Bridging and Bonding in the Academic Melting Pot: Cultural Resources and Network Diversity

Mike Owen Benediktsson
Princeton University

Abstract

Understanding how cultural resources shape the formation of social networks is a methodological challenge as well as a theoretical objective, and both are yet to be met. In this study, sociability on college campuses is modeled as a process in which students' prior cultural experiences and the current social structure of the student body work together, affecting the likelihood of friendships that take place within or across racial boundaries. Structural and cultural perspectives are surveyed to develop hypotheses concerning the determinants of interracial friendship, and these hypotheses are tested against a sample of 3,392 students from the National Longitudinal Study of Freshmen. The results suggest that religiosity, political activism, high arts participation and athletic activities undertaken prior to college affect the diversity of social networks formed in the first year, but work in different directions. The effects of these cultural experiences may be explained by the racial organization of cultural activity on campus.

More than thirty years after Bourdieu's influential writings on cultural capital, the role of cultural resources in building social networks remains a lamentable blind spot in sociology (DiMaggio 2004). A case in point is the role of culture in "heterophily" or the formation of interracial friendships, a topic that remains largely untheorized by sociologists, in spite of their longstanding interests in culture, race and social structure. In part, this omission may be due to the perceived trade-off between different approaches to social analysis: faced by an apparent choice between structural and cultural modes of explanation, analysts often opt for one and ignore the other. Studies of interracial contact have largely built upon Blau's (1977) social structural analysis and Allport's ((1954)) contact theory, both of which emphasize opportunities for interaction while bracketing individuals' cultural traits and the cultural content of social activity. Meanwhile, cultural sociologists have been busily applying Bourdieu's cultural capital to social reproduction and mobility, but have retained Bourdieu's focus on class, rarely examining race. The two perspectives share a central concern: explaining homogeneity and heterogeneity in social networks. Although not mutually exclusive, they have seldom been integrated.

On the other hand, it is intuitively clear that social structure and cultural resources work together in the creation of social ties. Researchers have repeatedly observed higher levels of racial homophily (within-race affiliation) than the racial distribution in a population would suggest. Shared cultural tastes and activities between members of a racial group may help to explain these findings. In an extensive review of empirical studies on homophily, McPherson and colleagues ((2001)) note this possibility, speculating that in some cases, "segregated foci of activity" or "hidden value homophily (information, attitudes, tastes, etc.) may drive the inbreeding process" (421-422). An

actor's location in social space affects the likelihood of contact with designated alters, but culture plays a role in friendship formation: speaking the same language, enjoying the same food, and supporting the same athletic team all increase the likelihood of acquaintance, sorting people into the same locations and giving them something to talk about. A recent programmatic statement ((Pachucki and Breiger)2010) asserts that cultural traits and rituals may provide the missing link in social network analysis generally: "cultural holes" may be more important than "structural holes" if it is acknowledged that a given actor may "bridge structure by sharing culture" (216). As DiMaggio ((1987): 442) remarked, "people use culture to make connections with each other." However, in studies of racial homophily, cultural activity has often been left unmeasured.

To be fair, measurement of any cultural effect on social network formation presents certain empirical difficulties. Most notably, causation may be hard to identify when cultural interests and experiences are likely to be disseminated through existing social networks. One possibility is examining a moment during which old social networks are disrupted and new networks formed. The high school to college transition is such a moment. When a student enters college, both the composition of a student body and the cultural tastes and experiences that students bring to campus should affect the new friendships that develop. This process is expedited by the age of high school graduates and the organization of social life among incoming cohorts of students, many of whom lack friends or acquaintances in the new setting upon arriving. If an actor's past cultural experiences influence her social networks, unsettled moments such as this should be precisely where such an effect would be most easily detected. As Swidler ((1986):

279) [following Weber ((1946))], suggested, culture is most obviously instrumental at times of social reorganization. At these unscripted moments, individuals (like collectivities) draw upon their cultural resources in forging new social arrangements. For example, to the extent that beginning a new job or moving to a new neighborhood involves "presentational rituals" ((Goffman 1967): 485), actors must recall and put to work the preferences, experiences and behavioral styles that constitute their cultural identities.

The present study examines this pivotal time in friendship formation in order to shed light on the roles of social structural conditions and actors' cultural experiences in producing "heterophily" and "homophily", or more specifically, the formation of racially heterogeneous and homogenous friend networks. The advantages of college as a site for researching social network formation are not solely methodological. The social networks that young adults create during their college years are extremely durable, shaping their later life chances in powerful ways. Furthermore, research suggests that the composition of these networks affects students' contentment, success and happiness while attending college ((Attinasi Jr 1989); (Nagasawa and Wong 1999)). On one hand, diversity on campus appears to be associated with a range of positive outcomes for students ((Gurin et al. 2002); (Hurtado et al. 1998); (Milem and Hakuta 2000)); on the other hand, within-race friendships may provide solidarity and psychological support for minority students attending predominantly white institutions ((D'Augelli and Hershberger 1993); (Nagasawa and Wong 1999)). Although differing in their normative assessments of network diversity, these studies agree that the composition of friend networks plays an important role in students' lives. However, for predictions regarding the determinants of

interracial friendship, it is necessary to look elsewhere, to theories that seek to explain the composition of social networks.

Two theoretical perspectives are used to contextualize this project: structural research on social ties between racial or ethnic groups; and a burgeoning program of research on the use of culture in social network formation. The present study is structured as follows: after surveying these bodies of research and comparing their theoretical predictions to existing empirical research, a unique dataset is analyzed to examine the role of structural conditions and cultural resources in the creation of interracial friendship ties at college. The results suggest that relatively diverse or homogeneous social networks are the results of a combination of structural and cultural factors.

Structural and Cultural Explanations for Heterogeneous Social Ties

How might social structural conditions affect the frequency of interracial friendship on campus? An extensive literature building upon Blau's ((1977)) social structural theory suggests that any form of cross-racial affiliation is heavily dependent upon the racial distribution within a population. Because chance contact plays an important role in the creation of social ties, baseline heterogeneity shapes opportunities for interracial affiliation and friendship. For members of a majority, a homogenous population offers many chances to befriend members of one's own race, while providing relatively few to a minority group. By extension, the smallest minorities have the highest likelihood of interracial affiliation; the largest majorities have the lowest likelihood ((Marsden 1987); (McPherson and Smith-Lovin 1987)). Blau's predictions have been borne out in a variety of settings. A broad literature on friendship among elementary

school students, for example, has consistently found that interracial friendships become more common as a student body approaches equal mixing between blacks and whites ((Hallinan 1982); (Hallinan and Smith 1985); (Hallinan and Williams 1989); (Schofield and Sagar 1977); (Quillian and Campbell 2003)). These findings suggest two basic structural hypotheses concerning the effect of social structure on social network composition:

> *H1: The larger the proportion of the student body that is of the same race as the respondent, the larger the proportion of the respondent's friendship network that will be of the same race.*
>
> *H1a: The more heterogeneous the student body, the more heterogeneous the respondent's friendship network will be.*

Although chance encounters are vital to the creation of social ties, they are clearly insufficient to precipitate friendship. Students' past experiences seem likely to play a role, by providing a stock of knowledge and preferences that students can apply in informal interaction and organized social activity. In recent years, a separate body of research has begun to empirically explore how actors' cultural tastes, experiences and worldviews might directly affect social networks. In general, they have found that the cultural traits that an actor brings to interaction have a significant effect on the strength and diversity of resulting social ties. Actors transport internalized, or "embodied" cultural resources into new social environments, where they can be converted into social capital through cultural "matching" ((Erickson 1996)). According to this research, an actors' cultural predisposition is likely to *intervene* in social structure, guiding her into repeated interaction with peers who share cultural interests.

The resulting interaction may take place within or across lines of social difference. Dominating a scarce cultural resource can allow for the reinforcement of external boundaries and the consolidation of social networks within a social group ((DiMaggio 1982); (Lamont and Lareau 1988)). By the same token, knowing and appreciating a *wide* range of culture appears to be consistent with knowing and appreciating a wide range of people ((DiMaggio 1987); (Pettit 1999)). Popular music, sports and other "middle-brow" cultural pursuits have "generalized conversion value" ((Lizardo 2006)), and are associated with more heterogeneous social networks (Erickson (1996); (Kane 2004); Lizardo 2006).

The aforementioned studies predominantly focus on social class (rather than race and ethnicity) as a basis of difference, but offer a conceptual model in which cultural tastes and experiences are internalized and transported into new surroundings, influencing the formation of homogeneous or heterogeneous social ties. They suggest, specifically, that a student's background in cultural activities such as religious worship, arts consumption or athletic participation may be consequential for the composition of the social networks that they form in college. Based on this insight, a general hypothesis can be constructed concerning the effect of students' past cultural experiences – here operationalized as religious observance, political activism, athletic participation and arts participation – on their new friend networks in college. For now, this hypothesis must remain general:

> *H2: Students' prior cultural experiences in religion, politics, sports and the arts are likely to affect the racial and ethnic composition of their friendship networks.*

Which cultural experiences might lead to diverse friendship networks on campus? Which are more likely to lead to the consolidation of within-race ties? By definition, for a student's past cultural experiences in, say, the arts, to produce interracial friendships in a new setting, these experiences must organize social interaction *across* racial boundaries. For a student's cultural experiences to produce within-race friendship, they must organize interaction *within* racial lines in the new setting. In other words, cultural experiences seem likely to affect friendship formation by modifying the baseline likelihood that students interact, producing higher or lower rates of interracial sociability. For example, students' past cultural experiences may influence their friendship networks by sorting them into subgroups where interaction is focused on a shared activity, and where interracial interaction occurs at higher or lower levels than the heterogeneity of the student body would suggest.

This intuition is supported by research emphasizing the importance of organized cultural activity in the formation of social ties ((Feld 1981); (Fischer 1982)). It is also supported by research on social relations in institutions of higher learning. Once students are placed into proximity with each other, the likelihood of contact is facilitated by common cultural tastes and activities ((Antonio 2001); (Feldman and Newcomb 1993): 232-234; (Newcomb 1962): 476; Wimmer and Lewis (2010)). Friendships that cross racial or ethnic lines, like all friendships on campus, are likely to depend heavily upon this process, in part because socializing plays a large part in students' social lives. Tinto, whose influential work ((1988); (1987)) highlights the "acculturation" of minority and poor students at college, suggests that extracurricular activities may play a key role by providing a durable institutional platform for the formation of social ties between

students of different backgrounds. As Gurin, Dey et. al. (2002) write: "Although these informal interactions with racially diverse peers can occur in many campus contexts, the majority of them occur outside of the classroom. Such interactions may include informal discussions, daily interactions in residence halls, campus events and social activities" ((Gurin et al. 2002)). By the same token, ties to ethnically and racially similar students are likely to be facilitated by organized interaction centered around activities such as religious worship and community activism ((Hurtado and Carter 1997)), but few studies have included measures of extracurricular cultural activity in their analysis.

This brief discussion suggests that the cultural backgrounds that students bring to college are likely to affect the racial composition of friendship networks, working either alongside or against the racial distribution of the student body to produce higher or lower rates of homophily or heterophily depending upon the racial organization of cultural activity on campus. Based on this speculation, two hypotheses can be constructed predicting the relationship between cultural activity on campus and interracial friendship:

> *H3: Cultural activities that organize interaction within racial and ethnic boundaries in college will be associated with higher levels of homophily.*
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> *H4: Cultural activities that organize interaction across racial and ethnic boundaries in college will be associated with higher levels of heterophily.*

To recapitulate this brief discussion, prior research suggests several hypotheses concerning the structural and cultural determinants of social network diversity in college. These hypotheses are not mutually exclusive, and point to social network formation as a process in which both chance contact and focused cultural activity are likely to play a role: first, the prevalence of same-race students is likely to be important in shaping the

composition of social networks, raising or lowering the baseline likelihood of interaction; second, the embodied cultural experiences that students bring to campus are likely to move them above or below this baseline, affecting the frequency of interracial friendships; finally, the racial organization of cultural activity in the student body is likely to determine whether any given cultural resource leads to homogeneous or heterogeneous networks.

Data: The National Longitudinal Survey of Freshmen

The high school-to-college transition is a moment at which ties are disrupted and reconstituted, but observing the creation of new social networks is insufficient to isolate the effect of a student's prior cultural experiences on this process. To provide evidence for this analytical task, a data source has to be unique, permitting to the greatest degree possible the pretest/posttest design of a laboratory experiment. More concretely, the data must offer measures of the prior cultural experiences of a racially and ethnically diverse sample of respondents, and must offer measures of network composition at two points in time, straddling the transition to college.

The National Longitudinal Survey of Freshman (NLSF) meets these criteria. Data were collected in five waves from an initial sample of 4,573 freshmen attending 28 selective universities. A final sample of 3,098 (79%) completed all five waves. A primary objective of the study was investigating the effects of academic and social background on the experiences of minority students at prestigious universities. Accordingly, the sample was divided roughly equally between Asian, non-Hispanic black, Hispanic and non-

Hispanic white students. The majority of the variables used in this analysis derive from the survey questions in the first and second waves of the study. Upon respondents' arrival at college, investigators collected data on the race and ethnicity of the respondents' 10 closest friends in high school, asked a range of questions regarding their family background, social attitudes, academic and social experience, and, importantly for the present analysis, their participation in a range of cultural activities during their senior year of high school. During the second wave, which was administered the following semester, students were asked about the race and ethnicity of the 10 closest friends they had made at college. The third wave of the survey included, among other topics, measures of the respondents' participation in a range of extracurricular activity groups at college. (For more information about the NLSF and a list of peer-reviewed studies using the data, see http://nlsf.princeton.edu/). Independent and dependent variables are summarized in Table 1. [TABLE 1 ABOUT HERE]

Dependent Variables: Homophily and Heterophily in Friendship Networks

Two measures of current social network composition were used as dependent variables. A question in Wave 2 of the NLSF, administered during spring of the respondents' freshman year, asked how many of the 10 closest friends the respondent had made since coming to college were Asian, Hispanic, black or white, respectively. From the answers to this question, the proportion of the respondent's friendship network consisting of same-race ties was calculated. Constructed in this way, the homophily index is easily interpretable, representing the probability that a randomly selected member of a respondent's friendship network is of the same race as the respondent.

Measuring heterophily proved slightly more complicated, in part because the concept has seldom been operationalized in prior research. An obvious possibility, the proportion of cross-racial friendship ties, failed to capture an important aspect of heterophily: the tendency to associate with members of *multiple* other racial or ethnic groups.[1] For this reason, an index measuring the heterogeneity of social networks was adapted from Moody ((2001)). The index, like the measure of homophily that I employ, has a fairly intuitive interpretation, representing the probability that any two students chosen at random from a student's high school friendship network are of different races or ethnicities. Students with homogenous high school friend networks will score near zero, while those whose high school friend networks containing an equal mixture of several racial categories will approach 1 on the indicator. The index is calculated as:

$$heterophily = 1 - \sum_k \left(\frac{n_k}{N} \right)^2$$

where *n* denotes the number of friends in racial group *k* in a respondent's friend network and *N* denotes the total number of friends in the network (typically 11 including the respondent). To be clear, when measured in this way, heterophily does *not* strictly represent a respondent's tendency to befriend racially dissimilar peers: a hypothetical white student whose entire friendship network consists of Asians would score low on the indicator. Rather, heterophily, as defined here, represents a tendency to befriend peers

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[1] I would like to thank an anonymous reviewer for pointing out this important dimension of heterophily and for suggesting that the dependent variable account for the heterogeneity of a respondent's social network.

from multiple different racial or ethnic groups, resulting in social networks that contain maximum heterogeneity.

Individual-Level Control Variables

Several demographic and attitudinal controls are included in the analysis below. Cultural traits, especially religiosity and arts participation, have been shown to be correlated with socioeconomic status, raising the possibility of spurious cultural effects. To control for this, a measure of parents' educational attainment was created by taking the average of two categorical measures representing father's and mother's respective educational attainment level. A dichotomous variable for sex was included in the analysis on the speculation that gender differences might be linked with different patterns of cross-race socializing. Thirdly, an attitudinal bias in favor of in-group socialization was hypothesized to reduce contact with racial or ethnic alters ((Currarini et al. 2010)). To measure in-group bias, a question asking how easy various racial groups are "to get along with" was used. The student's answer when prompted with their racial in-group was subtracted from the average of their answers when prompted by racial out-groups, to construct an indicator for in-group preference. It was further hypothesized that students' impression of the racial climate on campus would play a role in encouraging or discouraging students from pursuing interracial friendships. A question asking students whether they had been made to feel uncomfortable by other students because of their race was used to measure experienced prejudice on-campus.

Finally, a measure of the racial composition of students' *high school* friend networks was drawn from a question in Wave 1 of the NLSF. The question asked the

number of the respondent's 10 closest friends in high school who were Asian, Hispanic, black or white, respectively. The results permitted measures of heterophily and homophily to be calculated (as described above) for the students' friendship networks prior to college. These measures are crucial to the present analysis. In any study of new social network outcomes, unobserved prior social networks would appear to pose a powerful threat of spuriousness. Given that an established body of research suggests that social networks are crucial in the diffusion of cultural tastes and activities [although, see (Vaisey and Lizardo)(2010)], assessing the effects of cultural resources on new network ties would be especially hazardous if prior networks were unobserved. Cultural variables aside, including prior social network composition controls for a wide range of attributes and biographical experiences that may lead a student to consistently favor one group over another in the creation of new ties. This control variable thus offers a powerful "pretest" in the pseudo-experimental design of this study, identifying and controlling for prior heterogeneity before a treatment (in this case, entering the social milieu of a new freshman class) takes place.

Social Structural Opportunity

In order to test the structural theories described above, three indicators of social structural opportunity are included in the analysis. First, the proportion of the student body consisting of students of the respondent's own race during her freshman year was calculated based on data from *U.S. News and World Reports*. (These data were unavailable for one university in the sample, bringing the sample of universities down to 27 from 28.) Second, the racial heterogeneity of the student body was calculated using

Moody's (2001) heterogeneity index (see above), to test the hypothesis that a student population equally mixed between different races would be most likely to produce diverse friendship networks.

A third control, the percentage of the student body living in campus housing, was drawn from *US News & World Reports* to capture aspects of the spatial organization of student socializing. Given the race-blind residential assignment policies commonly pursued by universities and the frequency of high rates of racial segregation in residential neighborhoods across the United States, it is reasonable to infer that universities in which a large percentage of students live on campus are likely to present *more* opportunities for chance interracial contact than universities in which a large percentage of students commute from their parents' homes or from student housing in surrounding communities.

Prior Cultural Experiences and Current Cultural Participation

All of the variables used to measure cultural resources prior to college were drawn from the first wave of the study, which took place during students' first semester of college. Respondents were asked to assess their level of religiosity and political activism during their senior year in high school, as well as the frequency of their participation in athletic and arts-related activities. Four additive scales measuring religiosity, political activism, sports participation and arts participation were created from the answers to these questions. Descriptive statistics for the scales and the wording of their component measures are presented in Table 2. The cultural areas are admittedly broad, erasing for example the highbrow/lowbrow distinction in sports and the arts, as well as doctrinal and denominational differences in religion and ideological differences in political activism,

but their breadth is also an asset, as each indicator captures a wide range of tastes, beliefs and experiences. The resulting measures were arithmetically rescaled to a range of 0-1 in order to facilitate comparison between cultural resources. Although self-reported and retrospective, there appears little *a priori* basis on which to expect systematic bias in students' responses: questions refer to a period ending several months before the time of the survey, so inaccurate recollection seems unlikely. Systematic distortion rooted in social desirability seems equally unlikely given the innocuousness of the questions.

Beyond these measures of cultural experiences during high school, several measures of extracurricular involvement *during* college are also used in the ensuing analysis. As part of the third wave of the NLSF, which took place during respondents' sophomore year, the students were asked about their involvement in extracurricular groups devoted to religion, politics, sports (intramural athletic teams) and the arts ("music, art and theatre"), areas that map directly onto the four varieties of prior (high school) cultural experience described above. Students were separately asked to identify the racial or ethnic majority among the membership of each extracurricular group in which they participated. From their answers, dichotomous measures of participation in each area were created. [TABLE 2 ABOUT HERE]

Analysis and Results

Social Structural Conditions and Interracial Friendship

Given the nested nature of the sample (students within universities) and a substantive interest in the effect of higher-level variables such as the racial distribution of the student body, I fit a mixed-effect multilevel model including random effects for universities and

racial groups within universities. The two analytical assumptions behind this specification are as follows: first, holding individual-level factors constant, a student's number of interracial ties is likely to depend upon the average number of such ties among students at their university – in other words, some universities may be more conducive to interracial socialization and friendship than others; and second, a student's number of interracial ties may rely upon the average number of such ties among students of the same race at their university. Incorporating these random effects into the model provides more certainty that the fixed effects of primary interest are *not* capturing unobserved university-level heterogeneity.[2]

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[2] A number of alternate specifications were tested and all produced similar results, with one caveat. To reflect the assumption that students might have more than 10 same-race friends, censored regression models were fit for the homophily dependent variable (CNREG and TOBIT in STATA). Secondly, to reflect the stratified sampling strategy of the NLSF, both censored and uncensored regression models were fit using the appropriate survey weights for race. All of the unweighted specifications produced results extremely similar to the multilevel mixed effects results presented. The decision to present the results of a mixed effect multilevel model was motivated by the added confidence in individual-level coefficients and their standard errors that this model offered, considering that university level random effects appeared to capture significant heterogeneity in the data. The weighted specifications listed above produced similar results for the cultural variables when interaction terms were included for non-white status and the variables in question, perhaps indicating that cultural effects are slightly

The results of the analysis are presented in Tables 3 and 4. In Model 1, network homophily and heterophily are regressed on demographic and attitudinal controls as well as indicators measuring social structural opportunities for contact at college. The results suggest that females exhibit slightly more homophily (beta=.031) and slightly less heterophily (beta=-.024) than do males. Attitudinal bias in favor of one's own racial group has the effect anticipated, producing higher levels of homophily (beta=.017) and lower levels of heterophily (beta= -.006). After controlling for these factors, Asian, black and Hispanic students all display higher levels of heterophily than do white students, with Asian and Hispanic students forming the most heterogeneous social networks. Interestingly, however, black students appear to be, on average, significantly more likely (beta=.175) than whites to form *within*-race ties, perhaps suggesting that black students *either* form relatively homogeneous friendship networks with groups of other black students *or* form diverse networks, but tend not to form a large number of close ties with any one other racial group (a tendency that would produce low homophily *and* low heterophily). Among individual-level factors, I find that the composition of high school social networks has the largest effect, both on homophily (beta=.428) and on heterophily (beta=.254). Finally, as expected, social structural opportunities for within-race or cross-racial contact play a substantial role in affecting the composition of friendship networks.

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weaker for whites than for non-whites. By design, the weighted specification emphasizes the experience of white students over that of non-whites, as white students comprise on average 70% of the student bodies in question. Using an unweighted model carries a clear tradeoff: the results are less generalizable to the student bodies of predominantly white universities, but more generalizable across racial categories.

Higher levels of heterogeneity in the student body are associated with produce more heterogeneous friendship networks (beta=.350), while a relatively large same race population increases the likelihood of within-race ties (beta=.461).

In other words, the regression models predict that high school network composition and college social structure exert strong parallel constraints upon network composition in college. Holding all other variables constant, a student who attends a university that is 70% of the same race and who had only two cross-race friend in high school (the average profile of a white student in the sample) is likely to have a social network in college that roughly mirrors the homogeneity of both her high school network *and* the student body population, befriending only three friends of a different race. Once differences in sex, race and attitudinal predisposition are taken into account, the composition of a student's friend network in high school and the racial distribution of the university student body are nearly entirely sufficient to predict the "reproduction" of homophilous social structure in college. [TABLE 3 ABOUT HERE]

Prior Cultural Experiences and Interracial Friendship

What do students' cultural experiences in high school add, if anything, to the explanation above? In Model 2 in Tables 3 and 4, I add students' past cultural experiences to the analysis. First, it is notable that AIC and BIC goodness of fit statistics indicate a modest but significant improvement in the models when cultural variables are added. At the same time, the addition of these indicators produces little change in the other coefficients, suggesting that their effects are separate from those of the other variables (i.e., low multicollinearity). Religiosity, sports participation and arts

participation all have statistically significant effects on homophily, but in different directions: highly religious students are more likely to make friends of their own race (beta=.065), while students with an extensive background in sports (beta= -.018) and the arts (beta= -.028) tend to make more friends *across* racial lines. Comparing these results to the results presented in Table 4 suggests that the effects of religiosity and prior arts participation on homophily and heterophily are consistent: high religiosity produces a higher proportion of within-race friendships and *lower* network heterogeneity; arts participation produces a lower proportion of within-race friendships and *higher* network heterogeneity.

The results for political activism and sports participation are inconsistent across Tables 3 and 4, and thus require a slightly more nuanced interpretation. Political activism appears to produce greater network heterogeneity (beta=.04) while having no significant effect on homophily. Conversely, sports participation has no significant effect on network heterogeneity while lowering the proportion (beta=.-.04) of within-race friendships. The interpretation of these patterns are, still, fairly straightforward, suggesting that sports participation increases the likelihood of friendships that cross racial lines without increasing network diversity – producing, in other words, a large proportion of friendships with members of *one* other racial or ethnic group. In contrast, political activism appears to encourage diverse friendship networks, but has a positive effect on homophily that falls just short of meeting conventional tests of statistical significance. This suggests that political activism may produce *either* within-race friendship or diverse networks, but does not encourage large numbers of friendships with members of one other race.

In an attempt to further investigate the role of culture in the creation of diverse social networks, I ran six separate models. The first model included five additional indicators representing the level-two mean of each attitudinal and cultural variable (i.e. the average levels of these variables within each student's university). This specification allowed me to test for university-level selection effects while probing for the possible ecological effects of attending a university where students are high in a given cultural resource ((Bafumi and Gelman)2007). All additional variables proved insignificant, however, and goodness of fit indicators showed no improvement from the added terms. I fit four additional models including interaction terms for each of the four cultural variables and the student's race. Finally a sixth model included interaction terms for all four cultural variables and the same-race proportion of the student body. These models allowed me to probe for interaction effects between race or social structure and the prior cultural resources that students bring to college. Again, however, goodness of fit indicators showed no improvement from the inclusion of the added terms in any of these cases, instead suggesting slight gains in model fit that are not worth the loss of parsimony. (Results available upon request.) These findings, along with the evidence discussed above, suggest that the effect of cultural resources on students' friendships does not depend systematically upon their race or their predominance in the student body. Regardless of a student's minority or majority status, their cultural experiences appear to have similar effects on the heterogeneity of their social networks. Students' social networks in high school and the racial composition of the student body they enter have a powerful effect on their friendships, predicting patterns of homophily or heterophily in college social networks. However, the cultural experiences that students bring to college

predict movements away from this baseline, toward higher or lower frequencies of interracial friendship. [TABLE 4 ABOUT HERE]

Extracurricular Participation and Interracial Contact

The results thus far are intriguing, but raise questions that remain unanswered. Why should certain cultural resources lead to within-race friendship, while others appear to support the formation of diverse friendship networks? Previous research, as discussed above, suggests that the capacity of different cultural activities and tastes to encourage heterogeneous or homogeneous social networks is likely to depend upon the organization of cultural activities in a population. In order to test Hypotheses 3 and 4, I analyzed data from the third wave of the study. During students' sophomore year, investigators asked whether they participated in groups devoted to religion, arts, athletics (intramural sports teams) and political activism. Unfortunately, because this wave took place several months *after* data were gathered on students' friendship networks at college, it was not possible to model the direct effects of extracurricular cultural participation on homophily and heterophily at the individual level. Instead, the data were analyzed to gain insights into the racial organization of extracurricular participation on campus and to assess the relationship between organized cultural activity and rates of interracial contact and friendship at the aggregate level.

As a first step, I examined the relationship between racial homophily and extracurricular participation at the level of racial groups. For the purposes of this stage of the analysis, I define homophily and heterophily as higher rates of within-race friendship and network heterogeneity, respectively, *than predicted by student body social structure*,

which we have already seen to be a crucial factor. Coleman's ((1958)) homophily index, which defines homophily relative to group size in a broader population, provides a perfectly suited model for defining homophily in these terms. Letting u_j be the proportion of the student body belonging to race j and letting s_j be the proportion of a student's friendship network belonging to her own race, the homophily index is defined by $(s_j - u_j)/(1 - u_j)$. A score of 0 on this index indicates that the proportion of the student body belonging to a student's own race and the proportion of her friendship network belonging to her race are equal, exactly as Blau's general structural analysis (discussed above) would predict. A score of 1 indicates complete homophily: all of a student's friends are same-race, regardless of the composition of the student body. [For a recent application of the index to a related empirical topic, see Currarini, Jackson et al. ((2010))].

In figures 1, 2 and 3, levels of homophily are graphed against rates of participation in religious groups, intramural sports teams and arts groups on campus. (Political groups were excluded because, judging from the results presented in Table 3, prior political activism appears *not* to be strongly related to homophilous networks in college.) In these figures, a positive slope offers evidence that high rates of participation in an activity are related to *higher* frequencies of same-race friendship at the level of the racial groups in the sample universities. A negative slope offers evidence that participation is related to *lower* frequencies of interracial friendship. For the most part, the results are consistent with the analysis thus far: religious group participation is associated with higher levels of homophily and participation in intramural sports is associated with lower levels of homophily. Arts participation is the exception, as the results show constant levels of homophily at different participation rates. The results

indicate that patterns of on campus activity in three of the four areas of cultural activity are related with higher or lower levels of homophily, offering a further layer of evidence supporting the argument that cultural experiences influence frequencies of interracial friendship and (perhaps) suggesting a mechanism by which cultural activity helps to produce such friendships: through the intermingling of students involved in organized activity focused on shared interests. However, because students' prior cultural interests and experiences are likely to drive their extracurricular participation, causal speculation concerning the effect of such participation should be limited. Furthermore, when group-level *heterophily* indices were charted against extracurricular group participation, the results (not shown but available upon request) appeared to indicate a weak relationship between cultural participation and heterophily, as the slope of regression lines followed expectations, but were close to flat in every case. More direct evidence is needed of the capacity for extracurricular activity to organize interaction within and across racial boundaries.

Fortunately, a survey question in the NLSF provides such direct evidence. After students were asked whether they participated in an extracurricular group, they were asked about the racial majority in this group. As an alternative to indicating a majority, students could choose to designate that the group was "mixed." Their responses permit a more refined test of Hypotheses 3 and 4, providing a window into the degree to which cultural activity on campus is organized within or across racial lines. In every case, patterns are consistent with the findings presented in Tables 3 and 4. In the majority (55.4%) of cases where a respondent reported membership in a religious group, the respondent's race represented the racial majority in that group. Only 7.6% of religiously

active students reported membership in a "mixed" group. In contrast, 41.9% and 39.9%, respectively, of respondents reporting participation in intramural teams and arts groups reported that their own race represented the majority, and more than 10% of members in political organizations, intramural teams and arts organizations reported membership in "mixed" groups. These patterns indicate that the likelihood of cross-racial contact varies by cultural activity. Religiously observant students appear more likely to come into contact with students of the *same* race through their participation; students active in the arts appear more likely to come into contact with students of a *different* race; students active in politics and intramural sports appear to fall somewhere in between in the extent to which they experience cross-racial contact.

Taken as a whole, the data support a more-or-less intuitive model of students' cultural and social experiences when transitioning to college. Homogeneous or heterogeneous high school friend networks and student bodies strongly constrain the composition of new friend networks, leading in many cases to the reproduction of social network homogeneity or heterogeneity. But culture can work alongside or against this social reproduction model by leading students out of a broader population where contact is limited by chance encounters, into more immediate (and potentially meaningful) contact with interracial alters organized around shared activity.

Discussion

As previously noted, theories linking cultural resources with the creation of social networks are lacking. A plethora of metaphors are now available to characterize the social uses of culture, differing in the degree of agency and reflexivity they grant to

culture's users. The cultural resources that come into play in interaction have been alternately described as capital, schemata, repertoires, frames and toolkits. But when it comes to the finer points of social network formation (i.e. meeting acquaintances and making friends), we lack an understanding of *how* these cultural resources are used, and *when*, and with *whom* ((Lizardo 2006): 780). If culture is capital, we need to know who accepts what kind of currency. If culture is a toolkit, we need to differentiate the screws from the nails. A more incisive and complete understanding of culture's role in the building of friendships and other social ties will require that culture be defined in terms of its role *vis a vis* social structure in specific structural and cultural contexts ((Pachucki and Breiger)2010).

The findings presented above have several theoretical and empirical implications meriting further discussion. Empirically, my results offer an important refinement of Tinto's (1988) argument regarding the acculturation that minority college students experience on campus. Cultural involvement in campus activities can produce a variety of outcomes for students of any race: prior experience in some cultural fields, such as arts, athletics and political activism, lead to friendships that cross racial and ethnic lines. Other forms of cultural activity, such as religious worship, appear more likely to produce meaningful contact with one's racial peers.

In theoretical terms, these empirical findings underscore the insight that all cultural resources are not "born equal" with regard to their effect on social networks. Specific cultural experiences in an actor's background are associated with more or less diverse social networks. Moreover, these resources appear to work *independently* of social structure in affecting the likelihood of within-race or diverse social ties. In this

respect, my findings support both the empirical and theoretical implications of recent research on the racial composition of college friendship networks (Wimmer and Lewis (2010)). An actor's cultural resources do *not* seem to serve as mere social lubricant, facilitating friendship among actors whose contact is actually determined by the distribution of their racial or ethnic groups in the student body. Instead, cultural resources appear to work *above* and *across* social structure, carrying their own independent capacity to encourage friendship within or across racial lines.

On one hand, shared tastes, beliefs and cultural practices can help reproduce the ties between members of a group, resulting in social cohesion or exclusion. In other cases, cultural resources can allow actors to move or communicate *between* groups. In the first scenario group boundaries are likely to be reinforced; in the second they are likely to be weakened. In the case of cross-racial friendship among college students, religiosity appears to belong to the first category; sports, politics and arts to the second. Drawing analogically upon Putnam's discussion of social capital ((Putnam 2000): 22-24), these social uses of culture can be referred to as *bonding* and *bridging* with regard to any two discernible social groups. Cultural capital, toolkits and repertoires, vital in understanding how cultural resources might affect individual outcomes, may be less helpful in explaining the population-level outcomes of inherently dyadic processes such as communication, coordination and friendship. As Douglas and Isherwood (1996: xv) note, "[cultural] goods are neutral, their uses are social, they can be used as fences or bridges." Thinking of culture as either "bridging" or "bonding" defines cultural resources in relation to the social structural context of their use, positioning culture in the space between defined groups of actors (in this case, racial groups on campus).

Nonetheless, if cultural goods are neutral, it is nevertheless clear that at some point they acquire valence, becoming more "fence-like" or "bridge-like" for any two actors. How and when a given cultural resource acquires this valence is an important question that lies beyond the scope of this study. My findings regarding the role of religion and the arts resonate with prior research on the racial organization of cultural activity outside college: religious worship in the United States is known to be divided along lines of race (Blanchard 2007; (Blanchard 2007; Emerson and Smith 2000)). In contrast, an increasing racial "convergence" has been found in high arts participation in recent decades ((DiMaggio and Ostrower 1990)). The apparent carryover of the racial organization of these cultural practices to college campuses indicates that their racial specificity (or conversely, their racial generality) is transportable across institutional boundaries.

In part, this may be due to the way transportable categories of cultural practice (for example, religious denominations or specific athletic activities) overlap or bisect racial categories. To the extent that religious denominations coincide with racial boundaries, the capacity for religious practice to produce within-race affiliation may be explained by the importation of denominational differences onto campus. Categories of cultural practice, however, tend to coincide with differentiation in *content* - if semiotic or symbolic categories (for example, art or music genres) resonate differently for members of different racial or ethnic groups, this may also play a role in determining the effects of specific cultural activities on networks. The insight that symbolic and social boundaries are mutually articulated and reinforced represents well-traveled theoretical ground for sociologists of culture ((Lamont and Molnar 2003)). For empirical researchers

28

investigating the role of culture in the formation of social networks, however, this theoretical insight implies a formidable methodological challenge: simultaneously investigating both the social and the symbolic organization of cultural practices and seeking to disentangle their effects on social ties in a given setting.

A second limitation of this study that raises important questions for further research pertains to the *mechanisms* through which cultural tastes and experiences affect social networks. Following the insights of prior empirical research on the social life of university students, my findings focus on one possible mechanism through which cultural tastes and experiences influence social network formation: the organization of undergraduate activity around shared cultural "foci" in which interaction takes place within or across racial boundaries ((Feld 1981); Wimmer and Lewis 2010). In this model, religiosity, athleticism or an interest in the arts provide *sorting* mechanisms, affecting the likelihood of contact with peers who are racially similar or dissimilar and thus raising or lowering the probability of friendships that cross racial boundaries.

It is important to recognize, however, that cultural tastes and experiences might influence social network formation through a variety of other causal pathways. Shared cultural tastes can provide a basis for informal social activity, such as casually attending sporting events or dance performances, or, for that matter, dorm room conversations informed by a common indexical language or style of interaction based in shared cultural experiences. [For an empirical example in a professional setting, see Fine ((1995))]. While the typical college campus is likely to offer many formally organized opportunities for cultural activity, accommodating a plethora of organizations, clubs, teams, classes, concerts and events, many if not most social settings are characterized by more loosely

organized social activity (one thinks of public parks and recreational areas or neighborhood coffee shops and bars). In settings such as these, organized foci of cultural activity may play less of a role than nuanced symbolic or lexical cues in producing new social ties.

Finally, the preceding analysis has an additional important limitation that suggest avenues for further research. As previously mentioned, the study uses broad classes of experience (e.g. religiosity) to measure cultural participation. This obscures categories of content such as "high" and "low" cultural tastes in the arts, or differences in religious faith, that should ideally be taken into account in cultural analysis. In general, future research should seek to build upon the growing evidence that internalized cultural traits affect the composition of social networks. For example, a worthwhile study might expand upon the common ground between this study and Lizardo's (2006) analysis, examining how specific tastes (rather than broad areas of cultural experience) come into play in social network diversity, or examining the interplay between organized religious activity and moral worldviews ((Vaisey and Lizardo)2010) in the consolidation or expansion of social contact across or within social boundaries.

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Table 1: Descriptive Statistics for Variables Used in Analysis

Variable	N	Source[*]	Mean	Standard Deviation	Range
Control Variables:					
Sex (Female = 1)	3684	NLSF Wave 1	.59	.49	[0-1]
Parents' Educational Attainment (Categorical)	3684	NLSF Wave 1	5.24	1.45	[1-7]
Asian (Dichotomous)	3684	NLSF Wave 1	.25	.43	[0-1]
Black (Dichotomous)	3684	NLSF Wave 1	.27	.44	[0-1]
Hispanic (Dichotomous)	3684	NLSF Wave 1	.23	.42	[0-1]
In-Group Preference (College)	3595	NLSF Wave 1	0.27	1.11	[-5-6]
Experienced Prejudice (College)	3494	NLSF Wave 1	1.66	.87	[1-7
High School Network Homophily	3670	NLSF Wave 1	.51	.36	[0-1]
High School Network Heterogeneity	3670	NLSF Wave 1	.34	.28	[0-1]
Prior Cultural Experiences:					
Religiosity	3669	NLSF Wave 1	.50	.28	[0-1]
Political Activism	3683	NLSF Wave 1	.54	.25	[0-1]
Sports Participation	3678	NLSF Wave 1	.43	.22	[0-1]
Arts Participation	3681	NLSF Wave 1	.37	.14	[0-1]
University Fixed Effects:					
Proportion Campus Housing	3684	USN&WR	.59	.24	[.25-1]
Proportion Student Body Same-Race as Respondent	3684	USN&WR	.26	.29	[.01-.92]
University Heterogeneity	3627	USN&WR	.45	.14	[.15-.69]
On-Campus Cultural Participation:					
Religious Organization	3203	NLSF Wave 3	.23	.42	[0-1]
Political Organization	3203	NLSF Wave 3	.14	.35	[0-1]
Intramural Sports Team	3203	NLSF Wave 3	.23	.42	[0-1]
Arts Organization	3203	NLSF Wave 3	.19	.40	[0-1]
Dependent Variable:					
Interracial Friendship Ties	3485	NLSF Wave 2	5.11	3.48	[0-10]

Note: NLSF Wave 1 administered upon during respondents' first semester, upon their arrival at college. As part of this wave, respondents were asked a series of questions pertaining to their cultural participation during senior year of high school; their answers to these questions were used to construct measures of embodied cultural resources. NLSF Wave 2 administered during respondents' second semester. NLSF Wave 3 administered during respondents' third semester. All items from the NLSF are self-reported.

Table 2: Measures of Prior Cultural Experience

	N	Mean	Standard Deviation	Range	α
Religiosity					
"On a scale of 0 to 10, how religious would you say you were?"	3911	4.97	3.12	[0-10]	
"On a scale of 0 to 10, how observant would you say you were of your religion's customs, ceremonies, and traditions?"	3908	4.98	3.12	[0-10]	.85
"Did you attend religious services:" ("Never"…"Very Often")	3913	2.55	1.14	[1-5]	
Political Activism					
"Were the following characteristics true of you last year?" ("Politically Active:" "Not At All True"…"Very True")	3922	1.63	.74	[1-3]	-
Sports Participation					
"Last year, how often did you participate in sports at school?" ("Never"…"Very Often")	3918	3.05	1.70	[1-5]	
"Last year, how often did you participate in organized sports outside of school?" ("Never"…"Very Often")	3924	2.06	1.45	[1-5]	.60
"Last year, how often did your parents or other adults in your household take you to sporting events?" ("Never"…"Very Often")	3922	2.24	1.27	[1-5]	
Arts Participation					
"Last year, how often did your parents or other adults in your household take you to a museum?" ("Never"… "Very Often")	3922	1.77	.97	[1-5]	
"Last year, how often did your parents or other adults in your household take you to plays or concerts?" ("Never"…"Very Often")	3921	2.27	1.20	[1-5]	.73

Note: Data provided by National Longitudinal Survey of Freshmen (NLSF).

Table 3. Multilevel Mixed Effects Regression of Friendship Network Homophily in College on Selected Conditions.

|	(1)		(2)	
Intercept	0.068*	(0.037)	0.090*	(0.039)
Controls				
Sex (Female)	0.031***	(0.008)	0.033***	(0.008)
Asian	0.025	(0.031)	0.014	(0.031)
Black	0.175***	(0.033)	0.155***	(0.033)
Hispanic	-0.054*	(0.033)	-0.070*	(0.033)
Parents' Education	0.000	(0.000)	0.000	(0.000)
In-Group Preference	0.017***	(0.005)	0.015***	(0.005)
Experienced Prejudice	0.020***	(0.003)	0.020***	(0.003)
High School Friendship Network Homophily	0.428***	(0.014)	0.416***	(0.014)
Prior Cultural Experiences				
Religiosity			0.065***	(0.014)
Political Activism			0.024	(0.015)
Athletic Participation			-0.044**	(0.018)
Arts Participation			-0.073**	(0.028)
University Fixed Effects				
Proportion Campus Housing	0.000	(0.000)	0.000	(0.000)
Proportion Student Body Same-Race	0.461***	(0.046)	0.453***	(0.046)
University Random Effects				
Intercept	0.210***	(0.003)	0.210***	(0.002)
Asian	0.064***	(0.013)	0.061	(0.013)
Black	0.077***	(0.014)	0.077	(0.014)
Hispanic	0.039***	(0.012)	0.037	(0.012)
AIC	-746.49		-739.27	
BIC	-647.55		-616.69	
N	*3392*		3392	

Note: Network Homophily defined as the probability that an alter chosen at random will be of the same race or ethnicity as the respondent. Standard errors in parenteses. * p < .05; ** p < .01; *** p < .001 (one-tailed tests for hypothesized effects, otherwise two-tailed). Data provided by National Longitudinal Survey of Freshmen (NLSF).

Table 4. Multilevel Mixed Effects Regression of Friendship Network Heterophily in College on Selected Conditions.

|	(1)		(2)	
Intercept	0.063*	(0.033)	0.036	(0.037)
Controls				
Sex (Female)	-0.024***	(0.007)	-0.027***	(0.007)
Asian	0.054***	(0.012)	0.056***	(0.012)
Black	0.029*	(0.015)	0.034*	(0.015)
Hispanic	0.080***	(0.010)	0.082***	(0.010)
Parents' Education	-0.001*	(0.000)	-0.001**	(0.000)
In-Group Preference	-0.006*	(0.003)	-0.006*	(0.003)
Experienced Prejudice	0.010*	(0.004)	0.009*	(0.004)
High School Friendship Network Heterogeneity	0.254***	(0.015)	0.251***	(0.015)
Prior Cultural Experiences				
Religiosity			-0.022*	(0.013)
Political Activism			0.044**	(0.014)
Athletic Participation			0.002	(0.017)
Arts Participation			0.063**	(0.027)
University Fixed Effects				
Proportion Campus Housing	0.001*	(0.000)	0.001*	(0.000)
University Heterogeneity Index	0.350***	(0.055)	0.339**	(0.057)
University Random Effects				
Intercept	0.201***	(0.002)	0.200***	(0.002)
Asian	0.033***	(0.011)	0.031***	(0.011)
Black	0.050***	(0.013)	0.049***	(0.013)
Hispanic	0.000***	(0.010)	0.000***	(0.010)
AIC	-1126.176		-1055.831	
BIC	-1058.755		-933.5866	
N	3392		3392	

Note: Network Heterophily defined as the probability that any two alters in the respondent's network will represent two different racial or ethnic groups. Standard errors in parenteses. * $p < .05$; ** $p < .01$; *** $p < .001$ (one-tailed tests for hypothesized effects, otherwise two-tailed). Data provided by National Longitudinal Survey of Freshmen (NLSF).

Figure 1: Racial Homophily and Religious Participation: 27 Selective U.S. Universities
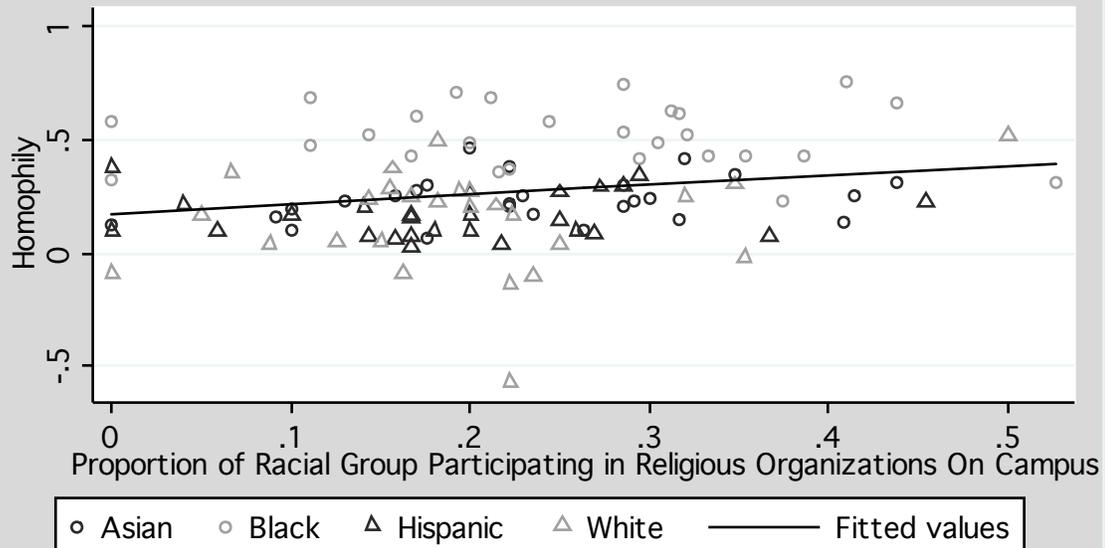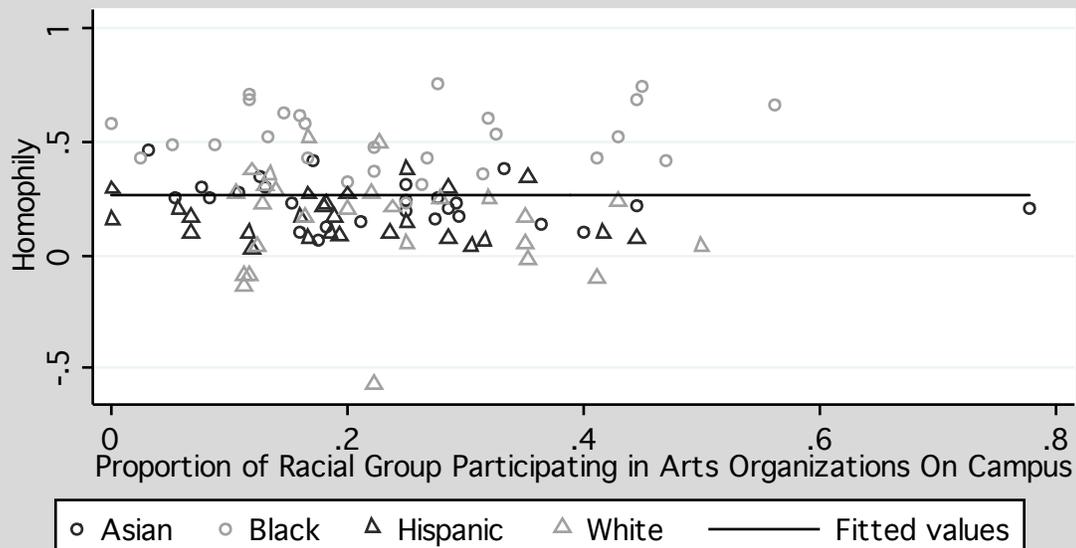
Note: Each point represents the average among students of a given race at a given university. Homophily index (Coleman 1958) measures deviation from expected level of racial homophily given the relative size of same-race population in student body. A score of 0 indicates that the same-race proportion of the student body and of friendship networks are equal (no homophily). A score of 1 indicates that all of students' friends are of the same race (perfect homophily). Data provided by the National Longitudinal Study of Freshmen (NLSF)

Figure 2: Racial Homophily and Intramural Sports Participation: 27 Selective U.S. Universities
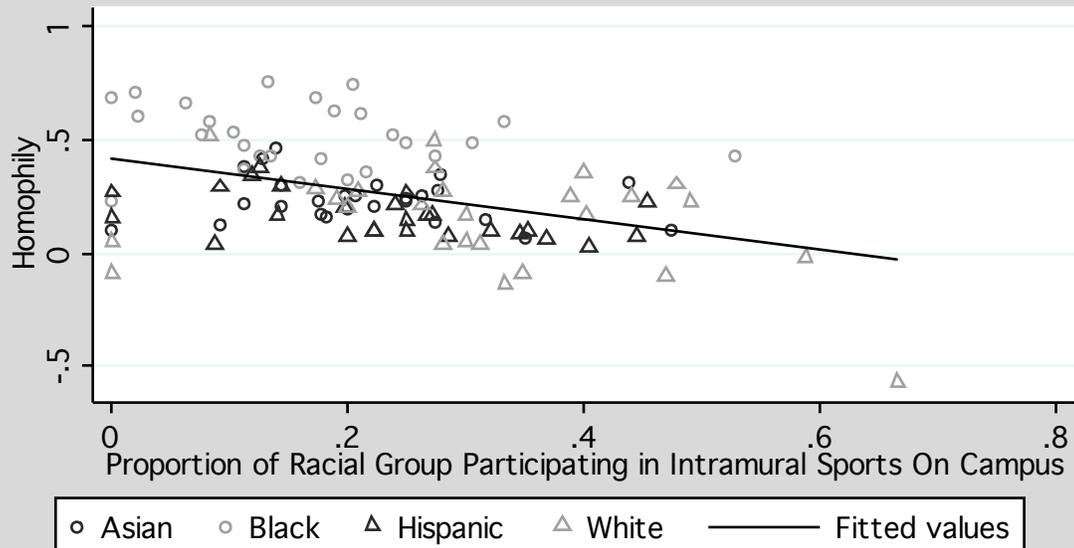
Note: Each point represents the average among students of a given race at a given university. Homophily index (Coleman 1958) measures deviation from expected level of racial homophily given the relative size of same-race population in student body. A score of 0 indicates that the same-race proportion of the student body and of friendship networks are equal (no homophily). A score of 1 indicates that all of students' friends are of the same race (perfect homophily). Data provided by the National Longitudinal Study of Freshmen (NLSF)

Figure 3: Racial Homophily and Arts Group Participation: 27 Selective U.S. Universities

Note: Each point represents the average among students of a given race at a given university. Homophily index (Coleman 1958) measures deviation from expected level of racial homophily given the relative size of same-race population in student body. A score of 0 indicates that the same-race proportion of the student body and of friendship networks are equal (no homophily). A score of 1 indicates that all of students' friends are of the same race (perfect homophily). Data provided by the National Longitudinal Study of Freshmen (NLSF)