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Do more diverse environments increase the diversity of subsequent interaction? Evidence from random dorm assignment☆

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ABSTRACT

Exposing university students to members of a different race via random dorm assignment increases the number of different race friends in the dorm, but does not increase the diversity of social networks outside that environment, based upon data from Facebook.

1. Introduction

The formation of social contacts on university campuses is an important topic in both labor economics and education policy. Many economists are interested in social ties because social connections influence information transmission.[1] Research in higher education has argued that a diverse learning environment improves educational outcomes for both minorities and non-minorities. For example, Bowen and Bok (1998) and Gurin et al. (2004) argue that diverse peers in both classroom and other campus settings improve learning and democracy outcomes. These types of arguments have influenced legal decisions; for example, the Supreme Court found in the case of Grutter vs. Bollinger regarding admissions to a law school that a diverse educational experience "promotes learning outcomes and better prepares students for an increasingly diverse workforce".

The university experience often provides the first genuine exposure to students from different backgrounds. An important policy question is whether such exposure changes the nature of subsequent interactions outside of the environment that is directly controlled by the university.

There is relatively little empirical research on this topic for several reasons. First, social interactions are difficult to measure.[2] Second, network formation is driven by unobservable characteristics and preferences, so endogeneity issues usually prevent causal inference. We exploit unique data to overcome both obstacles. We use information from the online social network Facebook to measure interaction between students. We overcome endogeneity concerns by exploiting the random assignment to dormitories at Rice University.

We find that the (exogenous) exposure to members of a different race increases the number of different race friends *in the dorm environment*. However, it does not increase the diversity of social networks *outside that environment*. In particular, students with more Black dorm mates have more Black friends within the dorm, but do not have more Black friends outside the dorm. The same pattern holds for Asian friends. These results contribute to a growing economics literature on social interaction in college (e.g. Marmaros and Sacerdote (2006), Arcidiacono et al. (2007), Camargo et al. (2009)).

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[1] See Jackson (2006) and Ioannides and Datcher-Loury (2004) for surveys.

[2] The few papers measuring networks include Weinberg (2006) who uses AddHealth data, Marmaros and Sacerdote (2006) who use email among Dartmouth students, and Mayer and Puller (2008) who use Facebook data.

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2. Data

Rice University randomly assigns entering students to one of nine dorms. Almost all students maintain their affiliation with that dorm for their remaining years in college. We have information on all undergraduate students at Rice who were registered on the social networking website Facebook in January 2005. At the time our data were collected, 80% of undergraduates at Rice were members of Facebook.[3] We use a student's list of Facebook friends as a proxy for her social network. On average students have 26 friends in their own dorm and 19 friends in other dorms. The Facebook data include other information, such as a student's year and dormitory. Race is determined by using undergraduate research assistants to visually classify Facebook profile pictures.[4]

After excluding students with missing information, we obtain a sample of 1332 students.[5] In this sample, 63% of students are White/Hispanic, 9% are Asian, 4% are Black, and 23% could not be assigned to one of these categories. Minorities are somewhat under-represented. When excluding students whose race could not be categorized, 12% of the students are Asian and 6% Black. For the entire Rice student body, the shares are 17% and 8%, respectively.

Table 1 shows that Black students have disproportionately many Black friends — 20% of friends of Black students are Black despite Blacks representing only 4% of the population. Similarly, Asian students have a disproportionately high share of Asian friends.

3. Methodology

Any analysis of network formation must address endogeneity concerns. We can identify the effects of the composition of a student's dorm because dorm composition is conditionally random and hence not correlated with unobserved tastes for friends. At Rice, all incoming students are assigned into categories consisting of all combinations of 5 characteristics: major, gender, ethnicity, athlete, and transfer status. The university attempts to distribute students in each "cell" roughly evenly across the nine dorms; it randomly draws students from each cell and assigns them to a dorm. Obviously, it is not possible to *simultaneously* smooth across each dimension. The process results in residual variation in a dorm's race composition. As compared to unconditional random assignment, this conditional random assignment algorithm leads to a decrease in econometric power due to reduced variation in ethnic composition across dorm-cohorts. However, it does not affect the correlation between observed and unobserved characteristics and dorm assignment, and thus does not introduce systematic biases.[6]

We analyze friendship networks of non-Black and non-Asian students. Because a very large majority of these students are White or Hispanic, we will refer to the group as White/Hispanic. For these students, we measure the share of their friends who are Black or Asian in their dorm and in different dorms. This measure serves as our dependent variable. Our independent variable of interest is the racial composition of the dorm for the student's cohort. We measure the composition of the environment of student i by dividing the number of Blacks (or Asians) in the dorm-cohort of student i by the number of all students in the dorm-cohort of student i. We estimate two regression models:

$$(Share\ of\ Friends\ Same\ Dorm)_i = \beta_s X_i + \gamma_s (Composition\ of\ Dorm)_i + \varepsilon_i \quad (1)$$

$$(Share\ of\ Friends\ Outside\ Dorm)_i = \beta_o X_i + \gamma_o (Composition\ of\ Dorm)_i + u_i \quad (2)$$

where X_i denotes controls for major, gender, cohort, political orientation, and relationship status. If the composition of the dorm is correlated with factors that affect the selection of friends, then the error term is correlated with the variable of interest and the estimated $\hat{\gamma}$ is biased. This concern does not apply in our setting because dorm assignment is random.

If exposure plays a role in friendship formation, the composition of a student's dorm affects friendships within the dorm and $\gamma_S > 0$. If exposure changes attitudes, the dorm composition influences friendships outside the own dorm and $\gamma_O > 0$.[7] γ_O allows us to address our primary research question: does exposure to more diverse environments increase the diversity of subsequent interaction?

Table 1
Composition of friendship networks.

	Share of friends who are:			
	White or Hispanic	Black	Asian	Race not clear
Student's race				
White or Hispanic	0.66	0.04	0.08	0.22
Black	0.47	0.20	0.07	0.26
Asian	0.49	0.03	0.23	0.25
Race not clear	0.57	0.05	0.10	0.28
All	0.62	0.05	0.10	0.24

Each column shows the mean share of friends for a student whose own race is given by the row.

4. Results

The results of regressions (1) and (2) with the shares of Black friends as the dependent variables are displayed in the first two columns of Table 2. Column one shows that living with disproportionately many Black students from the same cohort increases the share of Blacks among friends in the same dorm, $\hat{\gamma}_S = .387$. Increasing the share of Black dorm mates from 5% to 10% increases the share of Black within-dorm friends by 1.9 percentage points ($.387 * .05 = .019$). Like Marmaros and Sacerdote (2006), we find that friendship networks reflect the composition of students' residential environment.

Column (2) addresses our primary research question — the effect of exposing White/Hispanic students to Black dorm mates on friendships with Blacks *outside the dorm*. An exogenous increase in the fraction of Black dorm mates does not significantly change the fraction of Black friends outside the dorm.

Columns (3) and (4) display qualitatively similar results for the share of Asian friends among Whites/Hispanics. A high share of Asians in the same dorm-cohort increases the share of within-dorm Asian friends but does not affect the share of Asian friends outside the dorm.

[3] For a detailed data description and discussion of the relationship between Facebook friendships and educational outcomes, see Mayer and Puller (2008).

[4] Mayer and Puller (2008) show that this race categorization largely coincides with the official race classification at Texas A&M University.

[5] We lose 670 observations due to missing information on gender, cohort, major or dorm. Further we drop 352 students who could not be identified in their Facebook profile picture (e.g. a profile picture contains two individuals).

[6] As a test of whether the algorithm is followed, we examine whether the racial composition of a dorm in one cohort is a predictor for the racial composition in the same dorm in the following cohort. We cannot reject the null that there is no persistence of racial composition across cohorts within dorm.

[7] Exposure *within* a dorm to students of a different race can affect friendships *outside* the dorm via two mechanisms. See Mayer and Puller (2008) for a formal model. Briefly, friendship between two students results from two events: meeting which occurs with some probability, and, conditional upon meeting, forming social ties based upon preferences. Increased exposure to Black students can increase the probability of meeting the Black friends of the Black dorm mate. Alternatively, the increased exposure to Black students in the dorm can change the student's preferences for friend characteristics. This paper measures the total effect of both mechanisms in γ_o.

Table 2
Effect of dorm composition on friendship shares for Whites/Hispanics.

Dependent variable: Covariate:	Fraction of friends in *Same* dorm Black	Fraction of friends *Outside* dorm Black	Fraction of friends in *Same* dorm Asian	Fraction of friends *Outside* dorm Asian
Fraction Black in dorm-cohort	0.387 (0.004)	−0.100 (0.248)		
Fraction Asian in dorm-cohort			0.575 (0.000)	0.026 (0.656)
R^2	0.13	0.06	0.21	0.09
N	1145	1139	1145	1139

All regressions include controls for gender, year in college, major, political orientation, and relationship status.
p-values of H_o:$\gamma = 0$ are reported in parentheses, calculated using the wild cluster bootstrap-t with H_o imposed (Cameron, Gelbach, and Miller (forthcoming)). We cluster at the dorm-cohort level. Inference does not change when clustering at the dorm level.
The number of observations varies because a few students do not have friends.

In unreported regressions, we repeat our analysis for a larger sample that contains students who could not be identified in their Facebook picture and for a smaller sample that only contains students who could be categorized as White or Hispanic. The results are both quantitatively and qualitatively similar to the ones reported in Table 2. In addition we investigate effects across cohorts. In general, the results are consistent with the findings reported in Table 2.

5. Conclusion

This paper contributes to our understanding of one dimension of university efforts to promote diversity. We find that the racial composition of a student's dorm does not affect the composition of that student's friendship network outside the dorm. This study fails to find evidence that promoting more diverse environments leads to a substantial increase in diversity of subsequent social interaction, at least in the short run.

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