	Omitted		Omitted		Omitted		Omitted	
At least one roommate with family income \$150,000-\$199,999	.003	(.147)	.078	(.144)	.026	(.130)	.128	(.124)
At least one roommate with family income > \$200,000	-.008	(.135)	-.080	(.135)	.015	(.130)	-.311 **	(.127)
<b>RESPONDENT (all gathered in entering student survey)</b>								
Race discrimination is no longer a problem (reversed)	.143 **	(.071)	.057	(.069)	.117	(.073)	.127 *	(.070)
Wealthy people should pay more taxes	.245 ***	(.056)	.198 ***	(.056)	.165 ***	(.051)	.517 ***	(.048)
Colleges should prohibit racist/sexist speech on campus (reversed)	-.061	(.050)	-.061	(.047)	.019	(.046)	.005	(.046)
	.282 ***	(.075)	.227 ***	(.068)	.064	(.076)	.076	(.069)
Father's Education	.019	(.029)	.039	(.027)	.022	(.028)	-.006	(.026)
Mother's Education	.057 **	(.027)	.050 *	(.027)	.006	(.026)	.050 **	(.025)
High School Grade Point Average	.083	(.206)	.266	(.203)	-.001	(.203)	.175	(.207)
Test Scores (ACT Scale)	-.010	(.022)	-.043 **	(.021)	-.020	(.020)	-.022	(.017)
Family income < \$50,000	.008	(.196)	.036	(.178)	.153	(.162)	.141	(.157)
Family income \$50,000 to \$74,999	.015	(.164)	-.059	(.149)	-.125	(.145)	-.034	(.136)
Family income \$75,000 to \$149,999	Omitted		Omitted		Omitted		Omitted	
Family Income \$150,000 to \$199,999	.082	(.149)	-.002	(.148)	.133	(.136)	-.008	(.144)
Family Income > \$200,000	-.115	(.159)	-.153	(.177)	.040	(.160)	-.494 ***	(.154)
<b>FLOORMATES (all gathered in entering student survey)</b>								
% of floormates that are Black	.006	(.011)	.025 **	(.011)	.012	(.010)	.017 *	(.009)
% of floormates that are Asian	.001	(.008)	.004	(.008)	.008	(.007)	.003	(.006)
% of floormates that are Hispanic	-.002	(.014)	-.013	(.013)	-.011	(.012)	-.010	(.008)
% of floormates that are "Other Race or Multi-Racial"	.005	(.010)	.001	(.009)	.009	(.007)	.003	(.007)
% of floormates with family income > \$200,000	.005	(.008)	.008	(.008)	.003	(.008)	.015 **	(.007)
	N=627;		N=637;		N=670;		N=601;	
	R <sup>2</sup> =0.433		R <sup>2</sup> =0.459		R <sup>2</sup> =0.445		R <sup>2</sup> =0.576	
<b>Alternative Regression Model (Other coef. not shown)</b>								
Any Non-White Roommate	.092	(.135)	.161	(.124)	.116	(.124)	-.064	(.120)
P-value of F-test on R-square increase when adding Roommates' Characteristics		0.64		0.85		0.66		0.06
P-value of F-test on R-square increase when adding Floormates' Characteristics		0.96		0.12		0.34		0.10
P-value of F-test on R-square increase when adding both Roommates and Floormates' Characteristics		0.88		0.95		0.58		0.03

Notes:

All regressions include housing preferences, gender, cohort, test taken; values not shown.  
 Missing values assigned to the mean and controlled for by missing value indicators; values not shown.  
 Standard errors adjusted for room clustering using Huber-White robust estimations.  
 Floormates exclude respondent and his/her roommates  
 Significance levels: \*\*\* (p<=.01) \*\* (p<=.05) \* (p<=.10).

Table 4  
 OLS Regression Coefficients and Standard Errors for  
 Individual, Roommate and Floormate Predictors of Attitudes and Behaviors of  
 White Upperclassmen

	I have personal contact with people from other racial/ethnic groups		I interact comfortably with people from other racial/ethnic groups		The imperative of helping to promote racial understanding		Frequency of doing volunteer work	
<b>ROOMMATES (all gathered in entering student survey)</b>								
Any Black Roommate	.242	(.312)	.227	(.324)	.086	(.442)	-.043	(.293)
Any Asian Roommate	.185	(.190)	.427 **	(.178)	.164	(.177)	-.117	(.191)
Any Hispanic Roommate	-.071	(.376)	.063	(.349)	.172	(.227)	-.291	(.210)
Any Other Race or Multi-Racial Roommate	.612 ***	(.193)	.574 ***	(.183)	.061	(.269)	.016	(.331)
Father's Education	.013	(.031)	.036	(.030)	-.025	(.032)	.034	(.030)
Mother's Education	.030	(.031)	.035	(.031)	-.024	(.027)	.006	(.030)
Roommates' Average High School Grade Point Average	-.015	(.200)	.044	(.195)	-.038	(.188)	-.291	(.233)
Roommates' Average Test Scores (ACT Scores)	.011	(.021)	.008	(.019)	.013	(.020)	.008	(.023)
At least one roommate with family income < \$50,000	.134	(.176)	.105	(.185)	.235	(.169)	.443 *	(.237)
At least one roommate with family income \$50,000 to \$74,999	.102	(.145)	.088	(.148)	-.023	(.152)	.205	(.145)
At least one roommate with family income \$75,000 to \$149,999	Omitted		Omitted		Omitted		Omitted	
At least one roommate with family income \$150,000-\$199,999	-.018	(.158)	.056	(.166)	-.078	(.127)	-.011	(.140)
At least one roommate with family income > \$200,000	.023	(.147)	.206	(.130)	-.089	(.142)	-.004	(.121)
<b>RESPONDENT (all gathered in entering student survey)</b>								
Race discrimination is no longer a problem (reversed)	.032	(.075)	.049	(.076)	.139 *	(.071)	-.059	(.076)
Wealthy people should pay more taxes	.000	(.055)	-.023	(.053)	.136 **	(.055)	.018	(.055)
Colleges should prohibit racist/sexist speech on campus (reversed)	.037	(.052)	.085	(.053)	.030	(.049)	-.016	(.051)
	.037	(.081)	.101	(.078)	.075	(.065)	-.017	(.058)
Father's Education	.029	(.030)	.025	(.029)	.027	(.032)	.004	(.024)
Mother's Education	-.007	(.030)	.004	(.029)	-.017	(.026)	.005	(.027)
High School Grade Point Average	.179	(.221)	.140	(.228)	.098	(.189)	.358 *	(.189)
Test Scores (ACT Scale)	.005	(.021)	.018	(.020)	-.003	(.022)	-.018	(.019)
Family income < \$50,000	.274 *	(.159)	.152	(.165)	-.089	(.208)	-.088	(.178)
Family income \$50,000 to \$74,999	-.067	(.162)	.053	(.154)	-.020	(.149)	.223	(.143)
Family income \$75,000 to \$149,999	Omitted		Omitted		Omitted		Omitted	
Family Income \$150,000 to \$199,999	-.262	(.166)	-.376 **	(.162)	-.248	(.167)	.084	(.165)
Family Income > \$200,000	-.209	(.182)	-.185	(.173)	-.160	(.150)	.240	(.200)
<b>FLOORMATES (all gathered in entering student survey)</b>								
% of floormates that are Black	-.013	(.012)	-.021 *	(.012)	.006	(.011)	-.003	(.009)
% of floormates that are Asian	.016 **	(.008)	.010	(.007)	.003	(.007)	-.013 *	(.007)
% of floormates that are Hispanic	-.012	(.012)	-.012	(.012)	-.008	(.012)	-.001	(.010)
% of floormates that are "Other Race or Multi-Racial"	.009	(.008)	.015 **	(.007)	-.001	(.010)	.004	(.008)
% of floormates with family income > \$200,000	-.007	(.008)	-.006	(.008)	.005	(.007)	.006	(.008)
	N=679;		N=678;		N=659;		N=675;	
	R <sup>2</sup> = 0.287		R <sup>2</sup> =0.313		R <sup>2</sup> = 0.405		R <sup>2</sup> =0.295	
<b>Alternative Regression Model (Other coef. not shown)</b>								
Any Non-White Roommate	.241 *	(.144)	.363 ***	(.135)	.132	(.134)	-.110	(.143)
P-value of F-test on R-square increase when adding Roommates' Characteristics		0.72		0.18		0.60		0.48
P-value of F-test on R-square increase when adding Floormates' Characteristics		0.08		0.04		0.91		0.52
P-value of F-test on R-square increase when adding both Roommates and Floormates' Characteristics		0.35		0.05		0.82		0.54

Notes:

All regressions include housing preferences, gender, cohort, test taken; values not shown.  
 Missing values assigned to the mean and controlled for by missing value indicators; values not shown.  
 Standard errors adjusted for room clustering using Huber-White robust estimations.  
 Floormates exclude respondent and his/her roommates  
 Significance levels: \*\*\* (p<=.01) \*\* (p<=.05) \* (p<=.10).

Appendix Table 1  
Means and Standard Deviations of Roommate and Floormate Characteristics (Independent Variables)  
and of White Upperclassmen Attitudes and Behaviors (Dependent Variables)

	White respondents to the follow-up survey (all randomly assigned roommates)	
	Mean	Std. Dev.
<b><i>Roommates (all gathered in entering student survey)</i></b>		
Any Black Roommate	.031	(.173)
Any Asian Roommate	.066	(.248)
Any Hispanic Roommate	.031	(.173)
Any Other Race or Multi-Racial Roommate	.044	(.205)
Roommates' Average Father's Education	16.426	(1.874)
Roommates' Average Mother's Education	15.888	(1.932)
Roommates' Average High School Grade Point Average	3.758	(.269)
Roommates' Average Test Scores (ACT Scores)	28.098	(2.704)
At least one roommate with family income < \$50,000	.098	(.298)
At least one roommate with family income \$50,000 - \$74,999	.157	(.364)
Any roommate with family income \$75,000 - \$149,999	.408	(.492)
At least one roommate with family income \$150,000-\$199,999	.132	(.339)
At least one roommate with family income > \$200,000	.180	(.385)
<b><i>Floormates (all gathered in entering student survey)</i></b>		
% of floormates that are Black	3.642	(5.230)
% of floormates that are Asian	9.024	(9.047)
% of floormates that are Hispanic	3.341	(4.491)
% of floormates that are "Other Race or Multi-Racial"	5.691	(6.242)
% of floormates that are minority	21.825	(12.879)
% of floormates with family income > \$200,000	15.631	(9.403)
<b><i>Dependent Variables (all gathered in follow-up survey)</i></b>		
Affirmative action in college admission should be abolished	2.306	(1.034)
Affirmative action in college is justified if it ensures a diverse student body on college campuses	2.466	(1.014)
Having a diverse student body is essential for high quality education	3.296	(.818)
Wealthy people should pay more taxes	2.700	(.998)
I have personal contact with people from other racial/ethnic groups (number of times per month)	19.691	(8.432)
I interact comfortably with people from other racial/ethnic groups (number of times per month)	20.502	(7.993)
The Imperative of helping to promote racial understanding	2.282	(.905)
Frequency of doing volunteer work (number of times per week)	2.136	(3.521)

n=682