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Who Has Different-Race Friends, and Does It Depend on Context? Openness (to Other), but Not Agreeableness, Predicts Lower Racial Homophily in Friendship Networks

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People form relationships with people from their own racial groups, a phenomenon called *racial homophily*, which reduces interracial contact and exacerbates inequality and prejudice. Although viewed as arising from environmental factors, we argue that racial homophily also involves individual choice and, thus, personality factors. We address three major issues. First, are interpersonal concerns (Agreeableness) and intergroup concerns (Openness) differentially relevant to cross-race friendships? Second, are current conceptions of Openness sufficient, or do we need lower-level facets more attuned to intergroup concerns? Third, can we specify the interplay between personality and contextual factors in different settings? Across four studies (total $N = 1{,}820$), *Agreeableness* failed to predict more cross-race friendships, in both self- and peer reports, suggesting that interpersonal kindness was not sufficient to overcome racial homophily. In contrast, *Openness* and *Openness to Other* (O2, a new social facet of Openness) consistently predicted cross-race friendship. However, the O2 facet had the stronger and only unique effect, suggesting it is the "active ingredient." High-O2 individuals had an almost equal 1:1 ratio of same-to-different-race network members, whereas low-O2 individuals had 4:1 same-race. These results held for both college students and middle-aged adults, both friends and new acquaintances in the network, and both networks established before and at a diverse university. Finally, when moving to a more diverse environment, high-O2 individuals seemed to take advantage of the new environmental affordances, adding more different-race members to their networks. Overall, these studies advance understanding of person–environment transactions, showing how personality traits matter to the structure of people's social networks.

Keywords: Openness to other, race, homophily and heterophily, social networks, Big Five

In the U.S., recent estimates suggest that White Americans have mostly White friends (about 90%), Black Americans have mostly Black friends (about 83%), and Hispanic Americans have mostly Hispanic friends (about 64%; Cox et al., 2016). That people's friends and acquaintances tend to be the same race as them is called *racial homophily* (DiPrete et al., 2011; McPherson et al., 2001). This similarity can be beneficial: It may help produce shared reality and the joy that comes from experiencing mutual understanding (McPherson et al., 2001), leading to relationships characterized by greater intimacy and self-esteem, especially for members of marginalized groups (McGill et al., 2012). In diverse societies, however, this similarity can pose problems, ranging from the Black–White wealth gap (DiTomaso, 2013), to access to information and opportunity (McPherson et al., 2001), and the development of youths' attitudes toward intergroup contact (Eason et al., 2019). Given these issues, we ask: What are the personality predictors of racial similarity in personal friend and acquaintance groups?

In this research, we focus on three broad issues. First is that interpersonal and intergroup concerns may be differentially relevant to racial homophily. Specifically, the interpersonal nature of racial homophily may invoke the interpersonal trait Agreeableness, which

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Data, code, materials, and preregistration for studies may be accessed at https://osf.io/fbct5/.

Stephen Antonoplis and Oliver P. John conceived the project and all study designs. Stephen Antonoplis collected and analyzed data, with input from Oliver P. John. Stephen Antonoplis drafted the manuscript, with feedback and revisions from Oliver P. John.

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emphasizes compassion, respect, and trust over being cold, rude, and suspicious of others (see John, 2021). However, when people interact, another dimension of social life is relevant: That people sort each other into categories like ingroup and outgroup, indicating whether the other person is an insider or an outsider, somebody to be cared for as a friend or to be avoided (Fiske et al., 2002). Thus, the intergroup nature of racial homophily is more complicated than interpersonal contact between ingroup members and may render interpersonal warmth and kindness (as represented by Agreeableness) insufficient for reaching beyond one's own group. Instead, engaging in cross-race contact may require traits like Openness and its facets that involve going beyond the familiar and caring about social justice and that people come from different groups and backgrounds.

The second broad issue is how well intergroup phenomena can be studied within the existing Big Five personality taxonomy. In the past, personality psychologists have typically left the study of cross-race interactions to sociologists and social psychologists (King, 2022; Syed, 2021), who focus on contextual factors more than individual personality factors. We ask whether Openness as currently conceptualized is sufficient or whether new Openness facets more attuned to intergroup concerns need to be considered.

Third, we consider the interplay between personality and environmental factors in predicting racial homophily in personal friend and acquaintance groups. Traditionally, racial homophily has been conceptualized as a general phenomenon, with its origins located in structural features of society (e.g., proximity) and how these structures limit interactions between racial groups (McPherson et al., 2001). Individual differences in racial homophily have traditionally been ignored or treated as ephemeral variation due to variation in structural features (Kossinets & Watts, 2009). Consequently, little empirical research has examined the personality origins of individual differences in racial homophily (for a review, see Selden & Goodie, 2018). Recent work suggests, however, that individual differences in racial homophily do not result from context alone, but also from choice (Currarini et al., 2010), suggesting that individual differences in racial homophily may originate from psychological features of individuals, including their personality traits.

In four studies, we examined whether personality traits predict individual differences in racial homophily. We examined racial homophily in naturalistic contexts where the effects of personality have the opportunity to unfold over time, rather than in short-term experiments. First, we contrasted interpersonal concerns (Agreeableness) and intergroup concerns (Openness) as predictors of racial homophily. Second, we compared the effects of the general Openness domain with a new facet of Openness, Openness to Other (O2), designed to better represent intergroup concerns within the Big Five. Third, we examined the interplay between personality and environment in a variety of ways. These included examining two types of relationships (long-term friends and new acquaintances) to test whether personality factors were relevant across multiple relationship types. We collected data in two settings—one more and one less racially diverse—to test whether personality effects occurred only under certain circumstances. We also tested whether personality effects held for both majority and minority racial groups. Finally, to test whether individual differences in racial homophily show cross-situational consistency, we examined the consistency of individual differences in racial homophily across friends versus acquaintances, and more versus less diverse settings.

Racial Homophily in Social Networks

Defining Racial Homophily

Social networks consist of the stable patterns of interactions and relations between human beings, including individuals' friends and acquaintances (Borgatti et al., 2009; Moreno, 1934; Wasserman & Faust, 1994). They are an integral part of people's social environments, influencing diverse outcomes like psychological and physical well-being (Cohen & Wills, 1985; Santini et al., 2015), as well as exposure to information and social capital (Coleman, 1988). While social networks are structured in many ways, the association of "like with like" with respect to race—that is, racial homophily (Rogers & Bhowmik, 1970)—is one of the major structural features of social networks in the U.S. (McPherson et al., 2001).

We use the term *race* here to refer not to biological entities, but only to the socially constructed categories defined by a combination of people's geographic origin, culture, and perceptions based on physical appearance (Fredrickson, 2002; Painter, 2010; Taylor, 2013). Racial categories commonly used in the U.S. and in the U.S. Census (U.S. Census Bureau, 2020) include White Black, Asian, Mixed Race, American Indian, and Pacific Islander, with Hispanic/Latinx sometimes counted as a separate ethnic category or as a racial category (see, e.g., Page-Gould et al., 2008).

Structural Origins of Racial Homophily

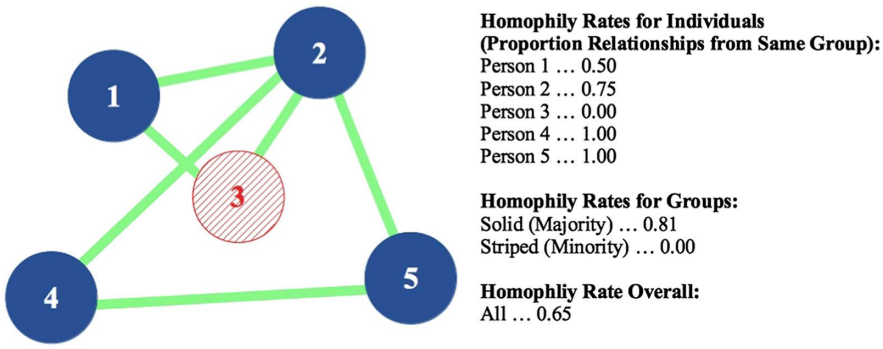
Traditionally, racial homophily has been regarded as a general phenomenon, originating from structural features of the context in which a particular social network was formed. For instance, in the U.S., practices like redlining created racial segregation within cities by restricting racial groups' access to loans needed to afford living in different areas of residence (Faber, 2020; Wolff, 2018). Since people tend to form relationships where they live, racial homophily was likely to follow from practices that incentivized people to live in the same area as members of their own racial group and away from members of different groups. Similarly, anti-miscegenation laws prevented the marriage of individuals from different races, again forcing racial homophily to occur in social networks (Loving v. Virginia, 1967; Wolff, 2018).

However, despite these normative pressures that make homophily the rule on average, these pressures operate only probabilistically, meaning individual differences in homophily can exist. This is illustrated in Figure 1. First, solid actors have, on average, many more same-group ties than striped actors, and overall, the network demonstrates a high degree of homophily (about two thirds of ties are between members of the same group). Second, despite the high rate of overall homophily, it is clear that some actors (e.g., 4, 5) engage in much higher rates of homophily than other actors (e.g., 1, 3). Thus, we ask: Where do these individual differences come from?

Structural origins of racial homophily imply that individual differences in racial homophily will be at least partly nonpsychological. For instance, Blau (1977) showed that a group's relative size within a set of groups affects the group's average rate of homophily, independently of its members' actual preferences for homophily. This can be seen in Figure 1, where the striped group engaged in perfect heterophily (i.e., lack of homophily). As there is only one striped actor, this result would be expected if ties were determined at random, meaning that the striped actor's ties to solid actors cannot

Figure 1

Illustrating Normative Homophily for Five People, with Individual Differences



Note. Each node (circle) represents a person from one of two groups, with lines between nodes representing that these two people have a relationship. See the online article for the color version of this figure.

be attributed to a preference for engaging with solid actors. More broadly, if we assume that people in a society associate at random, the largest group in the society (solid in Figure 1) must always engage in the highest rate of homophily, and the smallest group (striped in Figure 1), the lowest rate. Thus, individual differences in observed homophily are partly determined by base rates of group membership in the population.

That structure impacts individual differences in racial homophily means that any personality understanding should control for the effects of structural factors (Haslanger, 2016). For instance, because group size partly determines engagement in racial homophily, individuals from smaller groups experience greater difficulty expressing their preferences for racial homophily because fewer individuals from their group exist. In contrast, individuals from larger groups have a wider range of people to pick ties from and, thus, greater ease expressing their preferences.

Racial Homophily as Interpersonal or Intergroup Contact: Do Big Five Agreeableness or Openness Predict Racial Homophily?

In the present research, we focused on the Big Five taxonomy of personality traits (Goldberg, 1993; John, 2021; McCrae & Costa, 1997) as potential sources of individual differences in racial homophily. The Big Five dimensions provide a comprehensive description of personality traits (Goldberg, 1993) and are known to relate to a number of important life outcomes (Ozer & Benet-Martínez, 2006; Soto, 2019). Because racial homophily is an interpersonal phenomenon involving close relationships with others, Agreeableness may be of particular importance to racial homophily. Yet, developing different-race relationships involves crossing group boundaries, which may invoke Openness to Experience.

The Case for Agreeableness

Agreeableness describes individuals' compassion, respectfulness, and trust as well as their tendency to coordinate their own goals with other people's (DeYoung, 2015; John, 2021). How might Agreeableness relate to individual differences in racial homophily? Two broad perspectives on the personality origins of individual differences in environmental structure are relevant. These perspectives are *selection* and *evocation* (Buss, 1987; Caspi & Bem, 1990; Scarr & McCartney, 1983). Applied to racial homophily, *selection* locates its origins in individual differences in personality traits, viewing racial homophily as resulting from individuals' choices as guided by their personality characteristics. *Evocation* locates the origins of racial homophily in the possibility that individuals' personality traits predispose them to act in particular ways that may be seen as more or less desirable to potential same- or different-race contacts.

From a selection perspective, more agreeable people may be less likely to engage in racial homophily because their lower prejudice toward outgroups does not inhibit them from seeking out friends from outgroups. Researchers examining generalized prejudice in the U.S. have found that Agreeableness correlates with less prejudiced attitudes toward marginalized groups (e.g., racial minorities; women; lesbian, gay, bisexual, transgender, and queer [LGBTQ+] people) as well as majority groups (e.g., Whites, Christians, gun owners; Crawford & Brandt, 2019; Sibley & Duckitt, 2008). Assuming that prejudiced attitudes toward outgroups reduce the probability of contact with outgroups, more agreeable people should engage in less racial homophily than less agreeable people. From an evocation perspective, Agreeableness involves compassion, respect, and trust (Soto & John, 2017a), which may be helpful for attracting outgroup friends. Respect has been described as a critical component of intergroup tolerance (Simon et al., 2019), which is often considered the opposite of prejudice and, thus, important for smoothing intergroup relations. If more agreeable people are more respectful in intergroup interactions, they may be seen as more desirable social contacts and, thus, be more likely to attract different-race friends and acquaintances. Hence, it seems plausible that Agreeableness would correlate with less racial homophily.

One observation goes against this general hypothesis. If agreeable people truly hold lower prejudice toward *all* social groups (Crawford & Brandt, 2019), their appreciation and liking of people may be indiscriminate, more motivated by interpersonal than intergroup concerns. More agreeable people may be more concerned

with being nice and have no interest or see no need in making any special efforts to befriend different-race individuals because they like everyone and are content with whichever friends they happen to have. Due to the structural factors discussed above, these friends are more likely to be the same race as them. If Agreeableness is not sufficient to account for individual differences in racial homophily, which personality traits would be relevant? Because racial homophily is an intergroup phenomenon involving interacting with people from different social groups, Openness to Experience is the most promising candidate.

The Case for Openness to Experience

Openness (McCrae, 1996) is defined as an individual's tendency to think in novel ways, engage deeply with aspects of one's environment, and generate creative solutions to problems (see also DeYoung et al., 2005; John, 2021). From an information-processing viewpoint, Openness may be important for noticing new information and integrating it with existing knowledge, as well as generating novel solutions to problems encountered in one's environment (DeYoung, 2015; Jach & Smillie, 2020; Schwaba & Bleidorn, 2020). From a selection perspective, more open people may be more likely to actively engage in racial heterophily because their curiosity may motivate them to engage with people from different backgrounds and because their lack of prejudice may not inhibit them from seeking out friends from outgroups.

In fact, research on prejudice has found that more open people typically endorse less prejudiced, more approving views of traditionally marginalized groups in the U.S. (e.g., people of color, women, LGBTQ+ people; see Sibley & Duckitt, 2008). In addition, and of particular relevance to actual friendship choice, open individuals report a greater willingness to be socially close to members of these groups (e.g., friends, coworkers, spouses; Brandt et al., 2015). Hence, more open individuals should seek out contact with members of outgroups while their less open peers are more likely to avoid contact with people from outgroups.

From an evocation perspective, ambiguity and uncertainty often characterize experiences with people from different social groups (Stephan & Stephan, 1985), which more open people may be better able to handle. Research has found that more open people report greater tolerance of ambiguity and uncertainty (Jach & Smillie, 2019; McCrae, 1996). Thus, multiple perspectives lend credence to the hypothesis that more open people engage in less racial homophily. However, scholars have recently argued that intergroup concerns are poorly represented in the Big Five (Stürmer et al., 2013), and so we also sought to test whether we could improve on the intrapsychic focus of Openness with a recently developed facet, Openness to Other, that focuses on the social world and social groups.

Is Global Openness Enough for Understanding Intergroup Phenomena?

Intergroup relations have been present throughout human history—for instance, one meaning of the ancient Greek work for Celtic people, *Keltoi*, was "strange people" (Painter, 2010). Thus, people should develop facets of personality for managing these relations. Yet, the dominant conception of personality traits, the Big Five, does not feature any constructs clearly relevant to intergroup relations (Stürmer et al., 2013, call for such constructs). To rectify this issue, we introduced a novel facet of Openness to Experience that describes people's appreciation, embrace of, and preference for others who are different, which we call Openness to Other (or *otherness*; Antonoplis & John, 2022). Whereas existing facets of Openness emphasize intrapsychic experiences like curiosity, imagination, aesthetics, novelty seeking, and questioning dominant ways of thinking, O2 emphasizes social and, more specifically, intergroup aspects of individual experience. O2 contextualizes Openness within the world of social relationships, a world that is diverse and full of cultural exchange yet fraught with intergroup conflicts and social justice concerns.

Earlier validation work (Antonoplis & John, 2022) has shown that O2 can be measured reliably with a 10-item self-report scale, with items such as "I appreciate a wide range of cultural perspectives; they help me understand people's feelings and actions and guide my behavior toward people that are different." and "People who look different and act in ways I do not understand make me very uncomfortable." (reverse-keyed). As expected, the O2 scale showed a unidimensional factor structure and loaded with other Openness facets both in the NEO Personality Inventory—Revised (NEO-PI-R; Costa & McCrae, 1992) and in the Big Five Inventory-2 (BFI-2; Soto & John, 2017a); it also had a secondary loading on the Agreeableness factor. Within the BFI-2, O2 was most strongly associated with Intellectual Curiosity, consistent with the idea that high-O2 individuals are curious about others who are different from them. O2 adds an intergroup theme to this more general open-mindedness. In terms of personal values (Schwartz, 1992), higher-O2 individuals tend to prioritize social justice, tolerance of different ideas and beliefs, freedom of thought and action for all, and equal opportunity for all, over national security and tradition. In terms of attitudes, they were less prejudiced against outgroups (e.g., Muslims); favored increased immigration to the U.S. from a variety of groups; and believed that immigration strengthens, not threatens, the U.S. Finally, O2 is expressed in behavior. For example, peers reported that higher-O2 individuals are not nervous or upset when interacting with people from different cultural backgrounds and find ways to help people from different cultural groups get along. In these analyses, O2 had substantial associations with all these validation criteria, and importantly, these associations held even when controlling for the broader Big Five dimensions of Agreeableness and Openness.

How should O2 relate to racial homophily? In terms of selection processes, individuals higher on O2 should be motivated to engage in less racial homophily because race marks perceived differences between social groups in the U.S. and high-O2 people are curious about outgroups. In contrast, lower-O2 people should want to avoid potential different-race others as friends, consistent with their disregard for and disinterest in social difference.

In terms of evocation processes, people higher on O2 seem to behave in ways that signal interest and acceptance to members from other groups. For instance, peers reported that people higher in O2 were more likely to behave in ways that foster positive intergroup relations, such as "[being] calm and relaxed around people from different social backgrounds" and "find[ing] ways to help people from different cultural groups try to get along together" (Antonoplis & John, 2022). Different-race peers may see these behaviors as desirable and, therefore, be more willing to interact with and befriend individuals higher in O2. In contrast, lower-O2 individuals may

act in ways off-putting to potential different-race friends (e.g., LaCosse & Plant, 2020).

Empirical Evidence for Links Between Big Five Traits and Racial Homophily

A few studies provide indirect evidence consistent with our hypotheses. Baer (2010) found that more open people had friends from a greater number of different departments at work, and Tulin et al. (2018) found that more open people had friends from a wider range of occupations. Although work departments and occupations are different from race, these studies provide evidence that more open people engage in less homophily for some characteristics. Finally, more open people tend to live in more racially diverse areas (Danckert et al., 2017; Rentfrow et al., 2008), and if they make friends where they live, they should have more different-race friends and acquaintances.

One study was directly relevant to our hypotheses. Laakasuo et al. (2017) used data from a household survey of U.K. adults who had been asked to list their three closest friends and report a number of their characteristics (e.g., sex, age, ethnicity). Agreeableness was not significantly related to having fewer same-race friends, but Openness was: Individuals scoring *high* in Openness (1 *SD* above the mean) had 1% fewer same-race friends (87%) than individuals *low* (1 *SD* below the mean) in Openness (88%). The Openness effect was in the expected direction but very small. We suspect this small effect size may be a lower-bound estimate. The friendship data available to Laakasuo et al. (2017) were limited to only three close friends, 26% of whom were relatives and, thus, their measure included not only *chosen* homophily (from relations with nonfamily) but also *assigned* homophily (from relations with family). In the present research, we focus on *chosen* homophily, as is generally practiced in the literature on homophily (see McPherson et al., 2001). This is an important methodological detail, as Laakasuo et al. (2017) found that the inclusion of family members can lead to confounds: Individuals higher in Agreeableness were more likely to list family members in their friendship nominations, whereas individuals higher in Openness were more likely to list *nonfamily*.

Measuring Individual Differences in Racial Homophily

For assessing individual differences in racial homophily for personality research, our goal was to gather information on as large and representative a portion of people's networks as possible, sampling across the multiple social contexts in which people live. This approach would avoid error arising from the idiosyncrasies of particular contexts in which people live (e.g., a particular office where someone works or a particular class a student attends) and gain a more complete representation of people's friends and acquaintances. A few methods are available for reaching this goal.

The first method directly asks participants how many people they know of different races (e.g., how many Black friends people have; DiPrete et al., 2011). This is the simplest method to administer and permits participants to search their memory for friends across the many contexts they inhabit. Its main drawback is that this direct approach is subject to reporting biases. By cueing recall of people of particular races, this approach may encourage participants to search for people whom they know or have met but with whom they are not in regular contact, yielding overestimates of cross-race contact (see Smith, 2002, for a critique). Critically, this approach also makes plainly apparent to participants that the study is about race, potentially triggering socially desirable responding to avoid appearing racist (Smith, 2002).

The second method requires identifying a closed network (e.g., an office or classroom) and having all members of the network report their friends (acquaintances, etc.) from within the closed network (Wasserman & Faust, 1994). Two major advantages of this method are that it allows for identification of reciprocal friendships (i.e., those that both people report) and that it avoids reporting biases by asking individuals to report only their own, not their friends', characteristics. It has two major disadvantages, however. First, it is not feasible in many contexts. For instance, if one were interested in the friend networks that students have at college, this method would require administering a roster listing all students at the college. Such a roster would be long—thousands of names—and thus too taxing for participants to complete. Second, a more feasible version of this method, like studying students in a single classroom, presents a severe validity–reliability trade-off. Reliability is maximized via identification of reciprocal friendships. Validity, in contrast, is reduced by limiting possible friendships to a single context that is unlikely to reflect the breadth of any participant's personal network.

A third method balances the advantages and disadvantages of the first two methods. This indirect and unobtrusive method first asks participants to list individuals with whom they interact in a variety of ways and to meet various social goals (e.g., as friends, acquaintances, confidants, helpers, social companions, advisors). Then, when individuals have been named and cannot be changed, the method asks participants to report additional information about these individuals (e.g., age, gender, race, how long they have been known; Wasserman & Faust, 1994). This method avoids eliciting socially desirable responding by cueing participants to recall *relationships* and only later asking about race (Smith, 2002). This method also permits efficient querying of multiple social contexts for relationships, for categories like *friends* or *acquaintances* are not restricted to a single context (McCallister & Fischer, 1978; Perry et al., 2018).

The one potential downside of this method is that the reciprocity of nominations is unknown. Current evidence suggests reciprocation rates are high. For example, Roth et al. (2021) asked a sample of older adults in their early 70s to freely list members of their social network in this way and then obtained a second, independent report from the person that accompanied the older adult to the lab session. On average, 62% of the members in these two network reports were the same. Although this agreement may seem far from perfect, it should be understood as a high score on a difficult task, given the incomplete recall that is typical of open-ended listing tasks. In fact, at any given network assessment, individuals routinely forget to list some of the network members they had listed at earlier assessments. Research has shown that most of this apparent change in networks is due to imperfect memory, rather than change in relationship status (Fischer & Offer, 2020). The seeming disagreements between participants and their companions may not result from distortions by the participant but from incomplete recall by each party. Indeed, if the participant and companion had been allowed to discuss the discrepancies, the observed agreement might well be much higher. Thus, because of its various strengths for personality research, we

use this method to measure individual differences in racial homophily.

The Present Research

Across four studies, we tested whether personality traits were associated with lower rates of racial homophily. We collected data both from a more general, national sample of middle-aged adults in the U.S. (MTurk, Study 2) and from college student samples at a fairly diverse public university (University of California [UC] Berkeley, Studies 1, 3, and 4) to test the generality of the phenomenon, as well as specific contextual aspects of it. We employed a variety of study designs to test our central hypothesis and rule out important alternative explanations. We report how we determined our sample sizes, all data exclusions, all manipulations, and all measures across all studies. All preregistrations, materials, and data may be accessed on the Open Science Framework at https://osf.io/fbct5/. All studies were approved by the University of California, Berkeley Committee for the Protection of Human Subjects, #2015-01-7025.

Study 1: Initial Test With Self- and Peer-Reported Personality Traits

Given our hypotheses, we focus on three personality traits: Agreeableness, Openness, and Openness to Other. In addition to our primary hypotheses comparing Agreeableness with Openness and Openness with O2, we also sought to rule out a number of potential methodological issues. First, to rule out demand or carry-over effects, we measured personality traits at least 1 week prior to the social network assessment, guarding against effects of asking participants about their personality and the racial composition of their social network in the same session. Second, we sought to rule out method overlap by measuring personality traits with not only self-reports but also with peer reports. If the peer reports replicate the results obtained with self-reports, then method overlap cannot explain results obtained for self-reports. Importantly, we preregistered this study (https://osf.io/esx6d/).

Method

Participants

Three hundred forty participants completed both the self-reported personality measures and, at least 1 week later, a social network nomination task for partial course credit in their large psychology course. All data were collected using an online platform. Of these participants, 266 (71%) were women. As is typically true of UC Berkeley, the largest racial group on campus was Asian ($n = 199$; 51%), with White participants the next largest group ($n = 97$; 26%). See Table 1 for further details about sample demographics and data cleaning procedures.

All participants were instructed to nominate a friend or peer who knew them well enough to describe their personality. The peer was then invited to rate the personality of the target participant, and peer ratings were available for 252 of the target participants.

Personality

The Big Five domains of Agreeableness and Openness were assessed with the BFI-2 (Soto & John, 2017a), which uses a rating scale ranging from 1 (*Disagree strongly*) to 5 (*Agree strongly*). The 12-item Agreeableness domain scale (e.g., "Is compassionate, has a soft heart") had an alpha of .86 ($M = 3.69$, $SD = 0.63$). The 12-item Openness domain scale (e.g., "Is curious about many different things") had an alpha reliability of .84 ($M = 3.83$, $SD = 0.64$). Agreeableness and Openness correlated .27, similar to previous studies (Soto & John, 2017a).

Openness to Other (O2) is a new facet of Openness (Antonoplis & John, 2022), measured with five true-keyed items and five

Table 1
Demographics for All Samples

Variable	Study 1	Study 2	Study 3	Study 4	Total
N					
Precleaning	435	504	563	596	2,098
Failed most attention checks (≥2 of 3, 3 of 4)	—	19	33	28	19
Same response for >90% of items	16	0	34	22	72
Duplicate ID	72	0	1	6	101
Did not follow instructions	7	29	—	—	36
Not in the U.S.	—	11	—	—	11
Postcleaning	340	445	495	540	1,820
Gender					
Female	71%	43%	67.2%	67.5%	62.3%
Male	29%	57%	31.9%	32.3%	37.4%
Trans*/Transgender	0%	0%	0.2%	0.2%	0.2%
Race					
Asian	51%	5%	52%	60%	43.3%
Black	2%	14%	1%	1%	4.1%
Hispanic/Latinx	10%	6%	11.3%	11%	9.8%
Mixed/Other	11%	1%	7.9%	9%	7.2%
White	26%	73%	27%	19%	35.5%
M_{age} (*SD*)	21.63 (3.55)	38.26 (7.95)	20.77 (2.22)	21.01 (3.19)	25.42 (4.23)

Note. Some percentages may not sum to 100% due to missing data for the variables. For data cleaning, we followed the same procedures as we preregistered for Study 4 (see https://osf.io/fu6bq/).

false-keyed items. In this study, items were rated on a 5-point scale (1 = *Strongly Disagree* to 5 = *Strongly agree*). The alpha was .86 ($M = 3.93$, $SD = 0.59$). The Appendix shows all 10 O2 items used in the present studies. Prior research has found that the O2 scale shows temporal stability similar to other measures of personality traits and correlates with conceptually related constructs (e.g., universalism), as well as with peer ratings (Antonoplis & John, 2022). As in these earlier studies, O2 correlated most strongly with its superordinate domain of Openness ($r = .39$) and moderately with Agreeableness ($r = .27$).

Peer-reported personality traits were measured using the same instrument as the self-reports, with items adapted for observer reports (i.e., using 3rd-person format; see Soto & John, 2017a). Peers rated each item on the same 5-point scale as the self-reports. The alpha reliability coefficients were above .80 for all three traits: .85 for Agreeableness, .86 for Openness, and .83 for O2.

Social Networks

We used an elaborated and unobtrusive procedure to sample the participants' social networks as broadly and comprehensively as possible. Specifically, participants first completed a standard *name generator* task (Wasserman & Faust, 1994), in which they reflected about individuals with whom they interacted to realize each of 17 common interpersonal goals (e.g., to discuss a personal problem with; to borrow money from) and then listed at least one person for each goal. Participants were then asked to select 10 people to represent their social network, with the following constraints: (a) three network members had to be family members (mother or mother-like figure, father or father-like figure, sibling or sibling-like figure); (b) four friends; and (c) three new acquaintances met in the last year. In this study (and all other studies), we restricted the number of network members that could be reported in order to avoid participant fatigue (Smith, 2002) and to avoid confounding racial homophily with network size.

Family members were included in the beginning of the nomination task because they are usually part of college students' social networks and provided an easy and natural start for the network nomination task. However, they are not relevant for our analyses of racial heterophily because family are usually not freely chosen and, thus, do not count as *choice heterophily* (McPherson et al., 2001). This left seven network members (four stable friends and three new acquaintances) for the present analyses.

After selecting the final network members, participants reported basic demographics (e.g., age, race, gender) for each member. The following options for race were given: *African American*, *Asian or Asian American*, *Caucasian/White*, *Hispanic/Latin American*, and *Other/Mixed*. These options correspond closely to the options used by the U.S. Census (U.S. Census Bureau, 2020), with the exception of treating *Hispanic/Latin American* as a separate racial category (cf. Page-Gould et al., 2008). On a separate page, when participants could no longer change the nominated members, participants reported on additional aspects of each relationship (e.g., how many years they had known each person). After reporting on their network, participants were asked about their own demographics; the critical variable was race, using the same options as for the race of their network members.

In this multilevel design, each network member represents an independent observation, nested within participant. The critical dependent variable (DV) was whether each network member was of the same race or a different race as the participant (0 = *same race*; 1 = *different race*). Higher scores indicate higher racial heterophily in the network. Aggregated across the seven individual network members, scores could range from 0 (all network members were of the *same* race as the participant) to 7 (all network members were of a *different* race from the participant).

Procedure: Separating Personality From Network Assessments

To eliminate potential demand and carry-over effects, we collected all self-reported personality measures at least 1 week before the network assessment. All peer-reported personality measures were also separated by at least 1 week from the network assessment. Moreover, the O2 items were embedded within a longer personality questionnaire. This temporal separation ensures that connections between measures were not apparent to participants, thus protecting against demand effects and against inflation of effect estimates due to shared time of testing. Data from each time point were cleaned separately (i.e., data were not combined before data cleaning). We did not impute or replace missing data, so degrees of freedom may vary slightly across analyses, depending on missing data. All available participants were included in all analyses.

Analytical Approach Using Multilevel Modeling

Due to the hierarchical, nonindependent nature of the network data (i.e., seven network members nested in each participant) and because we planned to examine cross-level interactions between attributes of participants and attributes of network members, we analyzed the data using multilevel modeling (Offer & Fischer, 2018; Rabe-Hesketh & Skrondal, 2012). Because the DV is dichotomous (same vs. different race), we used logistic multilevel models. For the one continuous DV (time known each network member), we used a Gaussian distribution. In the few cases where we collapsed repeated-measure observations (i.e., summed dichotomous variables), we used standard linear regression with a Gaussian distribution (due to violating assumptions of the Poisson distribution).

The generalized model we used was the following (Equation 1):

$$\begin{gathered} Y_{ij} = \beta_0 + \beta_1 \mathrm{Trait}_j + \beta_2 \mathrm{X}_{2,ij} + \beta_3 \mathrm{Trait}_j \times \mathrm{X}_{2,ij} + \zeta_{0j} + \zeta_{2j} \mathrm{X}_2 + \varepsilon_{ij} \\ \zeta_{0j} \sim \mathrm{N}(0, \psi_0) \\ \zeta_{2j} \sim \mathrm{N}(0, \psi_2) \\ \varepsilon_{ij} \sim \mathrm{N}(0, \psi_\varepsilon). \end{gathered} \tag{1}$$

Characteristics (Y) of a specific network member (i) of a specific participant (j) were modeled as a function of a participant-specific intercept ($\beta_0 + \zeta_{0j}$), a level-1 covariate (X_2), a participant-specific slope for the covariate X_2 ($\beta_2 + \zeta_{2j}$), the level-2 covariate Trait (e.g., Openness, Agreeableness, or O2), and the cross-level interaction covariate Trait × X_2. β_1 was the coefficient for Trait; β_2, for X_2; and β_3, for the interaction between Trait and X_2. The ζ_{0j} in the intercept represented a normally distributed participant-specific error term with mean 0 and variance ψ_0. The ζ_{2j} in the slope for X_2 represented a normally distributed participant-specific error term with mean 0 and variance ψ_2. Depending on the analysis, all terms involving X_2 could be removed (e.g., if analyzing only the simple relationship between O2 and some network characteristic), or additional Trait

terms could be added (e.g., if controlling for a variable posing an alternative explanation to O2, like Openness or Agreeableness).

Given that higher scores on our DV indicate having *more different-race ties (i.e., more heterophily, less homophily)*, a positive correlation between personality traits and the DV (i.e., $\beta_1 > 0$) indicates that people higher on the trait were more likely to have different-race ties. A negative correlation ($\beta_1 < 0$) indicates that people higher on the trait were less likely to have different-race ties. We predicted that Agreeableness, Openness, and O2 would all relate positively to greater heterophily (i.e., lower engagement in homophily), with $\beta_1 > 0$. Similarly, for any additional, nontrait variables (represented by X_2), the same direction of effects applies (e.g., a positive correlation with $\beta_2 > 0$ indicates that higher values on the variable were more likely to have different-race ties).

Models for nonhierarchical regression followed the same logic as Equation 1, but omitting all random effects. All analyses were conducted in RStudio (RStudio Team, 2015), using R Version 3.6.2 (R Core Team, 2019) and the *lme4* (Bates et al., 2015), *nlme* (Pinheiro et al., 2019), *psych* (Revelle, 2019), and *sjPlot* (Lüdecke, 2020) packages.

Results

Racial Heterophily in the Average Network: Stable Friends, New Acquaintances, and Length of Relationship

Across all participants and network members, 61% of network members were the same race as the participant. Examining the data differently, we found that perfect homophily (i.e., zero different-race network members) was the modal pattern in this sample (20% of participants). Thus, even in a fairly diverse college context, racial homophily was the rule for the average network. This finding replicates prior research reporting that heterophily is the exception and homophily is the rule, on average, with about a 2:1 ratio of same-race versus different-race members in our sample. Table 2 shows the proportion of different-race members for friends, new acquaintances, and the entire network in Study 1. Participants had a greater number of different-race individuals in their new-acquaintance networks (M = 49%) than in their stable-friends networks (M = 32%), $p < .001$.

Overall, participants had known their network members for about 4 years (M = 3.84, SD = 4.30). As expected, participants reported they had known individuals nominated as friends longer (M = 5.42 years, SD = 4.66) than individuals nominated as acquaintances (M = 1.74 years, SD = 2.57), and this mean difference of 3.7 years was statistically significant, B = 3.67, $t(372)$ = 19.50, $p < .001$. Interestingly, different-race members had been known for less time (M = 2.93 years, SD = 3.37) than same-race members (M = 4.43 years, SD = 4.72), B = −1.67, $t(381)$ = −8.35, $p < .001$. Moreover, this difference between same- and different-race network members was not entirely explained by different-race members' higher likelihood of being nominated as acquaintances. When entered simultaneously in the multilevel model, both different-race status, B = −1.01, $t(394)$ = −5.45, $p < .001$, and being an acquaintance, B = −3.45, $t(2,252)$ = −25.67, $p < .001$, significantly predicted being known for less time. Independently of their position in the network (friend or acquaintance), different-race individuals had been known for less time than their same-race counterparts.

Table 2
Means (and Standard Deviations) for Different-Race Network Members Across Network Periods and Samples

	Network period				
	Past	Current			
Study	Friends	Friends	New acquaintances	All ties	Overall
1	—	.32 (.47)	.49 (.50)	.39 (.49)	.39 (.49)
2	—	.33 (.47)	.35 (.48)	.34 (.47)	.34 (.47)
3	.33 (.47)	.38 (.49)	.41 (.49)	.39 (.49)	.36 (.48)
4	.25 (.43)	.32 (.47)	.40 (.49)	.36 (.48)	.30 (.46)
M	.29	.34	.41	.37	.35

Note. These statistics should be interpreted as proportions (or, multiplied by 100, as percentages) of network members that were different-race from participants.

Predicting Individual Differences in Network Racial Heterophily: Separate and Joint Effects for Self-Reported Personality Traits

Although homophily described the average participant's network, we also found substantial variation across individuals, opening the question of individual differences in racial homophily. Were these individual differences predictable from personality traits?

The left half of Table 3 ("Single predictor models") shows odds ratios (*OR*s) and their 95% confidence intervals for the relations between each of the three personality predictors and network racial heterophily as the outcome, estimated from the multilevel models. *OR*s indicate the odds of an outcome in the presence or absence of a second variable. *OR*s larger than 1 indicate higher likelihood of the outcome occurring; below 1, lower likelihood; equal to 1, a null effect. Here, *OR*s indicate how much more (or less) likely participants are to have different- versus same-race network members as they increase on Agreeableness, Openness, or O2.

For self-reported personality, Agreeableness was not significantly associated with having more different-race network members, OR = 1.04, 95% CI [0.84, 1.19]. The *OR* of 1.04 means that people higher on Agreeableness were about equally likely as people lower on Agreeableness to have different-race network members. Since the confidence interval includes 1, the *OR* of 1.04 is not significantly different from a null result wherein Agreeableness is not related to change in the likelihood of having different-race network members. Thus, interpersonal kindness was insufficient for the development of different-race friends and acquaintances.

In contrast, Openness was positively associated with having more different-race ties and significantly so, OR = 1.40, 95% CI [1.11, 1.78]. Thus, individuals higher on Openness were more likely to have different-race (vs. same-race) individuals in their networks than individuals lower on Openness, showing that intergroup concerns were relevant to individual differences in racial heterophily.[1]

[1] For completeness, we report results for the remaining Big Five. Neither Conscientiousness (B_{Self} = −0.07, z = −0.65, p = .515, OR = 0.93; B_{Peers} = −0.02, z = −0.13, p = .893, OR = 0.99), Extraversion (B_{Self} = −0.03, z = −0.25, p = .805, OR = 0.98; B_{Peers} = 0.12, z = 1.11, p = .269, OR = 1.13), nor Neuroticism (B_{Self} = 0.14, z = 1.45, p = .146, OR = 1.14; B_{Peers} = 0.05, z = 0.53, p = .597, OR = 1.05) was significantly related to racial heterophily.

Table 3

Personality Traits (Openness, Agreeableness, and O2) Predicting Network Racial Heterophily in Networks Including All Members: Odds Ratios [With 95% Confidence Intervals]

Study (no. of network members)	Models					
	Single predictor models			Multiple predictor model		
	A	O	O2	A	O	O2
1—Self (7)	1.04 [0.82, 1.19]	**1.40 [1.11, 1.78]**	**1.64 [1.27, 2.12]**	0.80 [0.61, 1.04]	**1.37 [1.04, 1.80]**	**1.45 [1.07, 1.95]**
1—Peer (7)	1.22 [0.95, 1.55]	**1.29 [1.02, 1.63]**	**1.57 [1.22, 2.02]**	0.95 [0.72, 1.26]	1.00 [0.75, 1.34]	**1.61 [1.13, 2.29]**
2 (10)	1.02 [0.81, 1.29]	1.12 [0.89, 1.40]	**1.25 [1.07, 1.46]**	0.89 [0.69, 1.16]	0.91 [0.68, 1.21]	**1.34 [1.10, 1.64]**
3 (14)	**1.27 [1.06, 1.51]**	**1.31 [1.10, 1.56]**	**1.67 [1.45, 1.93]**	0.97 [0.80, 1.17]	1.09 [0.92, 1.31]	**1.64 [1.39, 1.94]**
4 (14)	1.13 [0.89, 1.44]	**1.33 [1.15, 1.53]**	**2.15 [1.79, 2.59]**	0.87 [0.67, 1.12]	1.25 [0.95, 1.64]	**1.85 [1.32, 2.60]**
M	1.14	1.29	1.66	0.90	1.12	1.58

Note. Odds ratios above 1 indicate that the likelihood of a different-race network member increases as the personality traits increases; values below 1 indicate that the likelihood decreases as personality traits increase. An odds ratio of 1 indicates a null effect. Effect estimates set in bold are significant at least at $p < .05$. A = Agreeableness; O = Openness to Experience; O2 = Openness to Other. All analyses use the whole network, collapsing across type of relationship (friend or acquaintance) and network period (pre- or at-Berkeley).

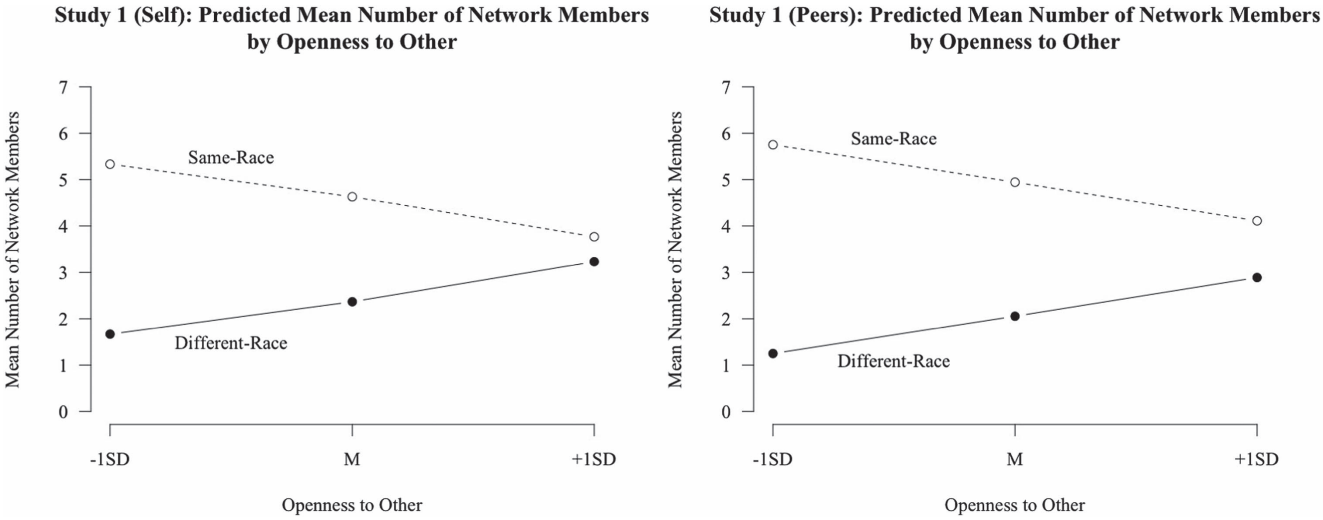
How did the Openness effect compare to the effect for O2? Individuals higher on O2 were also more likely to have different-race individuals in their networks, $OR = 1.64$, 95% CI [1.27, 2.12]. To test whether the O2 effect held even when Agreeableness and Openness were controlled, we entered each of these traits simultaneously into a multiple predictor multilevel model. The right half of Table 3 ("Multiple predictor model") shows *OR*s (and 95% CI's) for this three-predictor model. O2 remained the strongest significant predictor of racial heterophily, $OR = 1.45$, 95% CI [1.07, 1.95], and Openness was significant as well, $OR = 1.37$, 95% CI [1.04, 1.80]. As shown in Table 3, Agreeableness did not significantly predict racial heterophily, just as in the single predictor model.

Predicting Individual Differences in Network Racial Heterophily: Replication With Peer-Reported Personality Traits

Results for peer-reported personality traits (Study 1—Peer) are shown in the second row of Table 3, just below those for the self-reports. In the single predictor models, both Openness and O2, but

Figure 2

Predicted Mean Numbers of Same- and Different-Race Network Members (Study 1): Effects of Openness to Other Measured with Self-Reports (Panel A) and Peer-Reports (Panel B)



Note. Numbers are predicted means of same- and different-race network members across the whole network, at low (−1SD), medium (the mean, M), and high (+1SD) levels of Openness to Other (O2) for self-reported O2 (Panel A) and peer-reported O2 (Panel B) in Study 1. The peer data are for a subset of the participants from the self-report data, so only the overall shape of the effect should replicate, not the exact details.

not Agreeableness, were significantly related to having more different-race network members, exactly replicating the self-report findings. Most importantly, when all three personality traits were entered into the same model, O2 still predicted having more different-race network members. The broad Openness domain was no longer significant, and this was the only difference from the self-reports.

Illustrating the Openness to Other Effect on Overall Network Heterophily: Self and Peers

For illustration, Figure 2 plots the results for self- and peer-reported O2 using predicted counts of same- and different-race network members on the *y*-axis. On the *x*-axis, we show individuals at three levels of O2: low (1 *SD* below the mean), average (at the mean), and high (1 *SD* above the mean). Figure 2 shows the effect for self-reported O2 in the panel on the left. High-O2 participants (scoring +1 *SD* above the mean of O2) had almost as many same- as different-race network members, with a ratio of 1.17 being close to 1. In contrast, low-O2 participants (scoring −1 *SD* below the mean of O2) were predicted to have 3.20 times as many same- as different-race network members. Thus, whereas people high on O2 had nearly equal numbers of same- and different-race network members, people scoring low on O2 had over three times as many same- as different-race network members.

Results for peer-reported O2, in the right-hand panel of Figure 2, showed a very similar pattern and, thus, a close replication of the self-report findings.

Controlling for Environmental Structure: Base Rates

In this West Coast college sample, Asian American participants were the largest and majority group (51%) and, thus, had the lowest chance to interact with peers from another race. Indeed, Asian participants had a smaller proportion of different-race network members ($M = .33$, $SD = .47$) than non-Asian participants ($M = .46$, $SD = .50$), $B = -0.62$, $z = -4.33$, $p < .001$. They also scored lower on O2 ($M = 3.82$, $SD = 0.56$) than non-Asian participants ($M = 4.03$, $SD = 0.60$), $B = -0.21$, $t(338) = -3.29$, $p = .001$. Hence, being Asian could account for the observed relationship between O2 and network racial heterophily.

To examine this potential confound, we entered a set of dummy variables indicating participants' races into the multilevel model, with being Asian as the reference group. The *OR* for O2 decreased from 1.64 in the bivariate case to 1.63 and clearly remained significant, 95% CI [1.28, 2.08]. Thus, O2 still predicted having more different-race network members even when accounting for structural differences in participants' ability to form different-race relationships, and Asian participants continued to be less likely to have different-race network members, $B = -0.75$, $z = -7.47$, $p < .001$, $OR = 0.47$, 95% CI [0.39, 0.58].[2] The same results were obtained for peer-reported O2, $OR = 1.59$, 95% CI [1.25, 2.02].

Contrasting Majority and Minority Participants

We further examined robustness to structural differences by testing whether participants' being members of the racial majority group (i.e., Asian) or members of a racial minority group (i.e., non-Asian) moderated the relationship of O2 (either self- or peer-reported) with racial heterophily. The results were clear: Even in this design, O2 still predicted racial heterophily, and the effect held again for both self-reported O2, $OR = 1.53$, 95% CI [1.18, 1.98], and peer-reported O2, $OR = 1.48$, 95% CI [1.15, 1.91]. Consistent with the structural explanation, majority-race participants were less likely to have different-race network members, $OR_{Self} = 0.59$, 95% CI [0.44, 0.80]; $OR_{Peers} = 0.70$, 95% CI [0.51, 0.96]. Finally, O2's effect did not differ significantly between majority and minority participants ($p_{Self} = .246$; $p_{Peers} = .271$). Figure 3 depicts these models, clearly displaying the positive relationship of O2 with heterophily across majority and minority participants, as well as the mean difference between majority and minority participants, for both self-reported and peer-reported personality.

Racial Heterophily in Acquaintances Versus Long-Term Friends: Consistency Across Two Kinds of Relationships and O2 Effects for Self and Peers

So far, we have focused on the entire network (i.e., all seven members nominated); now, we consider friends and acquaintances separately, providing racial heterophily measures for two different contexts (i.e., closer vs. less close relationships). Did they lead to consistent estimates of the racial heterophily in the individual's social life? Note that these two separate measures are much shorter (especially when based on only four friends and three acquaintances) and thus will provide less stable estimates of heterophily, leading to lower-bound estimates of cross-relationship consistency. Nonetheless, individual differences in heterophily of friends correlated with heterophily of acquaintances, $r = .45$, 95% CI [.37, .52]. Thus, participants who had more different-race friends tended to also have more different-race acquaintances.

How was O2 related to heterophily in these two kinds of relationship contexts? O2 predicted racial heterophily for both: $OR = 1.77$, 95% CI [1.18, 2.64], for friends and $OR = 1.70$, 95% CI [1.28, 2.26], for acquaintances, and these effects did not differ ($p = .804$). In other words, O2 did not relate differently to having more racially different acquaintances and friends. Again, these results replicated with the peer reports ($p_{Intx} = .155$; $OR_{Friends} = 1.93$, 95% CI [1.30, 2.86]; $OR_{Acquaintances} = 1.41$, 95% CI [1.05, 1.89]).

Discussion

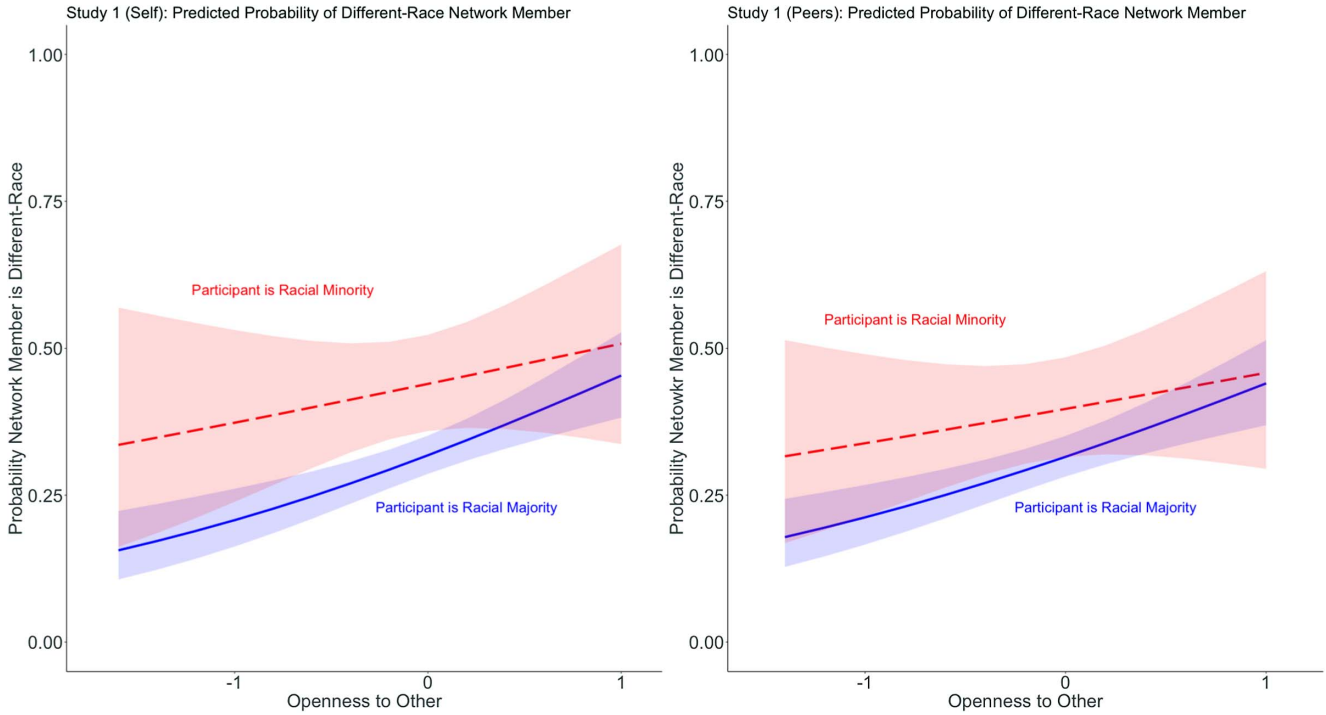
Contrary to the interpersonal hypothesis, Agreeableness did not significantly predict racial heterophily, with an effect size close to a true null of an odds ratio of 1. This suggests that the important interpersonal characteristics at the core of Agreeableness—compassion, respect, and trust—were not sufficient for making different-race friends or acquaintances.

In contrast, our Big Five candidate trait for intergroup concerns, Openness, was positively related to racial heterophily in the single predictor models, and this effect held in both the self- and peer reports. However, in the multiple predictor models, the Openness effect remained significant only in self-reports, not peer reports.

[2] Given self-reported Openness' significance in the multiple predictor personality model, we repeated the base rate analysis for Openness. Controlling for participant race, self-reported Openness remained a significant predictor of racial heterophily, $OR = 1.39$, 95% CI [1.12, 1.73].

Figure 3

Probability That a Network Member is Different-Race: Effects of Openness to Other for Racial Minority and Majority Participants (Study 1)



Note. Probability of a different-race network member predicted by Openness to Other (O2) separately for participants who are either a racial majority (Asian) or minority (non-Asian) in Study 1. Effects for self-reported O2 are depicted in Panel A and for peer-reported O2, Panel B. See the online article for the color version of this figure.

Importantly, O2 was associated with having more different-race network members, and it showed the numerically largest effect. Participants high on O2 (+1 *SD* above the mean) had nearly equal amounts of same- and different-race network members, whereas participants low on O2 (−1 *SD* below the mean) had about three times as many same- as different-race network members.

This link was robust to a variety of alternative explanations and generalizability checks. First, even though O2 correlated positively with both the Openness and Agreeableness domains (consistent with earlier findings), controlling for both of these broader personality traits did not account for O2's link to racial heterophily. Second, and most important, peer-reported O2 correlated with racial heterophily just the same as self-reported O2, indicating that results for the self-reports were not due to self-report method overlap and, in contrast to global Openness, O2 had a significant unique effect in both self-reports and peer ratings. Third, the O2 effect did not significantly vary between the Asian majority group and the non-Asian minority group.

Fourth, neither of the two contextual variables we studied made a difference. Structural differences in opportunities to form different-race relationships (i.e., the relative size of one's racial group on campus) predicted racial heterophily, as expected, but did not account for the O2 effect. Similarly, the O2 effect also held separately for both parts of the network, long-term friends and new acquaintances.

Overall, this pattern of findings—significant and consistently positive effects for Openness and O2 but null effects for Agreeableness—supports the view that cross-race relationships involve distinct personality predictors and, thus, different psychological processes than interpersonal relationships within the ingroup. Of course, this finding needs to be replicated in additional samples and in different populations.

In terms of limitations, the present sample consisted of college students at a public university on the West Coast and included social connections students had made while at UC Berkeley, a campus marked by high racial diversity overall. Thus, in the following studies, we planned to test our hypotheses (a) in a sample of middle-aged adults (Study 2) and (b) to extend the network assessment to cover students' past, pre-Berkeley networks (Studies 3 and 4), thus allowing us to study personality effects for both earlier and current college networks.

Study 2: Do the Differential Personality Effects Generalize to a Middle-Aged Adult Sample?

To test whether Study 1's results were limited to the public university context in which the data were collected, we recruited a sample of adults aged 30–60 living in the U.S. from Amazon's Mechanical Turk (MTurk). This middle-aged sample provides three interesting generalizability tests compared to Study 1: First, MTurk, unlike the Berkeley campus but like the rest of the U.S., is majority White. At UC Berkeley, the majority group is Asian students. Second, MTurkers live in a variety of areas around the U.S., which are typically less diverse than the particularly diverse areas

surrounding UC Berkeley (the greater San Francisco Bay Area and Alameda County; Olson, 2014) and would thus provide fewer opportunities for different-race relationships than Study 1. Third, attitudes toward cross-race relationships in the U.S. are neutral overall, despite growing more positive recently (Pew Research Center, 2017). In contrast, UC Berkeley holds strong pro-diversity norms. Berkeley's administration has endorsed diversity as a core value (UC Berkeley Division of Equity & Inclusion, n.d.), and, on average, students also show a strong commitment to diversity (Fuller & Mele, 2017). U.S. norms might inhibit the formation of cross-race relationships. In short, this replication study offers a strong test, changing three facets of generalizability from Study 1: age group of participants, diversity in participants' environment, and explicit support of pro-diversity norms.

Method

Participants

We aimed to recruit 500 participants from MTurk for a 20-min survey restricted to employed adults aged 30–60. Due to oversupply of workers, we had responses from 587 workers. Of these, 83 opened the survey but opted not to take it and were removed prior to any analyses. As summarized in Table 1, another 19 failed to pass at least three of four embedded attention checks, and another 40 were cut for giving random or meaningless responses to required written responses, leaving a final sample size of 445 participants. As in Study 1 and all subsequent studies, we included all available participants in all analyses and did not impute or replace missing data, so degrees of freedom may vary slightly across analyses. Participants resembled typical MTurk samples (see Buhrmester et al., 2011) and were, thus, quite different from the student sample in Study 1: about 50% women, about 75% White, and an average age near 40 (M_{age} = 38.09 years, SD = 8.25); see Table 1 for full demographics. Participants were paid $2.50 for participating in this study.

Personality

Openness was again assessed with the 12-item BFI-2 scale; alpha reliability was .89 (M = 3.76, SD = 0.80; Soto & John, 2017a). For space reasons, we used the shorter six-item scale from the BFI-2S to measure Agreeableness (Soto & John, 2017b); alpha was .77 (M = 3.74, SD = 0.77). As the remaining three Big Five were not of central interest, we used the three-item marker scales from the BFI-2XS (Soto & John, 2017b), which had alphas of .75 (Neuroticism), .63 (Extraversion), and .68 (Conscientiousness). Openness and Agreeableness correlated more strongly (.41) with each other in this sample. O2 was assessed with the same 10 items as in Study 1, rated on the usual 7-point scale ranging from 1 (*Disagree Strongly*) to 7 (*Agree Strongly*). The alpha was .87 (M = 5.33, SD = 1.14). Consistent with theory and Study 1, O2 correlated most strongly with Openness (r = .60) and moderately with Agreeableness (r = .37), but note that these correlations were higher than in Study 1.

Social Networks

Participants were told that we were interested in their "effective social network" (i.e., the people with whom they interact regularly) and asked to nominate seven current friends and three recent acquaintances for a total of 10 current network members. Nomination of network members occurred on a single webpage separate from any further questions about these members, thus providing no clue that the race of the network members was of interest. Participants could decline to nominate a network member if they could not think of more friends or acquaintances beyond those already named. Any "decline to answer" responses were recoded as missing data. After nominating all 10 members, participants were taken to a new webpage in which members' initials were displayed in a noneditable fashion (i.e., participants could not go back and change any network members) and then information about each of these network members (e.g., their race) was obtained. To ensure data quality (Bai, 2018), we manually inspected network members' names and removed any nonsensical entries (e.g., "good," "nice," "school," "wooded"). After reporting data on their network, participants reported their own demographics, using the same-race options as in Study 1.

The critical DV was again whether each network member was of the same race or a different race as the participant (0 = *same race*; 1 = *different race).* Aggregated across all 10 network members, scores could thus range from 0 (none of the network members were of a different race from the participant, perfect racial homophily) to 10 (all network members were of a different race from the participant, no racial homophily).

Procedure: Separating Personality From Network Assessments

Because all data were collected at a single time point (rather than at different times), all personality items preceded all network items in order to hide any connection between the two. To minimize demand and carry-over effects and avoid inflation of estimates, the personality items were embedded within a larger personality inventory. Openness to Other and the Big Five personality measures were administered at the start of the survey, followed by an unrelated task assessing seating preferences during business meetings. The social network task followed at the very end, so as to maximize the distance to the personality trait measures.

Analytical Approach Using Multilevel Modeling: Predicting Individual Differences in Racial Heterophily

We used the same analytical approach as in Study 1.

Results

Racial Homophily in the Average Network: Stable Friends and New Acquaintances

Across all participants and network members, 66% of network members were the same race as the participant (see Table 2). Like the college students in Study 1, the modal number of different-race network members was 0 (indicating perfect homophily; 33% of participants). In contrast to the college students of Study 1, these middle-aged adults had similar percentages of different-race individuals in their new-acquaintance networks (M = 35%) and in their stable-friends networks (M = 33%), B = 0.18, z = 1.77, p = .077, 95% CI [−0.04, 0.39]. This difference between samples suggests that the middle-aged adults in this study were not meeting different-race

people more often than they retained them as friends. We discuss this further in the General Discussion section.

Predicting Individual Differences in Network Racial Heterophily

Even though racial homophily described the average participant's network, we again found substantial variation across individuals.

The personality trait effects are shown in Table 3 for the entire network of 10 members. Replicating Study 1, Agreeableness was not significantly associated with having more different-race network members, $OR = 1.02$, 95% CI [0.81, 1.29]. Openness was positively, but not significantly, associated with having more different-race ties, $OR = 1.12$, 95% CI [0.89, 1.40]. In contrast to this weak relationship for broad Openness, people higher on O2 were significantly more likely to have more different-race network members, $OR = 1.25$, 95% CI [1.07, 1.46], suggesting that intergroup concerns were indeed predictive, but only when measured at the more narrow facet level.[3]

As in Study 1, we used a multiple predictor multilevel model to test which of the three traits uniquely predicted racial heterophily. Table 3 shows that O2 remained the strongest and only significant predictor of racial heterophily, $OR = 1.34$, 95% CI [1.10, 1.64].

Illustrating the O2 Effect on Overall Network Heterophily

Panel A of Figure 4 illustrates the relationship between O2 and racial heterophily in the entire network using plots of predicted counts of same- and different-race networks members. Participants high on O2 had 5.61 same-race members and 4.39 different-race members, that is, 1.28 times as many same- as different-race network members, close to an even split. In contrast, participants low on O2 had 7.09 same-race members and 2.91 different-race members, for a ratio of 2.44 times as many. Thus, participants high on O2 had nearly even amounts of same- and different-race network members, as reflected in their ratio near one, whereas people low on O2 showed a much stronger tendency toward homophily, with more than twice as many same- as different-race members.

Controlling for Environmental Structure: Base Rates

White participants were by far the largest group (73%; see Table 1), giving them more opportunities for same-race contacts. Indeed, White participants had a much smaller percentage of different-race network members ($M = 24\%$, $SD = .43$) than non-White participants ($M = 59\%$, $SD = .49$), $B = -1.92$, $z = -11.44$, $p < .001$. However, White participants did not score significantly lower on O2 ($M = 5.31$, $SD = 1.13$) than non-White participants ($M = 5.36$, $SD = 1.18$), $B = -0.05$, $t(435) = -0.38$, $p = .703$. Thus, being White did not strictly satisfy the conditions for being a third variable confound for the observed relationship between O2 and racial homophily, but ruling out base rates as an alternative explanation is still important (McPherson et al., 2001).

As in Study 1, we entered a set of dummy variables indicating participants' race into the multilevel model, with being White as the reference group. The *OR* for O2 decreased only slightly, from 1.25 in the bivariate case to 1.19 when base rates were controlled, and remained significant, 95% CI [1.05, 1.36]. Thus, O2 still predicted racial heterophily even when accounting for structural differences in participants' opportunities to form different-race relationships. White participants continued to be less likely to have different-race network members, $B = -1.47$, $z = -16.11$, $p < .001$, $OR = 0.23$, 95% CI [0.19, 0.27].

Contrasting Majority and Minority Participants

We further examined robustness of the O2 effect by testing whether participants' majority versus minority status (here, White vs. non-White) moderated O2's relationship with racial heterophily. Again, O2 positively predicted racial heterophily, $OR = 1.23$, 95% CI [1.07, 1.42], and majority-race participants were less likely to have different-race network members, $OR = 0.15$, 95% CI [0.11, 0.21]. Critically, O2's effect did not significantly vary between majority and minority participants ($p = .570$). Panel A of Figure 5 depicts this model, clearly displaying the positive relationship of O2 across majority- and minority-race participants, as well as the mean difference between majority- and minority-race participants. This pattern replicates Study 1, even though the majority group changed from Asian in Study 1 to White in Study 2.

Racial Heterophily in Acquaintances Versus Long-Term Friends: Consistency and O2 Effects

The previous analyses focused on the entire network with 10 members, including both friends ($k = 7$) and acquaintances ($k = 3$). Here we examine these two parts separately, providing racial heterophily measures for two different kinds of relationships. Individual differences in heterophily for friends correlated .57, 95% CI [.50, .63], with heterophily for acquaintances. Thus, participants who had more different-race friends also had more different-race acquaintances.

How was O2 related to racial heterophily in these two kinds of relationship contexts? Separate analyses showed that O2 predicted racial heterophily both for friends, $OR = 1.25$, 95% CI [1.05, 1.48] and for acquaintances, $OR = 1.20$, 95% CI [1.003, 1.44], and these two effects did not differ significantly ($p = .709$). In other words, just as in Study 1, O2 did not differentially relate to having more different-race friends versus acquaintances.

Discussion

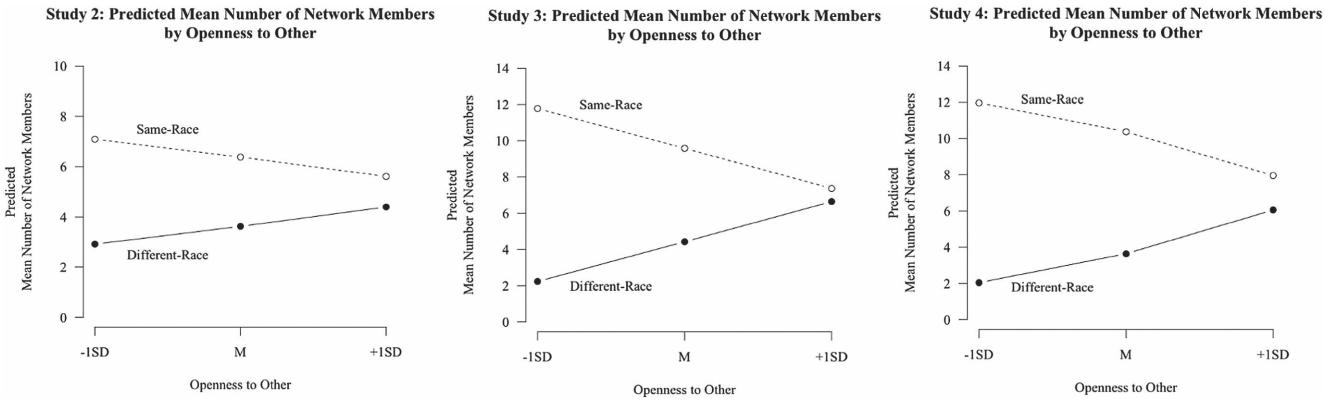
In this sample of middle-aged, mostly White adults from across the U.S., Agreeableness again failed to predict racial heterophily, and its effect sizes were close to a true null of an *OR* of 1, thus replicating Study 1. These Agreeableness results reaffirm that being generally prosocial is not sufficient for the formation of different-race friends and acquaintances, highlighting the need to differentiate the personality factors important for the interpersonal versus the intergroup domain.

The Openness effect was, as expected, positive but small and fell short of significance, thus failing to replicate Study 1. In contrast, the more narrowly conceptualized O2 facet was associated with having more different-race network members. Participants high on O2 had

[3] For completeness, we report results for the remaining Big Five. Neither Conscientiousness ($B = 0.01$, $z = 0.12$, $p = .901$, $OR = 1.01$), Extraversion ($B = 0.17$, $z = 1.76$, $p = .080$, $OR = 1.18$), nor Neuroticism ($B = -0.11$, $z = -1.30$, $p = .193$, $OR = 0.90$) was significantly related to racial heterophily.

Figure 4

Predicted Mean Numbers of Same- and Different-Race Network Members (Studies 2–4): Effects of Openness to Other

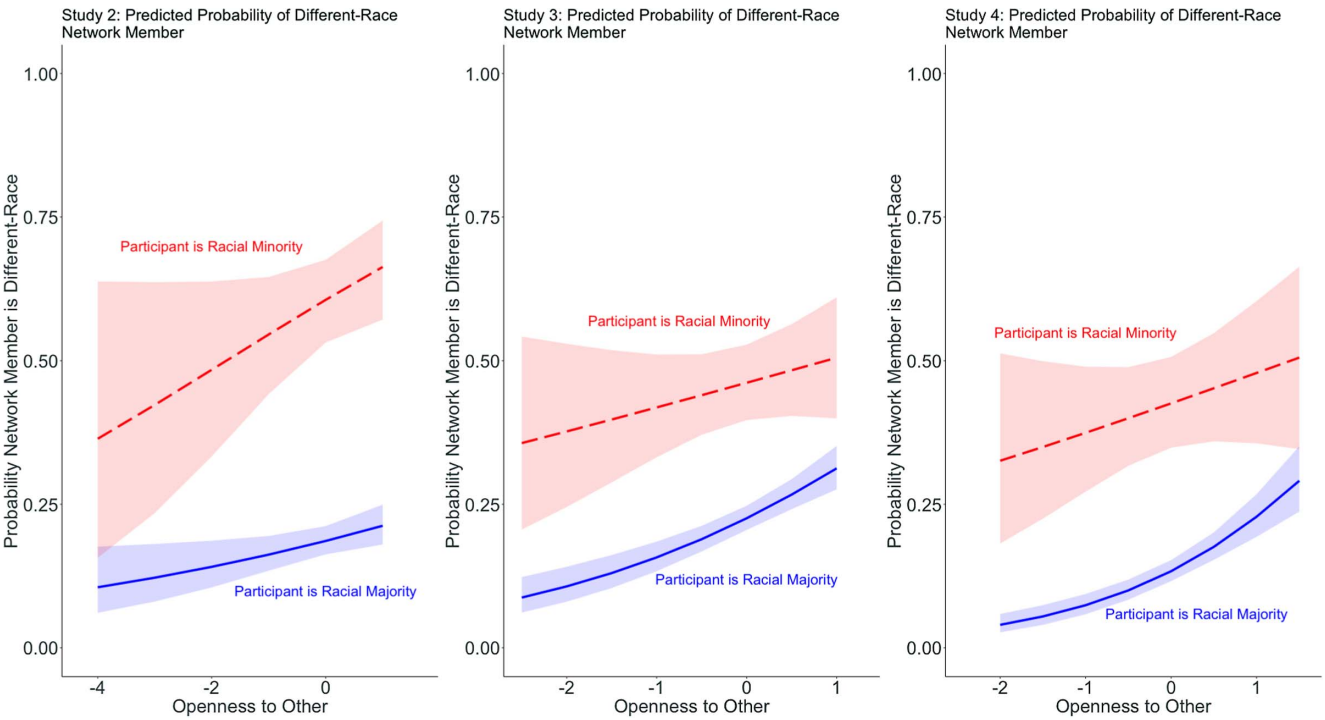


Note. Numbers are predicted means of same- and different-race network members across the whole network, at low (−1*SD*), medium (the mean, M), and high (+1*SD*) levels of Openness to Other for Studies 2 (Panel A), 3 (Panel B), and 4 (Panel C). Study 2 included a smaller number of total network members (10) than Studies 3 and 4 (both 14).

nearly equal amounts of same- and different-race network members, whereas participants low on O2 had about twice as many same- as different-race network members. This link was again robust to all alternative explanations. First, even though O2 correlated positively and substantially with Openness and Agreeableness, controlling for both of these broader personality traits did not account for O2's link to racial heterophily. Second, the O2 effect was again not significantly moderated by whether participants were members of the

Figure 5

Probability That a Network Member is Different-Race: Effects of Openness to Other for Racial Minority and Majority Participants (Studies 2–4)



Note. Probability of a different-race network member predicted by Openness to Other separately for participants who are either a racial majority (White in Study 2; Asian in Studies 3 and 4) or minority (non-White in Study 2; non-Asian in Studies 3 and 4). See the online article for the color version of this figure.

majority-race (here, White) or minority-race (here, non-White) group. Third, neither of the contextual factors explained the effect. Structural differences in opportunities to form different-race relationships (i.e., relative size of one's racial group) predicted racial heterophily but did not account for the O2 effect. In addition, O2 predicted heterophily for both long-term friends and acquaintances. This pattern of findings provides a powerful replication of the findings from Study 1, even though the samples differed in the age and employment status of the participants, changed the majority group from one (Asian) to another (White), and took place in less diverse and less pro-diversity contexts.

Overall, Study 2 showed that the O2 effect is not limited to highly diverse contexts where diversity is not only present but also valued and encouraged. The effect was also obtained in comparatively homogeneous contexts with neutral attitudes toward cross-race contact. In the following studies, we further probe the generalizability of our results and extend them by examining students' networks from before they came to UC Berkeley.

Study 3: Consistency and Change From Pre-College to at-College Networks

Studies 1 and 2 demonstrated that O2 predicted network racial heterophily in a college student sample on a relatively diverse campus as well as in a middle-aged, national adult sample. The present study aimed to replicate these results and added a new feature: We asked participants to report the social networks they had before they moved to UC Berkeley (for most students, their high school network). Thus, we could test how students higher and lower on O2 responded differentially to the increased diversity in the San Francisco Bay Area compared to the other parts of the U.S. they had moved from. In particular, conditional on the racial heterophily of pre-Berkeley networks, a positive relationship between O2 and racial heterophily of Berkeley networks would suggest that higher-O2 students at Berkeley formed more different-race network members on campus than would be expected solely based on their pre-Berkeley networks.

Method

Participants

Data were collected from 563 undergraduates at UC Berkeley for partial course credit. We filed a preregistration (May 2017; available at https://osf.io/fu6bq/) before the data for this study and for Study 4 were collected. While we do not count this study as preregistered, we did follow all of the data cleaning and analytic procedures described in the preregistration. In particular, Section 4b (within Hypotheses) of the preregistration describes the general logic for linking O2 with racial heterophily in the networks. The final section of the preregistration describes data exclusion procedures, which we followed for Study 3 and Study 4. After exclusions, our final sample size was 495 participants. Sixty seven percent of these participants were women; following norms at UC Berkeley, Asian students were the largest racial group (52%) and White students the second largest (27%). See Table 1 for further details about sample demographics.

Personality

We used the six-item BFI-2S scales (Soto & John, 2017b) to measure Agreeableness (alpha = .76, $M = 3.73$, $SD = 0.74$) and Openness (alpha = .75, $M = 3.73$, $SD = 0.75$). Agreeableness and Openness correlated .27. O2 was measured with the same items and 7-point scale as in Study 2 (alpha = .84, $M = 5.71$, $SD = 0.87$). As in Studies 1 and 2, O2 correlated positively with Openness ($r = .36$) and Agreeableness ($r = .43$), but note that in this sample, unusually, the correlation with Agreeableness was stronger.

Social Networks

We used a similar nomination procedure as in Study 2, but with some modifications and extensions. As before, participants were told that we were interested in their "effective social network" (i.e., people with whom they interact regularly). In Study 1, we did not distinguish friends from *before* Berkeley and friends *from* Berkeley, but that distinction should make an important difference because Berkeley is more racially diverse than most other parts of the U.S. (Olson, 2014). Thus, in Study 3, we asked participants to list seven friends from before they came to Berkeley (most commonly their high school friends), as well as four friends and three new acquaintances they made since coming to Berkeley (whether at UC Berkeley or outside of UC Berkeley). This expanded network task yielded 14 network members in total—the longest and most extensive network nomination used in the present studies.

As in Study 2, name generation occurred on a separate page from, and prior to, reporting any characteristics of the network members so that names of network members could not be changed after the initial generation page. After reporting data on their network, participants reported their own demographics. The critical DV was again whether each network member was of the same race (= 0) or a difference race (= 1) as the participant.

Procedure and Analytical Approach

Data were collected during a single assessment, using the same procedure as in Study 2 to protect against demand and carry-over effects. For the multilevel modeling, we used the same analytical approach as in the two earlier studies.

Results

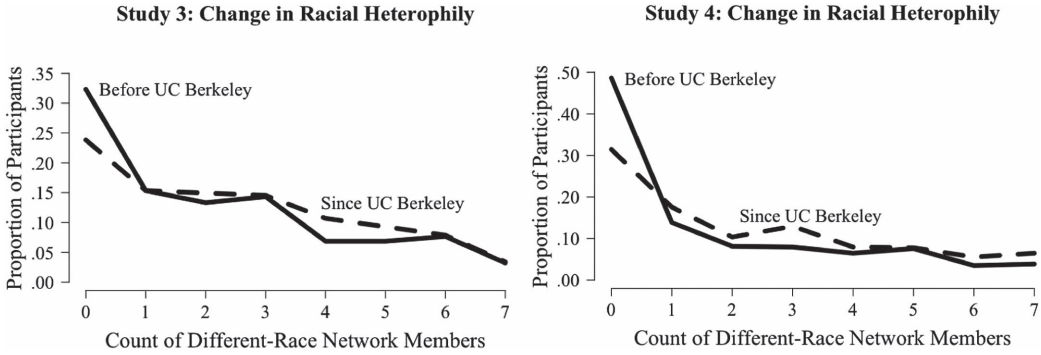
Describing the Pre-Berkeley and at-Berkeley Networks and How They Differ

Overall, about two thirds of networks members were of the same race as the participants ($M = 64\%$). Table 2 shows that new acquaintances were more likely to be of a different race ($M = 41\%$) than long-term friends ($M = 38\%$), $B = 0.31$, $z = 3.02$, $p = .003$, replicating Study 1.

What opportunities for cross-race interactions were available before and at UC Berkeley? Friends made before participants came to UC Berkeley (i.e., for most students, their high school friends) were even less likely to be of a different race ($M = 33\%$) than current network members at UC Berkeley ($M = 39\%$), $B = 0.47$, $z = 5.30$, $p < .001$, consistent with the idea that one's immediate environment (here, students' less diverse hometowns vs. UC Berkeley) is an important determinant of cross-race

Figure 6

Number of Different-Race Network Members Before and At UC Berkeley (Studies 3–4)



Note. Proportion of participants in Study 3 (Panel A) and Study 4 (Panel B) with different counts, from 0 to 7, of different-race network members before and at UC Berkeley.

relationships. The left panel of Figure 6 depicts this difference in the form of counts of different-race network members. Before coming to UC Berkeley, 32% of participants had 0 different-race network members, whereas at UC Berkeley, only 24% did.

On average, participants had known their 14 total network members for 4.32 years ($SD = 4.17$) and had followed our instructions when listing their three kinds of networks members: Acquaintances met at UC Berkeley had been known for less time ($M = 1.00$ years, $SD = 1.15$) than friends at UC Berkeley ($M = 2.02$ years, $SD = 1.87$), $B = 1.00$, $t(2,596) = 14.86$, $p < .001$; moreover, network members at UC Berkeley had been known for less time ($M = 1.67$ years, $SD = 1.73$) than friends from before UC Berkeley ($M = 6.87$ years, $SD = 4.23$), $B = -5.20$, $t(6,029) = -37.18$, $p < .001$.

As in Study 1, different-race individuals had been known for less time ($M = 3.84$ years, $SD = 3.78$) than same-race individuals ($M = 4.72$ years, $SD = 4.33$), $B = -0.96$, $t(5,839) = -6.74$, $p < .001$. This difference was not explained solely by different-race individuals' higher likelihood of having been met at UC Berkeley or of being acquaintances. When entered simultaneously in the multilevel model, all three predicted being known for less time: different-race status, $B = -0.50$, $t(5,722) = -6.01$, $p < .001$; having been met at UC Berkeley, $B = -4.99$, $t(5,722) = -35.77$, $p < .001$; and being an acquaintance, $B = -0.98$, $t(5,722) = 9.94$, $p < .001$.

Predicting Racial Heterophily From Personality Traits

At the bivariate level, Agreeableness, Openness, and O2 significantly predicted having more racially heterophilous networks (all p's $< .01$; see Table 3). Recall, however, that Agreeableness was more strongly correlated with O2 than in previous samples, so the bivariate result for Agreeableness may reflect its greater overlap with O2. Indeed, when entered simultaneously into a multiple predictor model, Agreeableness was no longer significant, and O2 was the only significant predictor ($p < .001$; see Table 3).[4] Thus, intergroup concerns, especially measured at the facet level, again won out over interpersonal concerns.

Panel B of Figure 4 illustrates the O2 effect. High-O2 individuals were expected to have 1.10 as many same- as different-race network members—approaching the 50:50 ratio as in our earlier studies—whereas low-O2 individuals were expected to have 5.29 times as many same- as different-race network members.

Finally, Asian participants again comprised the largest racial group in our sample (and on campus) and had fewer different-race network member ($M = .26$, $SD = .44$) than non-Asian participants ($M = .48$, $SD = .50$), $B = -1.23$, $z = -10.25$, $p < .001$. They also scored lower on O2 ($M = 5.45$, $SD = 0.88$) than non-Asian participants ($M = 6.00$, $SD = 0.77$), $B = -0.55$, $t(487) = -7.33$, $p < .001$. Nonetheless, when we controlled for participants' races, O2 remained a significant predictor, $B = 0.31$, $z = 4.63$, $p < .001$, $OR = 1.36$, 95% CI [1.20, 1.56], as did being Asian, $B = -1.23$, $z = -15.50$, $p < .001$, $OR = 0.29$, 95% CI [0.25, 0.34].

The majority versus minority (Asian vs. non-Asian) analyses also replicated the previous studies: Racial majority membership did not significantly moderate ($p = .060$) the link between O2 and racial heterophily, $OR = 1.36$, 95% CI [1.18, 1.57]. The middle panel of Figure 5 shows the results: The slope for O2 was positive in both majority and minority participants, and the minority participants again had much higher levels of cross-race friendship than the majority participants.

Acquaintances Versus Long-Term Friends: Consistency Across Three Kinds of Relationships and O2 Effects

Here, we examined the three parts of the network separately. Within the UC Berkeley network, individuals who had more different-race friends also had more different-race acquaintances, as indicated by a moderately high correlation between the two, $r = .41$, 95% CI [.33, .48]. Racial heterophily was not only consistent within the two Berkeley networks but also stable across their earlier high school versus current college networks: Heterophily of pre-Berkeley friends correlated positively both with heterophily of Berkeley friends, $r = .45$, 95% CI [.37, .51], and with heterophily of Berkeley acquaintances, $r = .36$, 95% CI [.28, .43].

How was O2 related to heterophily in these three relationship contexts? O2 predicted heterophily for each: for pre-Berkeley friends, $OR = 1.72$, 95% CI [1.40, 2.11]; for friends at Berkeley,

[4] In contrast to Studies 1 and 2, two of the other three Big Five traits had positive associations with racial heterophily: for Conscientiousness, $B = 0.25$, $z = 2.89$, $p < .001$, $OR = 1.29$; for Extraversion, $B = 0.16$, $z = 2.17$, $p = .030$, $OR = 1.18$; and for Neuroticism, $B = 0.02$, $z = 0.31$, $p = .756$, $OR = 1.02$.

OR = 1.94, 95% CI [1.55, 2.42]; and for acquaintances at Berkeley, *OR* = 1.62, 95% CI [1.33, 1.99]. These three effect sizes did not differ from each other significantly, all *p*'s > .150.

Finally, we examined how students constructed their new networks in Berkeley's more diverse environment, compared to their network from before Berkeley. In particular, would high-O2 individuals take greater advantage of the more diverse Berkeley environment? Thus, if we are predicting the number of different-race members at UC Berkeley, would O2 predict an increase relative to the number of different-race members participants had before UC Berkeley? To test this hypothesis, we first entered the proportion of different-race friends from before UC Berkeley (thus controlling for prior heterophily), then O2, and predicted the proportions of (a) different-race friends and (b) different-race acquaintances at UC Berkeley (see Figure 7).

In this model, a positive effect of O2 would indicate that, holding constant the proportion of different-race friends before Berkeley, those higher on O2 had made more different-race relationships at Berkeley than those lower on O2. The findings are summarized in Figure 7: Higher-O2 participants, compared to their lower-O2 peers, had both more different-race friends ($\beta = .17$, $p < .001$; Panel A) and acquaintances ($\beta = .15$, $p < .01$; Panel B) at Berkeley than would be predicted on the basis of their high school friends alone. This pattern of results suggests an *additive* process: When afforded the opportunity, individuals higher on O2 select different-race relationships above what they had previously. It also indicates that O2's effect on racial heterophily is not redundant with the heterophily of the previous network. This finding, if replicated, constitutes a relatively strong test of O2's association with racial heterophily since usually past behavior is by far the best predictor of future behavior (Ouellette & Wood, 1998).

Discussion

As in Studies 1 and 2, we found that only O2 was uniquely associated with having more different-race network members, and this effect held across all of our robustness checks. Critically, the O2 effect could not be attributed simply to the networks at UC Berkeley being unusually diverse, as the same link held in the networks established before these participants moved to UC Berkeley.

We also found that individual differences in network racial heterophily showed surprising levels of consistency, as well as some indication of an environmental effect, namely a change (an increase) from one context (high school, or pre-Berkeley) to the other (college, or at-Berkeley). Of course, our pre-Berkeley network was retrospective, assessed from today's perspective, and although participants seemed able to remember their pre-Berkeley friends well, a longitudinal design is preferable and needed for observing change over time.

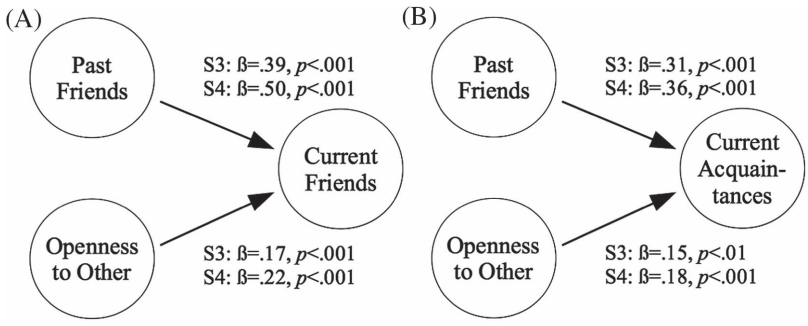
Finally, O2 was not redundant with racial heterophily in the pre-Berkeley network when predicting racial heterophily in the current network. Even when controlling for pre-Berkeley racial heterophily, O2 remained a significant predictor of racial heterophily at Berkeley. These findings are consistent with the idea that high O2 would predict an increase in racial heterophily after transitioning from a less to a more diverse environment—in other words, that O2 is responsive to environmental affordances, with high-O2 people constructing a more racially heterophilous network when the environment affords such choice. We discuss this finding further in the General Discussion section. To assess the reliability of these results, we ran a replication of Study 3.

Study 4: Replication of Study 3

Study 4 replicated Study 3 in a separate sample with a preregistered design and analysis plan (available at https://osf.io/fu6bq/; see Section 4b within Hypotheses and all other questions). We also tested whether social desirability bias in self-presentation might explain our previous results by controlling for individual differences in Impression Management (Paulhus, 1991) in the multiple predictor model. Note that these data were collected during the summer school sessions at UC Berkeley, which tend to enroll more Asian students from higher-income backgrounds. Thus, the sample is likely to have

Figure 7

Predicting Racial Heterophily Among Current Friends (Panel A) and Current Acquaintances (Panel B): Effects of Racial Heterophily Among Past Friends and Openness to Other



Note. Results for multiple regressions predicting individual differences in racial heterophily among current friends (Panel A) and current acquaintances (Panel B) from racial heterophily among past friends and Openness to Other. S3 = results for Study 3; S4 = results for Study 4. The arrows do not indicate causal directions, but rather clarify how the regression was run, from two predictors on the left to the outcome on the right.

more Asian participants than our prior samples from UC Berkeley, so overall rates of different-race network members should be lower than in previous samples.

Method

Participants

We preregistered to collect data from at least 180 students enrolled in introductory psychology classes during late Spring and throughout the Summer. Of 692 initial responses, 96 opened the survey but opted not to take it and were removed from all analyses. From the remaining responses, we removed duplicated participant IDs both within and between subsamples, as participants could have responded to multiple surveys. All exclusions and analyses were preregistered (https://osf.io/fu6bq/). After all exclusions, the final sample size was 540 participants: 67% were women, and Asian students were again the majority group (60%, which is larger than in Studies 1 and 3), with White students the next largest (19%). See Table 1 for further details.

Personality

We used the same items and rating scale to measure O2 as in Studies 2 and 3. To represent Agreeableness and Openness, we used those BFI-2 facets that were most highly correlated with O2 in previous research (Antonoplis & John, 2022), namely Compassion for Agreeableness and Intellectual Curiosity for Openness. These more narrowly focused constructs would provide the strongest test of alternative explanations regarding the Big Five. As in Studies 1–3, all personality measures showed expected levels of reliability; alphas were .63 for the four-item Compassion facet of Agreeableness ($M = 4.84$, $SD = 0.99$), .73 for the four-item Intellectual Curiosity facet of Openness ($M = 5.22$, $SD = 1.21$), and .84 for O2 ($M = 5.44$, $SD = 0.90$).

Impression Management was assessed using the best-validated measure of intentionally positive self-presentation, the 12-item Impression Management scale (Paulhus, 1991), which we included for a subset of the sample ($N_{subset} = 257$). Subjects rated each item on a 7-point scale. The α was .68. The mean of 3.75 ($SD = 0.78$) was below the scale midpoint of four, indicating that, on average, participants did not present themselves in an unrealistically positive light.

Social Networks

We used the same task as in Study 3 and followed the same procedures to separate personality from network assessments, thus protecting against demand and carry-over effects.

Results

Replicating Results for Network Structure and Personality Traits

As in Studies 1–3, about two thirds of networks members were the same race as participants ($M = 70\%$; see Table 2), and new acquaintances were more likely to be of a different race ($M = 40\%$) than stable friends ($M = 32\%$), $B = 0.69$, $z = 5.33$, $p < .001$. Replicating Study 3, friends from before UC Berkeley were even less likely to be of a different race ($M = 25\%$) than network members at UC Berkeley ($M = 36\%$), $B = 1.17$, $z = 8.83$, $p < .001$. The right panel of Figure 6 depicts this difference in the form of counts of different-race network members. Before coming to UC Berkeley, almost half of the participants (49%) had 0 different-race network members, whereas at UC Berkeley, only 31% did, a substantial reduction.

Network members had been known, on average, for 3.81 years ($SD = 4.27$). Participants followed instructions when listing networks members: Acquaintances at UC Berkeley had been known for less time ($M = 0.84$ years, $SD = 1.48$) than friends at UC Berkeley ($M = 1.68$ years, $SD = 2.15$), $B = 0.79$, $t(2,710) = 10.12$, $p < .001$; network members at UC Berkeley had been known for less time ($M = 1.34$ years, $SD = 1.94$) than friends from before UC Berkeley ($M = 6.04$ years, $SD = 4.56$), $B = -4.72$, $t(6,381) = -36.77$, $p < .001$.

As in Studies 1 and 3, different-race individuals had been known, on average, for less time ($M = 3.38$ years, $SD = 4.09$) than same-race individuals ($M = 4.04$ years, $SD = 4.33$), $B = -1.18$, $t(6,255) = -8.13$, $p < .001$. This difference was not explained by different-race individuals' higher likelihood of having been met at UC Berkeley or of being an acquaintance. When entered simultaneously in the multilevel model, all three variables predicted being known for less time: different-race status, $B = -0.39$, $t(6,175) = -4.08$, $p < .001$; having been met at UC Berkeley, $B = -4.41$, $t(6,175) = -33.40$, $p < .001$; and being an acquaintance, $B = -0.77$, $t(6,175) = -7.37$, $p < .001$.

At the bivariate level, O2 and Openness, but not Agreeableness, significantly predicted having more racially heterophilous social networks (all p's $< .01$; see Table 3), adding further support to the importance of intergroup over interpersonal concerns for cross-race relationships. As in most previous studies, when entered simultaneously into a multiple predictor multilevel model, O2 again was the only significant predictor ($p < .001$; see Table 3).[5]

As a single predictor, Impression Management was unrelated to racial heterophily, $OR = 1.00$, 95% CI [0.74, 1.36]. Critically, Impression Management did not explain O2's effect in a multiple predictor model. Impression Management did not significantly predict racial heterophily, $OR = 1.08$, 95% CI [0.79, 1.47], whereas O2 did, $OR = 1.82$, 95% CI [1.30, 2.55]; neither Agreeableness nor Openness was significant in the multiple predictor model (all p's $> .05$).

Panel C of Figure 4 closely replicates the pattern found in Studies 1–3: High-O2 participants had nearly even amounts of—1.31 times as many—same- as different-race network members, whereas low-O2 participants had substantially more—5.88 times as many—same- than different-race network members.

Finally, Asian participants were again the largest group, and so had fewer different-race network members ($M = .19$, $SD = .40$) than non-Asian participants ($M = .46$, $SD = .50$), $B = -1.78$, $z = -11.50$, $p < .001$. They also scored lower on O2 ($M = 5.19$, $SD = 0.86$) than non-Asian participants ($M = 5.82$, $SD = 0.82$), $B = -0.63$, $t(538) = -8.56$, $p < .001$. Nonetheless, when base rates were controlled, O2 remained a significant predictor, $B = 0.45$, $z = 5.04$, $p < .001$, $OR = 1.56$, 95% CI [1.31, 1.86], as did being Asian, $B = -1.88$, $z = -18.54$, $p < .001$, $OR = 0.15$, 95% CI [0.12, 0.19].

[5] Replicating Studies 1 and 2, none of the remaining Big Five correlated with racial heterophily ($N = 160$, who had completes measures of the remaining three Big Five): for Conscientiousness, $B = 0.29$, $z = 1.54$, $p = .123$, $OR = 1.33$; for Extraversion, $B = 0.17$, $z = 1.11$, $p = .269$, $OR = 1.19$; and for Neuroticism, $B = 0.01$, $z = 0.09$, $p = .930$, $OR = 1.01$.

The results for the racial majority versus minority membership (Asian vs. non-Asian) analyses are shown in Panel C of Figure 5. Consistent with all prior studies, O2 was positively related to racial heterophily, *OR* = 1.54, 95% CI [1.30, 1.83], and majority group membership, negatively related, *OR* = 0.21, 95% CI [0.15, 0.28]. Unlike our previous three studies, the interaction, *OR* = 1.55, 95% CI [1.10, 2.19], $p = .012$, was significant and indicated that the O2 effect was slightly stronger for majority group members than for minority group members.

Racial Heterophily in Acquaintances Versus Long-Term Friends: Consistency Across Networks Before and at Berkeley and O2 Effects

Within the UC Berkeley network, friend and acquaintance nominations provided relatively consistent estimates of the racial heterophily of participants' social lives, as indicated by a moderately high correlation between the two, $r = .57$, 95% CI [.51, .62]. Remarkably, network racial heterophily showed consistency across environments, too, as heterophily of pre-Berkeley friends positively correlated .55 with heterophily of Berkeley friends, 95% CI [.49, .61], and .39 with heterophily of Berkeley acquaintances, 95% CI [.32, .46].

How was O2 related to heterophily in these three relationship contexts? As in Study 3, O2 predicted heterophily for each: For pre-Berkeley friends, *OR* = 2.36, 95% CI [1.79, 3.11]; for friends at Berkeley, *OR* = 2.78, 95% CI [2.10, 3.68]; and for acquaintances at Berkeley, *OR* = 2.13, 95% CI [1.64, 2.77]. O2 did not predict racial heterophily differently for networks before and at Berkeley ($p = .695$) or for friends and acquaintances at Berkeley ($p = .080$).

Finally, we examined how individuals constructed their new networks in Berkeley's more diverse environment, compared to their networks from before Berkeley. We again found that participants higher on O2, compared to their lower O2 peers, had more different-race friends ($\beta = .22$, $p < .001$) and acquaintances ($\beta = .18$, $p < .001$) at Berkeley than would be predicted on the basis of their pre-Berkeley friends alone. These findings are shown in Figure 7 and closely replicated those from Study 3.

Discussion

We again found that O2 was associated with having more different-race network members. Critically, this could not be attributed to the networks of Berkeley being especially diverse, as the relationship held in networks from before participants moved to Berkeley. As in Studies 1–3, the relationship was robust to a variety of alternative explanations, including the superordinate personality traits Openness and Agreeableness, as well as base rates of racial group membership and majority–minority status. Critically, O2 was not redundant with prior network heterophily when controlling for pre-Berkeley network heterophily.

General Discussion

The primary aims of the current research were to examine whether systematic individual differences in racial homophily exist and whether they can be predicted from personality traits. Across four studies, we found consistent evidence for both points. First, racial homophily was a common phenomenon but did not characterize everybody's networks; some individuals had exclusively same-race friends, whereas many did not. Second, personality traits predicted how likely people were to have different-race relationships, and the overall pattern of findings was consistent across all four studies, for both self-reports and peer ratings of personality. Below, we review our results and their implications (a) for understanding interpersonal versus intergroup phenomena, (b) for conceptualizing personality at the level of broad domains versus more narrow facets, and (c) for understanding how personality and contextual factors are jointly shaping friendships. We also consider the limitations of the present studies, as well as directions for future research.

What Predicts Racial Homophily? Interpersonal Versus Intergroup Concerns and Their Representation in the Big Five

Although racial homophily in people's networks is an interpersonal phenomenon, it critically involves intergroup processes, as individuals must cross the ingroup–outgroup boundary to engage in cross-race contact and relationships. Thus, it was an open question whether interpersonal traits, such as compassion, trust, and respect (i.e., Agreeableness), would be sufficient (or even necessary) to account for individual differences in racial homophily. Alternatively, forming relationships across racial boundaries will likely bring about many new experiences and, thus, require traits like curiosity and exploration that are represented in the Big Five taxonomy by Openness. We tested these competing predictions in four studies, and the results were clear. In all but one study, Agreeableness was not significantly related to participants' likelihood of having different-race ties, and effect sizes were close to null, signified by an *OR* of 1. In fact, the *mean OR* across all studies was 1.14, with a range from 1.02 to 1.27 (see Table 3).

In contrast, Openness to Experience was always positively related to participants' likelihood of having more different-race ties and significantly so in three of our four studies (see Table 3), with effect sizes ranging from 1.12 to 1.40 (*mean OR* = 1.29), which are generally considered small (Chen et al., 2010). This pattern of findings suggests that intergroup concerns, but not interpersonal concerns, were important for the development of cross-race relationships.

We had hypothesized that Agreeableness would be important here because previous research had linked it with lower prejudice toward many outgroups (Crawford & Brandt, 2019; Sibley & Duckitt, 2008). A revised explanation may be that Agreeableness tracks a generally positive, warm attitude toward others that is indiscriminate and may not yield selective interaction with different-race individuals because (a) agreeable people care about others in their immediate surroundings—their families, neighborhoods, schools, and workplaces—and (b) these places tend to be populated by others of the same race as them. These findings extend Laakasuo et al.'s (2017) initial results from family-and-friends networks in the U.K. to larger, nonfamilial networks in the U.S. Important to note is that all the Big Five findings are based on the BFI-2 scales, and future research should extend these results to other personality measures, such as the Big Five Aspects Scale (DeYoung et al., 2007) or the NEO-PI-R (Costa & McCrae, 1992).

Improving Representation of Intergroup Concerns in the Big Five: Openness to Other

Although intergroup concerns better accounted for racial heterophily than interpersonal concerns, the effect size for Openness was

always small, a finding that is consistent with the poor representation of intergroup concerns in the Big Five noted by Stürmer et al. (2013). Hence, we also included in our studies a novel, social facet of Openness introduced to better represent social and intergroup concerns within the Big Five, which we call Openness to Other (Antonoplis & John, 2022). We found that O2 was significantly related to participants' likelihood of having different-race ties across all four studies, with effect sizes in the medium range (Chen et al., 2010). As shown in Table 3, the *mean OR* was 1.66, and *OR*'s ranged from 1.25 to 2.15; as Cohen's *d*'s, these effects corresponded to values ranging from 0.20 to 0.47 *SD*s. Importantly, even when both Agreeableness and Openness to Experience were controlled, O2 always remained significantly related to racial homophily, with little reduction in effect size (*mean OR* = 1.58; Table 3).

In contrast, in these multivariate analyses, neither Agreeableness and Openness to Experience were related to racial homophily, with average effect sizes across all studies near null (for Agreeableness, *mean OR* = 0.90; for Openness, *mean OR* = 1.12; Table 3 on p. 27). These results suggest that O2 is a valuable facet-level addition to the Big Five, contributing a facet that can predict individual differences in a feature prevalent throughout human societies, namely how individuals interact with members of outgroups. In addition, O2 was not redundant with structural features related to racial homophily. Even when controlling for base rates of racial group membership, the O2 effect remained significant in all studies (*mean OR* = 1.44).

Important to note is that the average *OR* for O2 of 1.66 indicates that, on average across studies, a one-unit increase in O2 was associated with a 66% increase in the odds that a given network member would come from a race different from the self. Combined with 35% of network members being of a different race, on average, across studies, the *OR* of O2 means that a person scoring 1 *SD* above the mean on O2 would have about equal numbers of same- and different-race networks members, whereas a person 1 *SD* below the mean would have roughly four times as many same- as different-race ties. In a network of eight people, then, low-O2 individuals would have two different-race members, whereas high-O2 individuals would have twice that number, namely four. Thus, while O2's effect on a single network member might appear medium by conventional standards, it amounts to rather substantial individual differences in the racial composition of people's networks.

Together, these results suggest that O2, although still a novel facet in the Big Five, is important to the formation of different-race ties, and especially so when compared to traditional predictors like Agreeableness and Openness to Experience. More generally, these findings are important because they demonstrate that observed levels of racial homophily have a basis in fundamental psychological attributes, such as personality traits, and that these personality effects could be observed above and beyond structural aspects (Anderson et al., 2014; Currarini et al., 2010).

Shared Self-Report Method Variance Does Not Explain Personality Results

The personality results reviewed above cannot be explained by shared method variance, as we took careful steps to guard against such effects. First, we used an unobtrusive measure of racial homophily in order to avoid demand and social desirability effects. This measure first asked participants to name friends and acquaintances in their networks, and we asked participants to report the races of their network members only after they moved onto a subsequent page and could no longer change the individuals they had nominated. Only Study 1 did not use this separated design; instead, the social network assessment was given at least 1 week after the personality measures. Second, we took a number of steps to avoid priming participants to the subject of our research question. Study 1 separated assessments by at least 1 week and embedded the key measures within larger surveys. Studies 2–4 began with personality measures, then had several sections of content unrelated to our research question (e.g., where people would choose to sit at a meeting), and ended with the social network assessment. It is important to note that we found the (replicated) personality results even with these strong precautions in place. Importantly, we tested this argument directly by using peer-reported personality traits in Study 1 and by controlling for Impression Management in Study 4. Peer-rated Openness and O2 both correlated with racial homophily, replicating results for the self-reports. Likewise, Impression Management did not account for the effect of O2 in Study 4.

Together, these results suggest that the present results are not driven by shared method variance or self-image maintenance concerns. In addition, if reports of network members' races were insincere, we might expect the effect to occur for only friends (strong ties), who are more important to and reflective of the self than new acquaintances (weak ties). Yet, O2 predicted racial homophily for both groups, consistent with a lack of image maintenance concerns in reporting.

Mapping the Interplay Between Person and Context in Predicting Racial Homophily

Another important goal of this work was to map how personality and contextual factors jointly predict who engages in racial homophily. Below, we summarize three areas in which we observed such joint effects.

Racial Homophily Is the Rule but Varies by Context and Across Persons

In all four samples, same-race ties were considerably more common than different-race ties. As shown in Table 2, racial homophily was the norm, whether we looked at adults from across the U.S. or undergraduates studying at UC Berkeley. Across all network periods and samples, same-race ties comprised, on average, 65% of all ties. In other words, only one third of social network members were of a different race.

This overall trend, however, obscures interesting contextual and relational variation. In particular, as we compared undergraduates' networks from their less diverse pre-Berkeley environments to the more diverse environment at Berkeley (Studies 3 and 4), we found that their proportion of different-race ties increased. Notably, the percentage of participants with no different-race network members at all decreased from 41% pre-Berkeley to 28% at Berkeley (see Figure 6). In addition, within the Berkeley environment, participants' new acquaintances were considerably more likely to be of a different race than participants' long-term friends. Across studies, new acquaintances met at Berkeley were the most likely group to be of a different race (41% of all ties). Current friends met at Berkeley were the second most likely to be of a different race (34% of all ties).

And friends met before Berkeley were the least likely to be of a different race (29% of all ties).

In contrast, the 30- to 60-year-old adults in Study 2 did not show the same difference between friends and acquaintances. Acquaintances were slightly, but nonsignificantly, more likely to be of a different race (35% of all ties) than friends (33% of all ties). This difference in network structure between samples may result from the fact that these adults were living across the U.S., in places less diverse than Berkeley, CA, with fewer opportunities to meet new people of a different race.

One statistic was surprisingly similar in the undergraduate and middle-aged adult samples: In both types of samples, about one third of their current friends were of a different race. However, they differed in their rates of different-race acquaintances: 43% for Berkeley versus 35% for the middle-aged adults. This difference in acquaintances, combined with the similarity for long-term friends, suggests that the Berkeley undergraduates, despite meeting more different-race acquaintances in their daily lives than the adults sampled from MTurk, were not especially likely to retain these different-race acquaintances as friends. One reason for this pattern to occur is that same-race acquaintances are more likely to share friends-of-friends with participants, easing conversion of the acquaintanceship into a friendship by increasing the likelihood of incidental contact (Heider, 1958; Newcomb, 1961). By the same logic, different-race acquaintances may be unlikely to occupy such a network position. Hence, the same-race acquaintances are more likely than the different-race acquaintances to be encountered in the future (e.g., at parties and other social events) and, thus, are easier to convert into friends. Relatedly, we found a difference in relationship length: Participants had known their different-race network members for a much shorter time than their same-race network members. Again, the implication is that cross-race relationships are less long-lasting and potentially more fragile.

In addition to these main effects of context, we also examined how consistent individual differences in racial homophily were across these contexts. We found surprisingly high levels of consistency in all four studies. Across relationship type (e.g., friends vs. acquaintances) and environment (high school before Berkeley vs. at Berkeley), the consistency correlations were always significant and all exceeded .30. Correlations between the two relationship types ranged from .41 to .57 across our studies, and between the two environments, from .36 to .55. Given all of our findings, one plausible explanation for this high level of consistency is that O2 and other personality traits and psychological attributes are stable causes of racial homophily, inducing positive correlations between individual differences across relationship type and context. Another explanation is that members of smaller (larger) groups in the U.S. population might persistently be members of smaller (larger) groups in the specific contexts they inhabit (e.g., work, school), leading to greater ease (difficulty) having outgroup ties. Thus, these consistency correlations may reflect a consistency in the experience of being a minority (majority) group member in the U.S. Future research should further examine these intriguing possibilities.

One implication of these consistency correlations is that it appears that consistent individual differences in racial homophily can be measured using as few as three nonfamily network members. Of course, information based on a larger sampling of network members (e.g., the total of 14 in Studies 3 and 4) will be more accurate, but it is useful to know that consistent individual differences can be measured with so few observations.

In Studies 1, 3, and 4, we found that different-race individuals had been known for less time, were more likely to be acquaintances than friends, and were more likely to have been met at Berkeley. Given that both acquaintances and people met at Berkeley were, by definition, known for less time than friends or people met before Berkeley, we questioned whether different-race ties had been known for less time simply due to their higher likelihood of being acquaintances and of being met at Berkeley. However, when simultaneously predicting time known from different-race status, relationship type, and environment (pre- vs. at-Berkeley), different-race status still predicted length of time known. Thus, regardless of relationship type (friend vs. acquaintance) and regardless of environment (before vs. at-Berkeley) different-race individuals had been known for less time than same-race individuals.

What might explain this result? One possibility is that preexisting racial segregation in society makes it so that different-race individuals are met later in life compared to same-race individuals. Given that U.S. neighborhoods remain segregated by race (Williams & Emamdjomeh, 2018), if people tend to live in and be active in their own neighborhoods rather than in distant neighborhoods, then people should tend to meet same-race individuals at a faster rate than different-race individuals. Within the university setting, segregation within universities could slow the rate at which students meet peers of different races. Alternatively, if base rates make majority-race members more likely to meet people of their own race, then they should meet different-race individuals later. Because majority-group members also influence the population mean more, this dynamic should make the general population mean for how long same-race individuals have been known higher than for different-race individuals. Future research could test these ideas using computational modeling (Guest & Martin, 2020; Smaldino, 2020) and longitudinal studies of organization-wide network development (Kossinets & Watts, 2006, 2009).

Personality Results Hold Across Relationship Type and Context

Although O2 predicted racial homophily across the whole network, it was an open question whether the relationship would hold for strong and weak ties (friends and new acquaintances) and across more and less diverse environments (before and at Berkeley). In all four studies, relationship type (friend vs. acquaintance) did not significantly moderate O2's relationship with racial homophily. Instead, O2 predicted racial homophily for both strong and weak ties. In Studies 3 and 4, we asked participants about their networks before and at Berkeley, under the premise that the unusually high diversity of UC Berkeley might facilitate the expression of personality in friendship choices. Again, O2's relationship with racial homophily was consistent across environment, predicting lower rates of racial homophily (higher rates of racial heterophily) in both pre-Berkeley and at-Berkeley networks.

We also examined whether O2 would predict racial homophily at Berkeley even after controlling for racial homophily before Berkeley. This was a severe test because past behavior is usually the best predictor of future behavior (Ouellette & Wood, 1998). In Studies 3 and 4, O2 remained a significant predictor of racial homophily at Berkeley, conditional on racial homophily before Berkeley (see

Figure 7). This finding indicates that O2 was not redundant with prior behavior. Importantly, it suggests that higher-O2 individuals may "take advantage" of environmental affordances that suit their psychological needs and build a more diverse personal network when a more diverse environment affords such an opportunity.

Personality Results Hold for Majority and Minority Participants and in Less Diverse Contexts

Another important direction for future research is to examine how the nature of the environment (e.g., base rates, legal strictures) might change how personality traits relate to racial homophily. Sociologists have emphasized structural features, like segregation (e.g., anti-miscegenation laws and redlining; Faber, 2020; Wolff, 2018) and base rates of group membership (Blau, 1977), as causes of racial hompohily. It seems plausible that these structural features could interact with personality traits to "turn on (or off)" when personality traits predict individual differences in racial homophily. For instance, if marriages between people of different races are made illegal, as anti-miscegenation laws enforced, the probability of two people of different races forming a romantic relationship should become less likely, making it harder to express one's preference for such a relationship. Since the expression of personality traits depends on the availability of different options (see Figure 1), personality traits may matter less for the formation of different-race ties in more segregated areas. Alternatively, when environments are more diverse, personality may be readily expressed by members of different groups, as seen in the directional consistency of O2's effect for majority and minority groups in both Asian-majority (Studies 1, 3, and 4) and White-majority (Study 2) populations. Of course, this consistency across different majority populations still needs to be tested in other contexts (e.g., majority Black or Latinx populations).

Despite the aforementioned consistency, we may have seen some evidence for this personality by environment prediction in the data presented in this article. In particular, the effect sizes for Openness and O2 varied across the four studies in a way that tracks participants' living in more versus less diverse places. Study 2, conducted on MTurk with participants living across the U.S., found the smallest effect sizes for both O and O2 (OR = 1.12 and OR = 1.25, respectively). Studies 1, 3, and 4, conducted in more diverse Berkeley, CA (Olson, 2014), found consistently larger effect sizes for O and O2 (OR's from 1.29 to 1.40 and from 1.57 to 2.15, respectively). If our personality by environment prediction is correct, this variation may result from the wider availability of potential different-race network members afforded by the more racially diverse environment that is Berkeley, CA, compared to other cities and counties in the U.S. If this prediction bears out, it would highlight the general utility of incorporating both psychological and sociological perspectives into the study of individual differences.

In line with our personality by environment prediction, recent work has found that personality traits, in particular Openness to Experience, interacted with government shelter-in-place orders to predict individual-level sheltering-in-place during the ongoing coronavirus disease (COVID-19) pandemic (Götz et al., 2020). In particular, in countries with stricter shelter-in-place laws, Openness was less predictive of individual sheltering-in-place. Future research should examine the extent to which broader contextual factors, like laws and public policy, affect the relationship between personality traits and individual differences in racial homophily.

Identifying Processes Linking Personality and Racial Homophily

Although this set of studies has many strengths, its primary limitation is that it cannot distinguish between selection and evocation effects that may have given rise to the correlations we observed. Moreover, this set of studies was not designed to help us distinguish between person-driven effects, such as selection and evocation, and socialization effects (i.e., learning traits from the environment). Regarding the former, both selection and evocation processes seem plausible and necessary for relationship formation. Both parties must agree to the social relationship for it to form and be maintained. Thus, we do not view our inability to distinguish them as a major issue. Future research could test the plausibility of a selection process by studying (e.g., experimentally) whether O2 relates to selection of different-race network members when opportunity for same- and different-race network members is equalized across groups. Similarly, future research could test the plausibility of evocation processes by testing whether different-race strangers choose higher-O2 individuals as ties more often than lower-O2 individuals (e.g., based on brief personality descriptions). Such studies could also look at the perceptions, feelings, and behaviors that drive each process.

Longitudinal studies of friendship and network development are needed to address these questions, as they would permit the study of tie nomination by each party to the relationship. More specifically, a longitudinal study would permit examination of whether higher-O2 individuals are more likely to nominate different-race peers as friends or acquaintances (selection process) and whether different-race peers are more likely to nominate higher-O2 individuals as friends or acquaintances (evocation process).

Although we cannot rule out socialization as an explanation of our results (i.e., having more different-race friends makes people higher on O2), we do not think that it is the only or most likely explanation. First, current evidence suggests that socialization effects on personality traits are rare and certainly less frequent than selection effects, which seem to occur somewhat often (Denissen et al., 2019; Lüdtke et al., 2011; Luhmann et al., 2020). In addition, evidence for intergroup contact theory, a kind of socialization particularly relevant to our results, has recently faced severe criticism. First, a meta-analysis of (quasi-)experimental longitudinal studies found a null to very small reduction in prejudice (Paluck et al., 2018). Second, a recent preregistered longitudinal experiment in Iraq found no changes in self-reported intergroup attitudes and only behavioral changes within the context in which the intergroup contact occurred, suggesting that the effects of intergroup contact may not generalize to everyday interactions (Mousa, 2020). Hence, it seems more likely that O2 and racial homophily should correlate because of selection (or evocation) effects, rather than socialization effects. Future research is needed to test these explanations by observing network changes following an intervention on O2 (e.g., using a recall-a-time manipulation, as in Hotchin & West, 2021) and by observing changes in O2 following an intervention on networks (e.g., using a natural experiment with a randomly assigned college dorm roommate, as in Shook & Fazio, 2008).

Conclusion

In the Introduction to this article, we reported recent estimates that racial homophily is prevalent in the U.S.: White Americans have

mostly White friends, Black Americans have mostly Black friends, and Hispanic Americans have mostly Hispanic friends (Cox et al., 2016). We presented evidence that this trend is generally true, but *not* for everyone. Across four studies, we found that racial homophily was indeed common but also that individual differences in racial homophily were both substantial and consistent. Moreover, we found that these individual differences were associated with Openness to Experience and Openness to Other, but not with Agreeableness. Importantly, O2 best accounted for the individual differences in racial homophily that we observed. For predicting individual differences in racial homophily, O2 was not redundant with Agreeableness, with Openness to Experience, with base rates of racial group membership, or with prior engagement in racial homophily. Moreover, O2 predicted adding different-race ties to one's network after transitioning to a more racially diverse environment. These results expand our knowledge of how personality traits relate to the construction of individuals' social environments (e.g., Danckert et al., 2017; Gosling et al., 2002; McCrae, 1996; Rentfrow et al., 2008). Moreover, they highlight that psychological attributes are important for understanding how individuals form friendships and social networks (e.g., Anderson et al., 2014; Currarini et al., 2010). Increasing our understanding of how personality traits guide the selection of different-race friends and the construction of racially diverse networks will be important as psychologists increasingly try to combat networked phenomena (e.g., the Black–White wealth gap, access to information and opportunity, and the development of youths' attitudes toward intergroup contact) that critically depend on individuals choosing to be with people from different racial backgrounds.

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(*Appendix follows*)

Appendix

Openness to Other (O2) Scale (Antonoplis & John, 2020): Items and Scoring Guide

Instructions

The following statements describe different ways to think and feel about ourselves and others. Please indicate the extent to which you agree (or disagree) with each statement using the rating scale provided.

Statements	Disagree strongly	Disagree somewhat	Disagree slightly	Neither agree nor disagree	Agree slightly	Agree somewhat	Agree strongly
1. I am comfortable working on joint projects with people who are very different from me in ethnicity, customs, and behavior.	1	2	3	4	5	6	7
2. For me, it is best to ignore cultural differences. Yes, there are some differences but I wonder: Wouldn't it be better if we were all just the same?	1	2	3	4	5	6	7
3. I appreciate a wide range of cultural perspectives; they help me understand people's feelings and actions and guide my behavior toward people that are different.	1	2	3	4	5	6	7
4. I find it very hard to understand people who have different looks, clothes, customs, and behaviors.	1	2	3	4	5	6	7
5. I know that differences between people can create a great mix of diverse skills and perspectives and can thus make us stronger.	1	2	3	4	5	6	7
6. I can see that cultural differences are real, but I often feel awkward around such people.	1	2	3	4	5	6	7
7. I would be interested in working on a team with students from different backgrounds than mine (e.g., religion, ethnicity, sexual orientation, etc.).	1	2	3	4	5	6	7
8. I don't get how "global issues" affect me or why they are important.	1	2	3	4	5	6	7
9. I am intrigued by cultural and ethnic differences; people who come from a different background are often more interesting to me.	1	2	3	4	5	6	7
10. People who look different and act in ways I do not understand make me very uncomfortable.	1	2	3	4	5	6	7

Note. Items copyright 2020 by Stephen Antonoplis and Oliver P. John. Reprinted with permission. For scoring, note that Items 2, 4, 6, 8, and 10 are false-keyed. To compute the scale score, reverse the five false-keyed items, then sum all 10 items, and divide by 10.

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