

Empathy or Antipathy? The Impact of Diversity

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While the enormous costs of ethnic and class divisions are depressingly familiar (William Easterly and Ross Levine, 1997; Claudia Goldin and Lawrence F. Katz, 1997; Paolo Mauro, 1995; James M. Poterba, 1997; Alberto Alesina et al., 1999), much less is known about the impact of various policies designed to ameliorate conflict between groups.

Different countries have followed very different policies regarding ethnicity. Some, such as France, encourage mixing and assimilation. Others, such as Belgium, with its separate French and Flemish higher-education systems, seek to preserve the cultural identity of different communities. Much of the recent emphasis on diversity in U.S. schools and workplaces is motivated by the view 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 (Thomas F. Pettigrew

and Linda R. Tropp, 2000). On the other hand, some argue that deliberate efforts to encourage mixing may actually inflame tensions and exacerbate conflict (Walter G. Stephan, 1978).

Within this larger debate, views on the impact of affirmative action policies on relations between racial and ethnic groups differ dramatically (see Faye F. Crosby, 2004; Alison M. Konrad and Frank Linnehan, 1999; David A. Kravitz et al., 1997 for general reviews). Patricia Gurin (2002) and Gurin et al. (2004) argue that diversity promotes critical thinking and learning among white students, while Stephan Thernstrom and Abigail Thernstrom (1997) and John H. McWhorter (2002) argue 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 (summarized in Pettigrew and Tropp, 2000; see also Maura A. Belliveau, 1996; William G. Bowen and Derek Bok, 1999; Gurin et al., 1999; Vladimir T. Khmelkov and Maureen T. Hallinan, 1999; Gretchen E. Lopez et al., 1998; Pettigrew, 1997; Anthony R. Pratkanis and Marlene E. Turner, 1999; and Marylee C. Taylor, 1995). A major problem with this literature, however, is that those who are more tolerant of other groups are more likely to choose to associate 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. One way to interpret evidence from a fascinating set of laboratory experiments (Elliot Aronson, 1975; Aronson et al., 1978; Aronson and Shelley Patnoe, 1997; David W. Johnson and Roger T. Johnson, 1983; David L. DeVries and Robert E. Slavin, 1978; Stewart W. Cook, 1990; Slavin and Cooper, 1999) is that interactions with members of other groups

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in situations of competition can exacerbate conflict, while interactions in situations designed to reward cooperation can improve relations among groups. Another line of laboratory-based studies examines the possible stigma (of both coworkers and the individuals themselves) associated with individuals hired under race or gender-based policies (David C. Evans, 2003; Madeline E. Heilman et al., 1998; Kimberly J. Matheson et al., 2000; Miriam G. Resendez, 2002). A general conclusion is that stigmatization can indeed arise, but is reduced or eliminated if merit-based criteria are clearly used in the hiring decision. One limitation is that laboratory studies are typically short-term. Moreover, the extent to which laboratory conditions resemble real-world situations is unclear.

This paper investigates the consequences of intergroup interactions in one particular real-world context by examining whether attitudes and behaviors change when people of different races 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 effects (as in Bruce Sacerdote, 2001; David J. Zimmerman, 2003; Jennifer Foster, 2003; Todd R. Stinebrickner and Ralph Stinebrickner, 2000; John J. Siegfried and Michael A. Gleason, 2003; and Kremer and Levy, 2003), and because this context is relevant for policy, in particular the controversy over affirmative action.

The key U.S. Supreme Court decisions on affirmative action, *Regents of the University of California v. Bakke* and the more recent *Grutter v. Bollinger*, held 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. As argued above, existing evidence on the causal effect of association with members of other groups on attitudes is not definitive. The university we examine has a strong affirmative action policy and, on average, African American students at the university have test scores more than one standard deviation below those of their white counterparts. If affirmative action indeed reinforces stereotypes among white students, 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 and have personal contact with members of other ethnic groups after their first year. Overall, the results suggest that mixing with members of other groups tends to make individuals more empathetic to these groups. We find no evidence for the Thernstrom and Thernstrom effect. However, a key limitation to bear in mind is that our sample size is small, so the results should be interpreted as suggestive rather than definitive. Due to the nature of our data and our small sample size, we cannot assess the impact of affirmative action on minorities.

The only other study we know of that specifically uses housing assignments of first-year college students to investigate the consequences of intergroup interactions during college (Collette Van Laar et al., 2004) found that having a roommate from another ethnic group tended to lead University of California, Los Angeles (UCLA) students to exhibit decreased levels of prejudice, especially toward that specific group. Our study yields similar findings, but differs methodologically in two important ways: first, we used data from the university housing office (instead of from a student survey) containing information on student housing preferences and initial assignment of roommates. This allows us to have reliable information on whether the roommate was randomly assigned, deal with nonresponse bias, and use initial roommate assignment rather than final roommate living arrangement in our estimations. It also allows us to statistically control for housing preferences in our estimations, which is important since roommate assignment is random, conditional on these housing preferences. Second, since most students live with at most two roommates, our main explanatory variable of interest is whether the student had one or more roommates of a certain ethnicity (in our case, African American), which seems to be a more natural form to model the relationship of interest than a functional form that controls for the number of roommates of different ethnicity and the number of roommates of each of the major ethnic groups separately.

This paper proceeds as follows: Section I describes the data and measures used in our analysis. Section II details our results, and a summary and discussion appear in Section III.

I. Roommate Assignment, Data Sources, Outcome Measures, and Descriptive Statistics

We examine students who were randomly assigned roommates at an academically strong state university. Our data are on students who entered in the fall of each year between 1997 and 2000. Most students initially live in university residence halls, but they usually move out of residence halls after their first year. Only about 17 percent of students live with their initial randomly assigned roommate after the first year.¹

A. Roommate Assignment

Since our identification strategy is based on taking advantage of randomness in roommate assignment, it is worth reviewing the roommate assignment process in some detail. In the spring before entering the university, incoming students submit (by mail) housing applications listing basic housing preferences (smoking/nonsmoking 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. Those students who did not elect to live in an enrichment residence hall or select a specific roommate were randomly assigned to their rooms by a computer, unless they missed the lottery deadline (usually around the end of April).

Our analysis focuses exclusively on those students who were randomly assigned rooms and roommates as part of the lottery process. These students were 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, cohort, and first, second, and third choices of basic housing preferences. All of our analyses control for the student's combination

of first choice 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). Standard errors are considerably higher in fixed-effects models that control for second and third choices, but 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 reviewed the documentation of the computer software used to make room assignments. Then, using techniques discussed more fully in Kremer and Levy (2003), 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 six significant coefficients (three positive and three negative) out of 140 variables checked. Only three of 140 correlations were in the 5-percent tail of a simulated distribution of correlations under random assignment. As Kremer and Levy (2003) discuss, these checks for random assignment have reasonable power. It therefore seems reasonable to assume that controlling for first choice 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.

We use the term "roommate" to refer to the roommate(s) *initially* assigned to the student in the housing lottery.² Ours are thus intention-to-treat estimates. Instrumenting for the actual first-year roommate with the initially assigned roommate would, however, give similar results, since less than 5 percent of students switch roommates during their first year. University policy does not allow roommate changes during the first six weeks of classes, except for extreme cases such as those involving vio-

¹ This is based on our survey, detailed below, which was administered in the winter of 2002 to a sample of students who entered the university between 1998 and 2000 and who were randomly assigned to their first-year roommate.

² If we used actual roommate (instead of the initially assigned roommate) in our regressions, our peer-effect estimates could be biased by self-selection among roommates.

lence, and it strongly discourages any roommate changes during the first year.

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 (CIRP) Entering Student Survey, an annual survey of the American higher-education system conducted jointly by the American Council on Education and UCLA. Entering students at the university fill in this survey at an orientation session before classes begin. The large majority of students filled out this survey at a special summer orientation session, before meeting their roommates, although a few may have met their roommates first.

The CIRP includes questions on socioeconomic background (parental education and income), positive and problem behavior (e.g., extracurricular activities during the last year of high school, drinking, smoking, etc.), 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 answered "Mexican American/Chicano," "Puerto Rican," or "Other Latino" and those who gave no other response. All respondents marking more than one category, marking "American Indian," or marking "Other" fall into our "other" category.³

CIRP measures used as control variables in our regressions include both self and average roommate responses to questions about: (a)

years of father's education; (b) years of mother's education; (c) high-school grade-point average; and (d) 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.

Outcome measures are drawn from a survey we administered to students who entered the university in the fall of 1997–2000 and were randomly assigned roommates. The survey was administered via the Internet with a telephone follow-up to maximize response rates. The timing of our research grants dictated that we administer our survey in two waves. An initial Internet survey with very limited telephone follow-up was conducted in the winter/spring of 2002. It focused on the 1998, 1999, and 2000 cohorts, who, at the time of the survey, were more than halfway through their second, third, and fourth years, respectively. Since members of the 1997 entering cohort who graduated in four years had already left the university, we initially succeeded in securing interviews from only 8.5 percent of them.

We later obtained funding to launch a more intensive effort to locate and interview the 1997 cohort by Internet, mail, and telephone, beginning in the summer and early fall of 2003. As detailed below, these efforts were quite successful and produced a high response rate.

Of all entering students in the 1997–1999 cohorts, 89 to 90 percent completed the CIRP survey (see Table 1; response rates for the 2000 cohort are not available). Of the 14,235 CIRP respondents, 3,246 opted to live in enrichment residence halls; 2,354 requested a roommate; 980 requested to live alone during their first year; 5,583 failed to meet the lottery deadline; and 63 otherwise-eligible students were not assigned a roommate, leaving 2,010 students eligible for our lottery sample. Some 1,647 of these students

³ Some 94 percent of students choosing "African American/Black" gave it as their only response.

TABLE 1—SAMPLE ATTRITION

	Total	1997	1998	1999	2000
Response rate on CIRP survey for all entering students		89%	89%	90%	n/a
Number of students responding to CIRP survey of which:	14,235	3,967	3,573	3,419	3,276
Students opting to live in enrichment dormitories	3,246	1,014	920	633	679
Students requesting a specific roommate	2,354	325	755	662	612
Students failing to meet the lottery deadline	5,583	1,449	1,166	1,615	1,353
Students living alone during the first year	979	255	273	215	236
Students not assigned roommates	63	21	5	12	25
Total number of students randomly assigned roommates of which:	2,010	903	454	282	371
Students designated race as "black" only	47	19	8	8	12
Students designated race as "white" only	1,647	729	377	236	305
Students designated race as "Hispanic" (see text)	61	26	14	7	14
Students designated race as "Asian" (see text)	149	72	34	19	24
Students with other racial designations	106	57	21	12	16
Target sample of white students opting for random assignment of which:	1,647	729	377	236	305
Failed to respond to follow-up survey	369	133	91	75	70
Response rate on follow-up survey	78%	82%	76%	68%	77%
Final analysis sample	1,278	596	286	161	235

designated themselves as "white." The follow-up survey response rate among this sample was 78 percent and produced an analysis sample of 1,278. Missing data on individual survey items reduced this case count further. We address the issue of possible nonresponse bias below.

Outcome measures were derived from sections in the follow-up survey corresponding to three broad domains: attitudes, behaviors, and goals. 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: (a) "Affirmative action in college admission should be abolished"; (b) "Affirmative action is justified if it ensures a diverse student body on college campuses"; and (c) "Having a diverse student body is essential for high quality education."⁴ The first of these items was also asked with identical wording on the 1997, 1999, and 2000 entering-student CIRP survey. Neither the second nor third items was asked in any of the CIRP surveys.

On the behavior front, respondents to our follow-up survey were also asked to specify the number of times per month when "I have personal contact with people from other racial/ethnic groups"; when "I interact comfortably with people from other racial/ethnic groups";

and when "I socialize with someone with an African American background."

The section on goals in both the CIRP and the follow-up survey contained questions about major life goals such as "becoming an authority in my field" and "being very well off financially." In terms of goals related to race, respondents were asked how imperative the following goals were to them personally: "helping promote racial understanding"; "helping others who are in difficulty"; "working to eliminate discrimination against people of color"; and "participating actively in civil rights organizations." All goals were rated on a scale of essential (coded as 4), very important (3), important (2), and not important (1).

Given the ordinal nature of the key attitudinal outcomes, we used ordered probit regression. Results from comparable OLS models, which presume a cardinal scale for the attitudinal responses but also increase the precision of the estimates, are shown in our tables for purposes of comparison. In all cases, responses were scaled so the higher 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 the respondent's own responses (standardized and scaled in a "liberal" direction) to the following statements: (a) "Affirmative action in college admissions should be abolished"; (b) "Race discrimination is no longer a major problem in America"; and (c) "Colleges should prohibit racist/sexist speech on campus." To control for class-related

⁴ 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.

attitudes, we also control for responses to the CIRP question, "Wealthy people should pay a larger share of taxes than they do now."

C. Descriptive Statistics

Table 2 shows descriptive statistics for entering students, and Appendix Table 1 shows comparable data for roommates as well as follow-up survey-based measures. The affluent nature of the sample is reflected in the high average levels of paternal (16.4 years) and maternal (15.8 years) education and the very small fraction of students coming from families with annual incomes under \$50,000 (columns 1 and 2 of Table 2). Test scores and high-school grade-point averages are high. Most entering students agree that racial discrimination is still a problem but students have disparate opinions about whether affirmative action policies should be abolished. Attitudes toward redistributive taxation fall in the middle of the 1–4 scale. Cross-racial/ethnic contact and comfort levels are quite high.

Of the 1,278 white respondents, 35 were assigned at least one black roommate, 98 were assigned at least one Asian roommate, 40 were assigned at least one Hispanic roommate, and 69 were assigned at least one "other race" roommate. The rest were assigned white roommates. The small number of whites assigned black roommates suggests that our analysis might best be treated as a pilot study rather than a definitive analysis. Despite the limits on the precision of our estimates of roommate impacts on white students, many of the estimated effects are statistically significant 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 affect the generalizability of our results to the larger university population. Despite the considerable statistical power, however, 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 on academic background, parental education, and racial attitudes (column 3 of Table 2), and on broader outcomes such as frequency of socializing or partying in high school, and perceived likelihood of joining a fraternity or sorority (results

not shown). White students in the lottery sample did have a slightly but statistically significantly higher high school GPA (3.78 versus 3.75; $p < 0.01$) and were less likely to come from very high-income families (11.9 percent versus 16.7 percent; $p < 0.01$) than white students not in the lottery sample. No other differences were statistically significant at or below the 0.05 level.

There are no significant differences in the response rates of whites assigned white roommates and those assigned black roommates, after controlling for housing request cells.

Columns 4 and 5 of Table 2 show differences in initial characteristics between white respondents and nonrespondents to the follow-up survey. Respondents come from significantly lower-income families and have somewhat higher test scores and high school grades. While there are no significant differences in response rates in terms of roommate income levels, survey response rates were significantly lower (67.5 percent versus 78.6 percent) among the whites assigned roommates with missing data on CIRP-reported family income than among whites with roommates who reported family incomes on the CIRP. 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 the significance level of 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 2 and 6). Test scores and high-school grade-point averages for whites exceed those for blacks, however, by more than a standard deviation of the distribution within the university. While blacks in our sample are at the eighty-second percentile of all ACT test takers nationally, whites are at the ninety-third percentile.⁵ Blacks in our sample are almost two standard deviations more likely than whites to endorse affirmative action.

In general, there are not large differences in observables between blacks in the lottery sample and other black students (columns 8 and 9),

⁵ These are scores from high-school graduates in 2000–2002 as reported on <http://www.act.org/aap/scores/norms1.html>.

TABLE 2—MEANS AND STANDARD DEVIATIONS OF RESPONDENTS' AND NONRESPONDENTS' CHARACTERISTICS FROM THE ENTERING STUDENT SURVEYS

	White respondents to the follow-up survey (all randomly-assigned roommates) (2)	White respondents to CIRP entering survey but not randomly-assigned roommates (3)	White randomly assigned roommates who FAILED to respond to the follow-up survey (4)	<i>p</i> value of <i>t</i> -test or Chi-square comparing (4) and (2) (5)	Blacks randomly-assigned roommates (6)	<i>p</i> value of <i>t</i> -test or Chi-square comparing (6) and (2) (7)	Black respondents to CIRP Entering Survey but not randomly-assigned roommates (8)	<i>p</i> value of <i>t</i> -test or Chi-square comparing (8) and (6) (9)
Affirmative action in college admissions should be abolished (reversed) ^a	2.083 (0.813)	2.033 (0.774)	2.089 (0.763)	0.110 (0.763)	3.487 (0.547)	0.000 (0.763)	3.240 (0.714)	0.020
Race discrimination is no longer a major problem in America (reversed) ^a	3.215 (0.719)	3.172 (0.730)	3.238 (0.733)	0.093 (0.733)	3.558 (0.682)	0.000 (0.682)	3.650 (0.615)	0.323
Colleges should prohibit racist/sexist speech on campus ^b	2.477 (0.956)	2.424 (0.958)	2.504 (0.952)	0.211 (0.952)	2.617 (1.153)	0.196 (1.153)	2.853 (1.003)	0.120
Wealthy people should pay a larger share of taxes than they do now ^b	2.524 (0.927)	2.489 (0.929)	2.426 (0.860)	0.086 (0.860)	2.620 (1.089)	0.463 (1.089)	2.743 (0.891)	0.366
Father's education	16.360 (1.980)	16.399 (1.977)	16.565 (1.831)	0.070 (1.831)	15.834 (2.230)	0.066 (2.230)	15.089 (2.334)	0.033
Mother's education	15.801 (2.083)	15.911 (1.978)	15.903 (1.946)	0.433 (1.946)	15.957 (1.922)	0.623 (1.922)	15.155 (2.185)	0.014
High-school grade point average	3.762 (0.260)	3.752 (0.280)	3.741 (0.276)	0.023 (0.276)	3.543 (0.366)	0.000 (0.366)	3.480 (0.423)	0.324
Test scores (ACT scale)	28.051 (2.616)	28.372 (2.854)	27.888 (2.457)	0.034 (2.457)	25.134 (2.952)	0.000 (2.952)	24.118 (3.630)	0.060
Family income < \$50,000	0.114	0.112	0.068		0.170		0.392	
Family income \$50,000 to \$74,999	0.166	0.150	0.138		0.213		0.200	
Family income \$75,000 to \$149,999	0.405	0.375	0.388		0.340		0.255	
Family income \$150,000 to \$199,999	0.094	0.098	0.098	0.001	0.128	0.547	0.038	0.000
Family income ≥ \$200,000	0.121	0.119	0.167		0.128		0.032	
Missing Family income	0.100	0.099	0.111		0.021		0.083	
	<i>n</i> = 1,558	<i>n</i> = 1,278	<i>n</i> = 369		<i>n</i> = 47		<i>n</i> = 832	

Note: Blacks randomly assigned roommates may or may not have been respondents to the follow-up survey.

^a Scale: (4) disagree strongly; (3) disagree somewhat; (2) agree somewhat; (1) agree strongly.

^b Scale: (4) agree strongly; (3) agree somewhat; (2) disagree somewhat; (1) disagree strongly.

although blacks in the lottery sample do have higher family income. Black students in the lottery sample could also differ from other black students in unobservable ways, and, in particular, blacks who were particularly averse to having white roommates may be more likely to avoid the lottery by requesting a particular roommate. Only 40 percent of black students who were not in the lottery sample lived with a black roommate in their first year of college, however, so it does not seem that blacks in the lottery sample were uniquely willing to live with white roommates. Many of those who were not in our lottery sample presumably simply missed the lottery deadline.

There is little evidence that blacks outside the lottery sample had particularly strong views on racial questions. There were no significant differences between blacks in the lottery sample and outside it on CIRP questions asking whether race discrimination is a problem, whether colleges should prohibit racist/sexist speech, or the importance of promoting racial understanding. Blacks outside the lottery sample were actually slightly less opposed to abolishing affirmative action than those in the lottery sample. While we do not estimate the impact on white attitudes of being assigned a random roommate from the black undergraduate population, we accurately measure the impact on white attitudes of being assigned a roommate from the population of blacks willing to enter the lottery system. This group does not seem to be particularly anomalous, and examining this population may be most relevant for real-world policies that affect racial mixing, such as contracting or expanding on-campus housing or introducing on-line systems that allow students to choose their own roommates.

II. Results

We begin our discussion of results with a bivariate contrast that previews our regression-based findings. Figure 1 shows the distribution of responses to the statement, "Affirmative action in college admissions should be abolished," for white respondents who were randomly assigned black and white roommates. A test for differences in these distributions is not very powerful given the small sample size, and yields a p -value of 0.35. The regression analysis

reported below controls for respondents' attitudes prior to meeting their roommates, which greatly sharpens the precision of our estimates. It also uses fixed-effect controls for housing preferences to eliminate the possibility of bias from correlations between attitudes and housing preferences.

A. Regression Results

Table 3 presents results from three regression specifications for three different attitudinal outcomes. Each column in this table constitutes a separate regression in which the given dependent variable is regressed on the set of respondent and roommate measures listed in the rows and notes of the table. All are fixed-effects regressions in which the unit of observation is the cell (i.e., combination of values of housing variables plus gender and cohort). Huber-White methods adjust standard errors for heteroskedasticity and for the clustered nature of our roommate data.

The first, fourth, and seventh columns show coefficients on assignment to a black rather than white roommate from ordered probit regression in which the four-point responses to these three measures are taken as dependent variables, and the only other controls are for housing preference fixed effects. In all three cases the coefficients are statistically significant at the 0.05 level or less.⁶ The second, fifth, and eighth columns display results from ordered probit regressions with a full set of controls, whereas the third, sixth, and ninth columns display results from OLS regressions (also with a full set of controls) to check for robustness.

Being assigned a black roommate was associated with more positive attitudes toward affirmative action and diversity policies. Despite the relatively small sample, all but one of these effects were statistically significant at the 5-percent level. Endorsement of affirmative action

⁶ The statement, "Affirmative action in college admissions should be abolished," was posed in identical form in the freshman CIRP and in our own follow-up survey. One concern is that our results are driven by large changes in just one or two white respondents assigned black roommates. In fact, fewer than one-third of these white students gave the same response category in the two surveys. For example, of the eight whites initially agreeing that affirmative action policies should be abolished, two changed their responses to "disagree" and three changed to "strongly disagree."

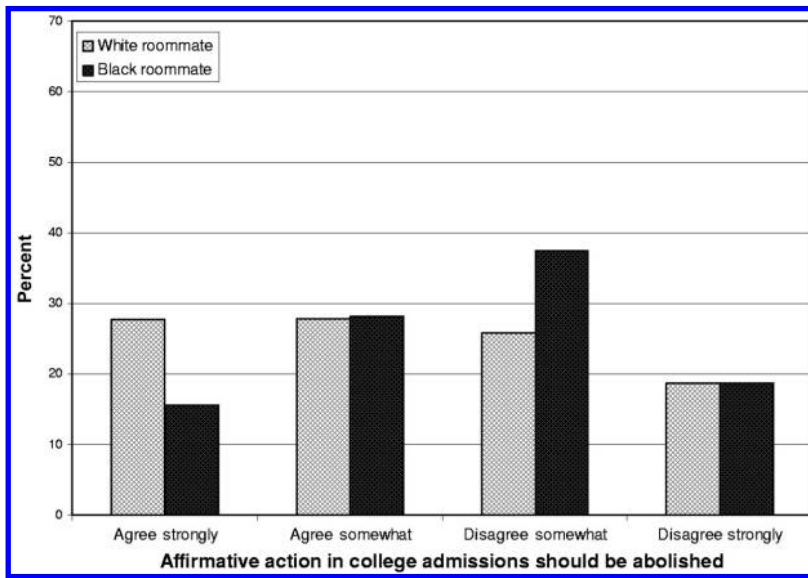


FIGURE 1. ROOMMATE RACE AND ATTITUDES TOWARD AFFIRMATIVE ACTION

questions was between one-third and one-half of a standard deviation higher among whites who were randomly assigned black roommates than among whites assigned white roommates. Estimated effects on endorsement of the proposition that “a diverse student body is essential for high-quality education” exceed half a standard deviation in the ordered probit regressions. The estimated effect sizes translate into increments in the four-point, agree-disagree scale of one-third to three-quarters of a point. Responses to these attitudinal questions for white students assigned other minority roommates did not differ significantly from white students assigned white roommates.⁷

Not surprisingly, the respondents’ prior responses to affirmative action and income redistribution questions in the entering-student CIRP questionnaire were strong significant predictors of affirmative action responses 1.5 to 6.5 years later in several cases (results available upon request). The respondent’s own SAT/ACT test scores had an inconsistently negative impact on current affirmative action attitudes, while maternal schooling had an inconsistently positive association with them.

⁷ When we broke the “other minority” category into “Asian,” “Hispanic,” and “mixed,” we found no significant differences between any of these categories and the omitted, white roommate, category.

Students who were assigned black roommates during their first year report more frequent personal contact and comfortable interactions with members of other racial/ethnic groups in later years (Table 4, columns 1 and 2). But while reported contact and comfort with minorities increased, reported friendships and socializing did not change significantly (Table 4, columns 3 and 4).⁸ In no instance was assignment to other minority roommates a significant predictor of these four outcomes.

The follow-up survey also 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 were with their initial roommates. Since these questions were not asked for each specific randomly assigned roommate, we restricted the sample of white students from the 1,278 who responded to the follow-up survey to the

⁸ While we were able to control for baseline measures of the outcome in the regressions where the dependent variable was an attitude, we were not able to do so in the regressions where the dependent variable was a behavior (because we lacked baseline data on behaviors). Other things being equal, this makes it harder to detect a statistically significant roommate effect in the behavior regressions than in the attitudinal ones.

TABLE 3—ORDERED PROBIT AND OLS REGRESSIONS COEFFICIENTS, AND STANDARD ERRORS FOR ROOMMATE PREDICTORS OF ATTITUDES OF WHITE STUDENTS TWO TO SIX YEARS AFTER ENTERING COLLEGE

	Affirmative action in college admissions should be abolished (reverse coding) ^a		Affirmative action is justified if it ensures a diverse student body on college campuses ^b		Having a diverse student body is essential for high-quality education ^b	
	Ordered probit regressions	OLS regression	Ordered probit regressions	OLS regression	Ordered probit regression	OLS regression
ROOMMATES' CHARACTERISTICS						
Any black roommate(s)	0.497** (0.239)	0.489** (0.249)	0.493** (0.236)	0.506** (0.239)	0.743*** (0.256)	0.470*** (0.154)
Any other minority roommate(s)	—	0.029 (0.107)	0.096 (0.100)	0.154 (0.107)	0.022 (0.104)	0.025 (0.072)
Only white roommate(s) [omitted group]	—	0.125 (0.129)	—	—0.012 (0.131)	—	—
At least one roommate with family income < \$50,000	—	0.105 (0.113)	—	—0.006 (0.112)	—	0.180* (0.087)
At least one roommate with family income between \$50,000 and \$74,999	—	0.043 (0.108)	—	0.055 (0.107)	—	0.047 (0.075)
At least one roommate with family income between \$75,000 and \$149,999 [omitted group]	—	—	—	—	—	—
At least one roommate with family income between \$150,000 and \$199,999	—	0.078 (0.130)	—	0.069 (0.129)	—	0.061 (0.087)
At least one roommate with family income ≥ \$200,000	—	-0.023 (0.112)	—	-0.077 (0.115)	—	0.156 (0.097)
TIME						
Years since sophomore year	—	0.165 (0.113)	—	0.095 (0.108)	—	-0.104 (0.109)
R-squared/Pseudo-R ²	—	0.180 (0.370)	—	0.178 (0.371)	—	0.191 (0.356)
Number of observations	1,172	1,169	1,196	1,193	1,241	1,241

Notes: Standard errors are given in parentheses. Standard errors are adjusted for room clustering using Huber-White robust estimations. All regressions include controls for respondent's: father's education, mother's education, high-school grade point average, ACT/SAT score, CIRP-based attitudes about race discrimination, taxation of the rich and prohibition of racist/sexist speech. For roommates': average father's education, average mother's education, average high school grade-point average, average ACT/SAT score. All regressions also control for respondent housing preferences, gender, cohort, test taken; values not shown. "—" indicates that the variable was not included in the regression.

^a Scale: (4) disagree strongly; (3) disagree somewhat; (2) agree somewhat; (1) agree strongly.

^b Scale: (4) agree strongly; (3) agree somewhat; (2) disagree somewhat; (1) disagree strongly.

* $p < 0.10$. ** $p < 0.05$. *** $p < 0.01$.

TABLE 4—OLS REGRESSION COEFFICIENTS AND STANDARD ERRORS FOR ROOMMATE PREDICTORS OF BEHAVIORS OF WHITE STUDENTS TWO TO SIX YEARS AFTER ENTERING COLLEGE

	I have personal contact with people from other racial/ethnic groups (number of times per month)	I interact comfortably with people from other racial/ethnic groups (number of times per month)	Fraction of friends from own racial/ethnic background	Socialized with someone with an African American background (number of times per month)
ROOMMATES' CHARACTERISTICS				
Any black roommate(s)	2.949* (1.730)	2.844** (1.436)	-0.048 (0.045)	1.830 (1.826)
Any other minority roommate(s)	0.052 (0.794)	0.214 (0.740)	-0.011 (0.016)	-0.982 (0.911)
Only white roommate(s) [omitted group]	—	—	—	—
At least one roommate with family income < \$50,000	0.719 (0.963)	1.042 (0.895)	0.026 (0.019)	2.306** (1.073)
At least one roommate with family income between \$50,000 and \$74,999	0.996 (0.754)	0.267 (0.744)	-0.024 (0.018)	1.7622* (0.968)
At least one roommate with family income between \$75,000 and \$149,999 [omitted group]	—	—	—	—
At least one roommate with family income between \$150,000 and \$199,999	0.851 (0.918)	0.883 (0.871)	-0.010 (0.019)	1.382 (1.127)
At least one roommate with family income ≥ \$200,000	0.592 (0.868)	1.349* (0.741)	-0.007 (0.019)	1.064 (1.026)
TIME				
Years since sophomore year	-0.743 (0.820)	-0.689 (0.802)	0.006 (0.015)	-1.333 (0.918)
R-squared	0.189	0.201	0.171	0.230
Number of observations	1,257	1,254	1,245	1,243

Notes: Standard errors are given in parentheses. Standard errors are adjusted for room clustering using Huber-White robust estimations. All regressions include controls for respondents: father's education, mother's education, family income, high-school grade-point average, ACT/SAT score, CIRP-based attitudes about race discrimination, taxation of the rich, and prohibition of racist/sexist speech. For roommates: average father's education, average mother's education, average high-school grade-point average, average ACT/SAT score. All regressions also control for respondent housing preferences, gender, cohort, test taken; values not shown. "—" indicates that the variable was not included in the regression.

* $p < 0.10$. ** $p < 0.05$. *** $p < 0.01$.

1,087 white students who had only one roommate. The vast majority (923, or 85 percent) had white roommates; 21 had black roommates, 70 had Asian roommates, 25 had Hispanic roommates, and 48 had "other" race roommates. We found no statistically significant differences in frequency of subsequent interactions depending on roommate race. For example, 14 percent of whites with white roommates and 15 percent of whites with black roommates considered these roommates to be their "best college friend." Very close fractions (41 percent and 45 percent, respectively) were either "not in touch" or "did not get along" with these roommates. Similar fractions (14 percent and 10 percent) had

socialized more than once a week with their first-year roommates in the past year, while 62 percent and 50 percent 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.

B. Extensions

We explored several extensions of the analysis above. First, we investigated whether the effects of being assigned a black roommate persisted over time. Second, we explored

whether our earlier findings on affirmative action attitudes could result merely from whites having been assigned roommates with more positive affirmative action attitudes. Finally, we explored whether having a black roommate affected race-related goals such as “helping to promote racial understanding” and “helping others who are in difficulty.”

We estimated a number of models that allowed for the impacts of being assigned a black roommate to differ by cohort. Since the impact of initial roommate assignment could fade over time, or change when one leaves the university, we examined a specification allowing for a linear interaction between cohort and roommate assignment, as well as a specification interacting roommate assignment with a dummy for the 1997 cohort.⁹ The sample sizes are too small to draw strong conclusions from interaction terms, but point estimates suggest at least some roommate effects fade once students leave the university.¹⁰ The interaction term on the reverse-scaled “affirmative action in college admissions should be abolished” item suggests virtually no attitude difference for 1997 cohort members assigned black versus white roommates. There is also some evidence of 1997 cohort differences for the second affirmative action item, although the *t*-statistic on the interaction term is less than one.

Given the much stronger endorsement of affirmative action policies among black than white first-year students, it is theoretically 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 regressions listed in Table 3 measures of initially assigned roommates’ CIRP-based attitudes on affirmative action. The key coefficients on roommates’ race increased slightly in absolute value and

remained statistically significant, providing no evidence that initial roommates’ attitudes account for the race-of-roommate effect.

Finally, we found no effect of having a black roommate on goals. Having a black roommate had no substantial association with endorsement of the imperatives to “help promote racial understanding,” “help others who are in difficulty,” “work to eliminate discrimination against people of color,” or “participate actively in civil rights organizations.”

C. Robustness Checks

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 OLS models with fixed-effect controls for all possible combinations of first and second choices and with all possible combinations of first, second, and third choices. This reduces power because there are many possible combinations of first, second, and third choices of housing characteristics. Key coefficients increased somewhat, but standard errors increased markedly, particularly in the case of controls for categories representing combinations of all three sets of preferences.

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 in Table 3.

The differences in socioeconomic status between white respondents and nonrespondents to our follow-up survey lead us to attempt to adjust for possible nonresponse bias. We did this in two ways and in neither case found evidence that nonresponse bias might explain our results. First, we estimated a Heckman two-step model in which the first stage model predicted response status among the 1,647 white students eligible for the survey, and the second stage estimated a version of the regressions listed in Table 3 that adjusted for predicted nonresponse using Mills Ratio methods. 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

⁹ The rationale for the interaction models is that most students in the 1997 cohort responded to our follow-up survey after they had graduated, so we may expect the effects for this cohort to be different from the effects for other cohorts.

¹⁰ This result is in contrast to work from Gurin (1999) which suggests that diversity experiences during college had effects on the extent to which graduates were “living racially and ethnically integrated lives in the post-college world.”

roommates change by more than 0.02. The coefficient on having a roommate from a high-income background fell by 0.01.

Our second approach to nonresponse bias was to develop a set of nonresponse weights and then reestimate the OLS 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.¹¹ Response rates range from 68 percent for students with family incomes over \$200,000 to 85 percent for students in the 1997 cohort with lower family incomes but high levels of maternal schooling. We used the inverse of the response rates for the subgroups to weight the OLS regression results in Tables 3 and 4. None of the key coefficients changed by more than 0.03.

III. Summary and Discussion

We find that white students randomly assigned African American roommates express more positive attitudes toward affirmative action and interacted more comfortably with minorities several years after college entry than white students assigned white roommates. One interpretation of our 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. 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 (Pettigrew and Tropp, 2000). Consistent with such a view, in related work (Boisjoly et al., 2003), we find that whites become less supportive of redistributive policies when they are assigned roommates from wealthy families.

Although African Americans have lower high-school grades and standardized test scores in the university we study, we found no evidence to support the claim of some opponents of

affirmative action that accepting more minority applicants than would be admitted under a purely test score-based process reinforces racial stereotypes and ultimately hurts minorities.

The pattern of our results seems to indicate that roommates tend to affect attitudes (such as endorsement of affirmative action policies or being in favor of more diversity) and intermediate behaviors (such as having personal contact or being comfortable interacting with blacks), but have little or no effect on harder-to-change behavior (such as befriending or socializing with someone from another racial/ethnic group) and long-term goals (such as assigning greater importance to the imperative "helping to promote racial understanding").

An important limitation of our study is the small numbers of whites assigned to black roommates. While standard errors reflect the small sample sizes, our study can be seen in some ways as a pilot study, and its conclusions should be viewed as suggestive rather than definitive. Moreover, we can examine only the effect on individuals of being randomly assigned a roommate; we cannot identify the general equilibrium effects of affirmative action, and we cannot determine if affirmative action leads to general changes in white attitudes other than those caused by increased exposure to African Americans. For example, we cannot rule out the possibility that the decision to adopt affirmative action policies at a university reinforces stereotypes among students who read about the policy in a newspaper.

One topic for future research is to understand better the channels through which exposure to other groups affects attitudes. A variety of channels are plausible, from changes in preferences to Bayesian learning. People may simply become more empathetic to those with whom they spend more time, as argued by Casey B. Mulligan (1997). Alternatively, one could tell a purely informational story in which whites who believe discrimination is a thing of the past learn otherwise if they are assigned an African American roommate. Understanding the particular channels will be important for assessing whether working, studying, or sharing a neighborhood with African Americans is likely to have similar effects as being assigned an African American roommate.

¹¹ Specifically, we used the CHAID option in SPSS's ANSWER TREE. Details are available from the authors upon request.

APPENDIX TABLE 1—MEANS AND STANDARD DEVIATIONS OF DEPENDENT AND INDEPENDENT VARIABLES
(for respondents and roommates)

	White respondents to the follow-up survey (all randomly assigned roommates)	
	Mean	Std. Dev.
Dependent variables (all gathered in follow-up survey)		
<i>Attitudes</i>		
Affirmative action in college admissions should be abolished (reverse coding) ^a	2.361	(1.074)
Affirmative action is justified if it ensures a diverse student body on college campuses ^b	2.441	(1.043)
Having a diverse student body is essential for high-quality education ^b	3.246	(0.872)
<i>Behaviors</i>		
I have personal contact with people from other racial/ethnic groups (number of times per month)	19.906	(8.336)
I interact comfortably with people from other racial/ethnic groups (number of times per month)	20.559	(7.883)
Fraction of friends from own racial/ethnic background	0.737	(0.166)
Socialized with someone with an African-American background (number of times per month)	10.422	(9.757)
Respondents (all gathered in entering student survey)		
Affirmative action in college admissions should be abolished (reverse coding) ^a	2.016	(0.772)
Racial discrimination is no longer a major problem in America (reverse coding) ^a	3.166	(0.723)
Colleges should prohibit racist/sexist speech on campus ^b	2.434	(0.942)
Wealthy people should pay a larger part of taxes than they do now ^b	2.518	(0.928)
Father's education	16.362	(1.920)
Mother's education	15.810	(2.023)
High-school grade-point average	3.775	(0.251)
Test scores (ACT scale)	28.209	(2.594)
Family income < \$50,000	0.105	(0.306)
Family income \$50,000 to \$74,999	0.159	(0.366)
Family income \$75,000 to \$149,999	0.417	(0.493)
Family income \$150,000 to \$199,999	0.101	(0.301)
Family income ≥ \$200,000	0.119	(0.324)
Roommates (all gathered in entering student survey)		
Any black roommate(s)	0.027	(0.163)
Any other minority roommate(s)	0.161	(0.368)
Father's education	16.373	(1.886)
Mother's education	15.809	(1.963)
High-school grade-point average	3.745	(0.268)
Test scores (ACT scale)	27.946	(2.664)
At least one roommate with family income < \$50,000	0.115	(0.319)
At least one roommate with family income between \$50,000 and \$74,999	0.174	(0.379)
At least one roommate with family income between \$75,000 and \$149,999	0.446	(0.497)
At least one roommate with family income between \$150,000 and \$199,999	0.115	(0.319)
At least one roommate with family income ≥ \$200,000	0.160	(0.366)
Years since sophomore year	2.545	(1.720)

n = 1,278

^a Scale: (4) disagree strongly; (3) disagree somewhat; (2) agree somewhat; (1) agree strongly.^b Scale: (4) agree strongly; (3) agree somewhat; (2) disagree somewhat; (1) disagree strongly.^c Averaged over all roommates for a given respondent.

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