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# Mate Selection in Cyberspace: The Intersection of Race, Gender, and Education

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# Mate Selection in Cyberspace: The Intersection of Race, Gender, and Education<sup>1</sup>

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In this article, the authors examine how race, gender, and education jointly shape interaction among heterosexual Internet daters. They find that racial homophily dominates mate-searching behavior for *both* men and women. A racial hierarchy emerges in the reciprocating process. Women respond only to men of similar or more dominant racial status, while nonblack men respond to all but black women. Significantly, the authors find that education does not mediate the observed racial preferences among white men and white women. White men and white women with a college degree are more likely to contact and to respond to white daters without a college degree than they are to black daters with a college degree.

## INTRODUCTION

We examine how race, gender, and education jointly shape online interaction among Internet daters. Evidence suggests that the Internet is replacing neighborhood, family, and the workplace as a major venue to meet romantic partners (Madden and Lenhart 2006; Rosenfeld and Thomas 2012).

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The immense network and interactional data available on the Internet, meanwhile, have been proclaimed the new paradigm in data collection, with the potential to illuminate significant dimensions of social life (Salganik, Dodds, and Watts 2006; Watts 2007; Lazer et al. 2009). Utilizing data extracted from one of the largest dating websites in the United States, we explore classic sociological questions in the mate selection process: Is racial homophily or racial hierarchy the chief driving force of assortative coupling? If racial hierarchies matter, where is the crucial divide among racial groups in the dating market? How do gender and education intersect with race in the mate selection process? Empirically, we contrast the similarities and differences in racial preferences between heterosexual men and women. We also examine the extent to which education as an achieved status mediates the ascribed status of race in determining the likelihood of interaction among Internet daters.

Though many of these questions have been previously examined, existing literature and theories are largely limited by the empirical evidence. Studies of interracial marriage and cohabitation observe only the outcome but not the dynamics in the mate selection process and thus cannot separate the effect of racial preferences from that of propinquity in generating the observed coupling patterns. Studies of self-reported experience and attitudes toward interracial relations, on the other hand, are vulnerable (and increasingly so) to social desirability bias. This article extends and improves on previous studies. By directly observing the dynamics in the mate selection process within a bounded social space, we untangle choice from circumstance and distinguish behaviors from beliefs.

We first review how previous research has approached intermarriage and interracial dating and their limitations. Building on that literature, we discuss how theories of homophily, racial hierarchy, and gendered racial formation apply to the interaction of Internet daters. We then introduce our data set and method, followed by a presentation of the results and a discussion of the implications of our findings.

#### INTERRACIAL MARRIAGE: A PARADIGMATIC MEASURE OF RACIAL DYNAMICS

The vast majority of research on interracial intimate relationships has focused on marriage. Intermarriage has long been considered the ultimate indicator of social integration and reduced racial stratification. Scholars conclude that marital assimilation played a critical role in the successful American integration of European immigrants, who were once considered “non-white” at the turn of last century (Foner 2002; Alba and Nee 2005; Alba 2009). Although still rare, interracial marriage has become more common in U.S. society and especially among the younger generation. Between 1970

and 2000, the prevalence of black-white marriage grew more than fivefold from 65,000 to 363,000 couples, and marital unions between whites and members of all other races grew almost fivefold from 233,000 to 1.1 million (Qian 1997; Qian and Lichter 2007).

Marital mate selection generally operates under a strong tendency toward homogamy, where partners are similar to each other on many characteristics, including racial identity. Partly as a result of population size, intermarriage rates are lowest among whites. Yet when intermarriage occurs, whites are most likely to marry Latinos and Native Americans, followed by Asians, and least likely to marry African Americans (Qian and Lichter 2007). The pattern is consistent with the triracial hierarchy proposed by Bonilla-Silva (2004), which argues that the new racial stratification system has increasingly elevated the status of Asians and Hispanics above blacks.

However, there is salient gender variation. White men more often intermarry with Asian women than they do with black women, while white women more often marry black men than Asian men (Jacobs and Labov 2002; U.S. Census Bureau 2010). Gendered racial formation theory argues that such disparities are less explained by a one-dimensional racial hierarchy than by deeply instilled societal notions of desirability, which defines ideal masculinity and femininity according to racial identity. Black men are stereotypically depicted as hypermasculine while Asian women are often depicted as exotic, submissive, and more feminine. Black women and Asian men, on the other hand, are depicted, respectively, as less feminine and less masculine (Omi and Winant 1994; Collins 2004; Nemoto 2006, 2008).

Because intermarriage is numerically rare, most studies focus on white-minority pairing (Qian 1997; Fu 2001; Rosenfeld 2005; Qian and Lichter 2011). A natural consequence is that existing theories on mate selection are generalized largely from white-minority coupling patterns. While the tri-racial hierarchy may explain the likelihood of intermarriage between white and minority groups, it sheds no light on why black-Asian pairing is equally rare, though these two groups are claimed to inhabit shorter social distance. Gendered racial formation theory, similarly, makes claims to societal notions of masculinity and femininity based solely on white-minority coupling patterns. There is little evidence indicating that similar perceptions of masculinity and femininity are shared across racial boundaries.

Most important, both triracial hierarchy theory and gendered racial formation theory operate under the implicit assumption that the likelihood of interracial marriage reflects white racial preference (and not minority preference). And yet it may be an unrealistic assumption when we know that continuing societal racial segregation means that marriage markets are also largely divided. Thus, a major challenge faced by traditional studies of interracial marriage is that they are unable to detect whether the ob-

served coupling pattern results from racial preferences or the opportunity structure prior to marriage, that is, how much exposure individuals had to those of different backgrounds in their immediate dating market (Blau 1977; Blau, Blum, and Schwartz 1982; Tomaskovic-Devey and Tomaskovic-Devey 1988). Indeed, attitudinal survey data show that 86% of Americans (and 96% of black Americans) approve of interracial marriage, at least in theory (Jones 2011). Yet only 4% of U.S. marriages are interracial (U.S. Census Bureau 2010).

#### INTERRACIAL DATING AND COHABITATION: NEW TRENDS AND IMPLICATIONS

The continued use of interracial marriage as the primary measure of social integration overlooks the rich and burgeoning life history of intimate partnerships. Modern changes in the American family, such as acceptance of gay unions, marital postponement, cohabitation, and the cultural acceptance of nonmarital sexual relations and childbearing, have lessened the centrality of marriage in the individual's life course. The 2010 census indicates that married couples represent less than half of all American households. Even though black-white intermarriage rates are very low, we know that black-white cohabitation rates are much higher (Qian and Lichter 2007, 2011). While nonmarital relationships may be less stable, an exclusive focus on marriage ignores significant forms of intimate relations. Prior to marriage, and occasionally in place of marriage altogether, individuals engage in lengthy periods of dating and serial relationships that, because they are unofficial unions, are not captured by standard surveys. A growing number of studies have begun to examine interracial pairing among the heterosexual population, showing that such relationships are indeed more prevalent among daters than among married couples (Blackwell and Lichter 2004; Joyner and Kao 2005). More than 50% of African American, Latino, and Asian American adults self-report that they have dated someone from a different racial group (Yancey 2002).

However, similarly to studies of intermarriage, most dating research is unable to account for differences in group propinquity. For example, interracial dating is elevated among those who have lived in racially mixed neighborhoods or attended integrated schools (Yancey and Yancey 2002). Some studies have analyzed racial preferences listed on Internet dating advertisements as a strategy to avoid unknown levels of interracial marriage market exposure. They find patterns similar to those found in the interracial marriage literature. Using Yahoo personal ads, one study shows that black, Hispanic, and Asian straight men are more likely than white men to have a racial preference for a partner (Phua and Kaufman 2003). Using data from the same source, a study comparing white men and women dat-

ers shows that white women were most likely to exclude Asian men from their dating preferences while white men were most likely to exclude black women (Feliciano, Robnett, and Komaie 2009; Robnett and Feliciano 2011). Another study shows that Hispanic daters are more open to dating either whites or blacks than either group is to date one another (Feliciano, Lee, and Robnett 2011). Finally, profile data from match.com show that older cohorts are less willing to date anyone outside their racial group except whites. Whites and Asians are least willing to date blacks (Tsunokai, Kposowa, and Adams 2009).

Unfortunately, these studies also suffer the kind of social desirability bias that typifies traditional survey data on racial attitudes in the “postracial” United States (Pager and Quillian 2005). A significant portion of Internet daters might not believe that they themselves have any racial preference; and, even if they do, they are unlikely to reveal it in their personal ads because this has potential to reflect negatively on them to other potential daters. More importantly, very little information is known about actual dating behaviors, as opposed to stated preference, particularly those from within the context of a known universe of partner choices.<sup>2</sup>

#### RACE IN CYBERSPACE: A NEW FRONTIER

Using interactional data from online sources is one way to examine what people actually do at the beginning of the mate selection process. Since online dating websites contain the full potential market from which users select and the service providers maintain complete records of the online activities of their users, they provide a unique window to observe both the

<sup>2</sup> Preference is an elusive concept. One could certainly make the argument that stated preference is closer to one’s true preference because it is less contingent on the perceived opportunity and cost structure. On the other hand, if one’s preferences are informed by stereotypes, how one reacts to that person’s profile and online dating persona may reflect a “truer” preference because it is based on more accurate information. The contrast between perception and reality is most salient in the case of Middle Eastern Americans. While previous studies on dating profiles (e.g., Robnett and Feliciano 2011) indicate that white daters tend to exclude Middle Eastern American daters in their stated racial preferences, our preliminary analysis shows that white daters do not avoid interacting with Middle Eastern American daters at all. A potential explanation for this result is that Middle Easterners are “whiter” and more acculturated than they are portrayed in the media. In any case, if we define preference as a principle of action, it is reasonable to believe that the private interaction choice in a large dating website better captures one’s racial preference than publicly stated preferences shown on the dating profile. We would even speculate that dating websites provide one of the best social settings to observe underlying racial preferences, not only because no other social settings provide a comparable pool of potential mates in both quantity and diversity but also because the cost of potential rejection is fairly low, compared with rejections that take place in the workplace, church, and neighborhood.

opportunity structure and racial preference among daters at the interaction level. Evidence shows that Internet dating is becoming an important and popular technology for mate searching. The Pew Research Center's Internet and American Life Project shows that 74% of American Internet users who are currently single and looking for romantic partners have used the Internet to find dates, about half of whom have actively dated people they met online, with 17% entering into long-term or marital relationships as a result (Madden and Lenhart 2006). Another study finds that, other than having access to the Internet and a certain level of computer literacy, Internet daters differ little from daters who meet face to face (Sautter, Tippett, and Morgan 2010). A nationally representative survey also finds that the Internet has begun to rival neighborhood, family, and the workplace as one of the most common venues for couples to meet (Rosenfeld and Thomas 2012). As Internet usage has become a regular feature in most Americans' lives, researchers have increasingly come to view cyberspace activity less as a novel activity and more as an extension of normal social behavior.

A few scholarly studies have utilized interaction data from online sources (e.g., Wimmer and Lewis 2010). Using data from a German online dating website, Skopek, Schulz, and Blossfeld (2011) find that educational homophily is the dominant pattern among daters' initial contacts and replies. In the minority of cases in which educational dissymmetry does occur, it is gendered, with men contacting women of lower education. Most relevant to our study is Hitsch, Hortaçsu, and Ariely's analysis (2010*a*, 2010*b*) on mate preferences in an online dating setting, in which they observe strong preferences for racial similarity among Internet daters. We improve on their study in three important ways. First, Hitsch et al. limit their analysis to patterns of initiation and thus yield incomplete knowledge of the mate selection process. This is especially problematic when the majority of all initial contacts are made by men. Our study analyzes both the initiating and reciprocating behaviors and shows how racial preferences are contingent on gender and the stage of action. Second, similarly to Skopek et al. (2011), Hitsch et al. limit the risk set of interaction to only those profiles that an Internet dater has chosen to view more closely after first considering the profile picture and summary information. This methodological approach obscures the fact that the browsing behavior is inherently part of the selection process. We instead construct an opportunity space for each individual that includes all the probable dyads in the same metropolitan area. Finally, because of sample size limitation, Hitsch et al. are unable to estimate the racial preferences of the minority groups with precision. Our analysis, by contrast, utilizes a significantly larger and geographically more diverse sample and thus provides a better understanding of the racial preferences of the minority groups.

### RESEARCH QUESTIONS

We answer three empirical questions in this article. First, do people prefer those of similar racial identity or those with a more dominant racial status? Second, if racial hierarchies are in operation, where is the crucial divide among racial groups in the dating market? Finally, we explore how gender and education intersect with race. In the next section, we discuss these questions and the related hypotheses.

#### Homogamy: Homophily, Hierarchy, or Propinquity?

It is well established that homogamy, the marriage or union between individuals who are similar to each other, is the dominant pattern of mate selection. Couples often share similar characteristics such as educational attainment and racial identity. However, because only the end result is observed, there is no direct evidence showing that homophily, the intrinsic tendency of individuals to associate with similar others, is the driving force behind such patterns. At least two other theories are proposed to explain the prevalence of homogamy (Kalmijn 1994, 1998). Applying a utility maximization framework, some researchers argue that individuals do not seek similarities but, rather, higher status in the mate selection process (e.g., Elder 1969; Becker 1991; Oppenheimer 1997). When this theory is applied within the rubric of racial hierarchies, people of marginalized racial status may search for partners of the dominant racial group, who, in turn, may avoid or reject those of marginalized racial status. Thus, homogamy is prevalent only because market competition prevents those of marginalized racial status from partnering with those of dominant racial status. Other scholars emphasize the importance of propinquity in the partner-searching process. That is, individuals select mates from those who are proximate in social space. Since people of similar backgrounds have greater, if not exclusive, contact with each other in various social settings, no intrinsic preference is required to produce a homogamous outcome (Blau et al. 1982; Tomaskovic-Devey and Tomaskovic-Devey 1988). Analyzing pictures on Facebook, a recent study also shows that friendship formation is less linked to race than to dorm coresidence and past elite high school attendance (Wimmer and Lewis 2010).

These explanations yield distinct predictions on the behavior of Internet daters with regard to racial preference. If homophily theory is the principle of mate selection, we should observe that Internet daters, in general, are more likely to interact with members of their own group than daters of all other groups. If racial hierarchy is the main driving force of mate selection, we should see that Internet daters of marginal racial status are more likely to approach and respond to those of dominant status, while the latter avoid



and reject the former.<sup>3</sup> Finally, if propinquity is the sole social force that generates observed racial homogamy, we should see no significant role of racial identity in online interaction.<sup>4</sup>

#### Racial Hierarchy in Dating Markets: Where Is the Critical Line Drawn?

Second, we explore whether and how racial hierarchies in the United States shape mate selection processes. Because of sample size limitations, most empirical studies focus on only black-white intermarriage, where blacks are considered to be the marginal group and whites the dominant group. This dichotomous model has been challenged by contemporary racial dynamics, particularly the influx of Hispanic and Asian immigrants since the 1960s. One might ask where the critical line is now being drawn among racial groups as the United States gradually transforms from a biracial to a multiracial society. Some argue that the divide in the U.S. racial hierarchy is between whites and racialized others (Blauner 2001); some argue that the divide is between blacks and nonblacks (Feagin 2000); and others advocate a tri-racial stratification model, where Asian and Hispanic Americans are in the middle of the hierarchy (Bonilla-Silva 2004).

Existing evidence supports the latter two theories more than the first. Hispanic and Asian Americans have higher intermarriage and cohabitation rates with whites than blacks do (Qian and Lichter 2007). Reported racial preference studies also show that whites and Asians are less willing to date blacks (Tsunokai et al. 2009), while white and Hispanic daters are preferred by each other (Feliciano et al. 2009, 2011). In employment outcomes, Asians tend to be occupationally close to whites, with blacks the most distant (Stainback and Tomaskovic-Devey 2012). The literature generates hypotheses largely about the behavior of white Internet daters. If the racial divide is mainly between whites and nonwhites (Blauner 2001), we should see whites preferring to date only other whites, with equal degrees of rejection for all minority racial groups. Alternatively, if the black

<sup>3</sup> It should be noted that white daters are expected to behave similarly in both scenarios since homophily and hierarchy are indistinguishable among members of the dominant racial group. Therefore, the critical test of these two hypotheses is whether minority daters prefer daters from their own group over those of more dominant racial status.

<sup>4</sup> Because the propinquity hypothesis focuses on opportunity structure instead of intrinsic preference, observing tendencies toward homophily or racial preference does not suggest that this hypothesis should be rejected. In this article, we do not directly test the effect of propinquity. However, the absence of homophily or racial preference would indicate a high likelihood that propinquity is a major explanation for observed racial homogamy. Note that while Internet dating may reduce local barriers such as work and neighborhood segregation, daters are still likely to limit their mate searches to those they will be able to meet in person. Thus, in our analyses we limit the online dating market opportunity structure to the city level.

and nonblack framework is most applicable (Feagin 2000), white daters should be open to dating all racial groups except blacks. On the other hand, the triracial hierarchy theory (Bonilla-Silva 2004) suggests that whites should prefer to date other whites first and foremost, followed by Asians and Hispanics, and least likely to date blacks. How racial hierarchies might characterize the preferences of minority groups is an open question. While much of the literature suggests that minority groups should prefer to date whites, it is unclear how ethnic minorities would differentially rank other minority groups in their dating preferences. We therefore also explore hierarchy patterns among minority Internet daters.

### Gender and Education

The third topic we examine in this article is the role of gender and education in the interracial mate selection process. Previous studies have examined gender differences in the likelihood of forming interracial relations but found mixed results. Attitudinal surveys show that women report being more open to interracial relationships than men and the gender difference is more salient among whites than among blacks (Johnson and Marini 1998; Meier, Hull, and Ortyl 2009). Yet the census shows that white men are more likely to out-marry than white women (U.S. Census Bureau 2010). Research on dating profiles also finds that white women are more likely than white men to exclude nonwhites from their stated racial preference (Feliciano et al. 2009; Robnett and Feliciano 2011). Studies on online (Hitsch et al. 2010*b*) and speed dating (Fisman et al. 2006, 2008) also show that women have stronger in-group preferences than men. This motivates us to further examine the difference in homophily tendencies between men and women.

Furthermore, race often interacts with gender in the marriage market. Asian women are more likely than Asian men to marry whites, even when the cases of “war brides” are controlled for; the reverse gender pattern is true for blacks, though the gap has been decreasing over time (Jacobs and Labov 2002). Gendered racial formation theory attributes such results to societal notions of masculinity and femininity that vary by race (Collins 2004; Nemoto 2006, 2008). Black men are stereotypically depicted as hypermasculine and Asian women are commonly described as feminine and submissive, while Asian men and black women are, respectively, characterized as emasculated and unfeminine. If this claim is valid, we should observe that Asian women and black men receive more positive responses not only from whites but also from other minority groups. On the other hand, the theory predicts that Asian men and black women should receive fewer responses from whites, as well as other minority groups, in the dating market. Thus, gendered racial formation theory introduces added nuance around the previous triracial hierarchy hypothesis, predicting that

men are likely to place black women at the bottom of the preference hierarchy, while women are likely to do so with Asian men.

In addition to testing how gender interacts with racial-ethnic identity, we examine whether educational status mediates the effect of race. Recent demographic studies (Schwartz and Mare 2005; Fu and Heaton 2008; Hou and Myles 2008) show that, while there has been a slow decrease in racial homogamy over time, educational homogamy has risen since the 1960s. This development is consistent with the thesis that achieved status is becoming increasingly more important than ascribed status in the mate selection process (Kalmijn 1991). Other studies analyze interactions between men and women on a German online dating website and find that educational homophily is the most dominant mechanism in online mate choice (Skopek et al. 2011). We thus contrast the effects of racial homophily and those of educational homophily in our analysis. If educational homophily is prioritized over racial homophily, we should observe that white daters prefer minority daters with similar education status over white daters of lower educational status. If racial homophily remains the most dominant sorting mechanism, we should observe that white daters prefer white daters over minority daters, regardless of their educational status.<sup>5</sup>

#### DATA, VARIABLES, AND METHOD

##### Data

We obtained the data from one of the largest U.S. dating and social networking websites, which facilitates both heterosexual and same-sex dating for millions of active users. Similarly to most dating websites, registered users can create a personal profile, search and view other users' profiles, and contact fellow users through a website-based messaging system. A typical user profile contains basic information such as sex, sexual orientation, geographical location, age, race, height, body type, religion, language, lifestyle, and socioeconomic status, as well as photographs and short essays. Unlike most large dating websites that charge a membership fee to contact other users, this website places no restriction on searching, viewing, sending, and responding to messages, which, we believe, makes this website one of the best data sources for studying online dating behaviors in the United States. It should also be noted that this website does not recommend potential matches by ethnic-racial status. The only criteria used to select which pro-

<sup>5</sup>We are aware of the recent debate on status exchange theory among intermarriage scholars (Rosenfeld 2005; Gullickson and Fu 2010; Kalmijn 2010). However, since the theory provides only post hoc prediction on the socioeconomic asymmetry of interracial couples, it is not clear how to test its validity at the beginning of the mate selection process. We thus plan to explore this topic with a different set of analyses in future.

files to display are age, sexual orientation, and the matching score that is derived from personality questions.

Though we do not claim that our data set is representative of the general population, it is more powerful than conventional survey data in a number of ways.<sup>6</sup> First, this data set contains actual interactions among Internet daters, which allows us to observe what people do instead of what people say. Second, since our data set is generated from interactions within a definite population, it allows us to examine how race determines the likelihood of interaction in a bounded probability space. Third, because all the variables are extracted from digital records, our data set is largely immune to measurement problems such as social desirability bias and recall errors that are common in conventional survey data. Fourth, the size of our data set gives us the opportunity to explore not only the interaction between whites and minorities but also the interaction among minority groups. Finally, because we have access to almost as much information as the users on the website, we are confident that our estimates are less biased by unobserved variables.

The original data set consists of approximately 9 million registered users worldwide and 200 million messages, from November 2003 to October 2010. In essence, the data set consists of numerous social networks in which the users are nodes with various attributes and the messages are directional ties that connect nodes. However, in contrast to typical social network data, both our nodes and ties have a temporal property: each user has a definite lifetime and each tie is formed at a specific time point.

To facilitate the analysis, we filter the users in four steps. First, we limit our scope to users who reside in the 20 largest metropolitan areas in the United States.<sup>7</sup> This facilitates the reconstruction of opportunity structure

<sup>6</sup>We consider two types of sample selection biases when analyzing this data set. First, among those searching for potential partners, online daters are likely to be younger and of higher socioeconomic status than those who do not have access to the Internet. Since age and education status are both associated with more positive attitudes toward interracial relations, we would expect Internet daters to have more inclusive racial preferences than the general population. Second, Internet daters who use general dating websites are likely to have more liberal attitudes toward dating across racial lines than those who use ethnic dating websites exclusively. Thus, taking these together, we expect to underestimate the significance of racial preferences in the U.S. dating market.

<sup>7</sup>The metropolitan areas alphabetically include 12060 Atlanta–Sandy Springs–Marietta, Ga.; 12420 Austin–Round Rock, Tex.; 12580 Baltimore–Towson, Md.; 14460 Boston–Cambridge–Quincy, Mass.–N.H.; 16980 Chicago–Naperville–Joliet, Ill.–Ind.–Wis.; 19100 Dallas–Fort Worth–Arlington, Tex.; 19820 Detroit–Warren–Livonia, Mich.; 26420 Houston–Sugar Land–Baytown, Tex.; 31100 Los Angeles–Long Beach–Santa Ana, Calif.; 33100 Miami–Fort Lauderdale–Pompano Beach, Fla.; 33460 Minneapolis–St. Paul–Bloomington, Minn.–Wis.; 35620 New York–Northern New Jersey–Long Island, N.Y.–N.J.–Pa.; 37980 Philadelphia–Camden–Wilmington, Pa.–N.J.–Del.–Md.; 38060 Phoenix–Mesa–Scottsdale, Ariz.; 38900 Portland–Vancouver–Beaverton, Ore.–Wash.; 41740 San

(discussed below) and brings down the sample size to about 3 million daters. Second, we exclude users who did not send or receive at least one message, who did not upload at least one photograph, who listed their birth year later than 1992 or earlier than 1911, or who fit the profile of spammer users.<sup>8</sup> The reason is that, similarly to most free membership websites, some of the users did not actively engage with or even return to the website after initial registration and a few users are likely to be fake identities created by spammers. We thus retain only genuine dating website members, that is, users who had the opportunity to legitimately interact with other users in the data set. Third, we exclude daters who were looking only for casual sex or platonic relationships to ensure that the patterns observed among the daters reflect the mate selection process. Finally, we exclude from the analysis in this article users who identified as gay or bisexual, a population we explore in a separate paper. Our final sample consists of 528,800 straight men and 405,021 straight women.

We identify users' racial identity using the information on their personal profiles. There are 10 ethnicity boxes the users can check when they fill out their personal profiles. The options are Asian, Middle Eastern, black, Native American, Indian, Pacific Islander, Hispanic/Latino, white, other, and undeclared.<sup>9</sup> Users can check as many boxes as they prefer. We categorize those who did not check any box as undeclared and those who checked more than one box as multiracial. Our initial sample thus consists of 11 ethnic-racial groups, with the 10 default categories and the multiracial group.

Table 1 presents the ethnic and racial composition of our analytical sample. About half of the users self-identify as white.<sup>10</sup> About 24% of the sample did not specify any ethnic and racial identity.<sup>11</sup> Blacks and Hispanics

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Diego–Carlsbad–San Marcos, Calif.; 41860 San Francisco–Oakland–Fremont, Calif.; 42660 Seattle–Tacoma–Bellevue, Wash.; 45300 Tampa–St. Petersburg–Clearwater, Fla.; 47900 Washington–Arlington–Alexandria, D.C.–Va.–Md.–W.V.

<sup>8</sup> After consulting with the managers of the website, we identify spammers as users (1) who did not answer any personality question, (2) whose profiles were deleted or blacklisted, and (3) who had an account lifetime that was shorter than an hour.

<sup>9</sup> It should be noted here that, while Indians are conventionally categorized as Asian, they are treated as an independent ethnic group in the data set and are not included in the Asian category throughout our analysis.

<sup>10</sup> From now on we use white and non-Hispanic white interchangeably.

<sup>11</sup> We conducted three sensitivity tests around these respondents and determined that their missing ethnic identity more reflects tendency in reporting behavior than conscious omission. First, we had a group of undergraduates examine photographs for respondents who left their race missing. In a sample of 150 profiles, no systematic pattern emerged in which people of one particular ethnicity were any more or less represented. Second, we conducted factor and logistic analyses predicting the correlates of missing on race and found that being missing on height, education, smoking behavior, and drinking behaviors correctly predicted being missing on race 93% of the time. Third, as table 1 indicates, racially undeclared daters receive among the fewest e-mails, indicating that other daters

## Mate Selection in Cyberspace

TABLE 1  
ETHNIC-RACIAL COMPOSITION OF THE SAMPLE

Race	Men (%)	Women (%)
Asian . . . . .	3.28	3.69
Middle Eastern . . . . .	.36	.26
Black . . . . .	3.35	3.86
Native American . . . . .	.23	.26
Indian . . . . .	.81	.47
Pacific Islander . . . . .	.25	.24
Hispanic . . . . .	4.97	4.66
White . . . . .	52.05	53.67
Other . . . . .	1.47	1.48
Undeclared . . . . .	25.24	24.36
Multiracial . . . . .	7.99	7.05
<i>N</i> . . . . .	528,800	405,021

are significantly underrepresented in our sample. About 4% of the users identified themselves as black (this is only slightly higher when excluding “undeclared”) in contrast to 12% in the U.S. population. About 5% of the users identified as Hispanic/Latino or white Hispanic in contrast to 16% of the U.S. population.<sup>12</sup> One group that is overrepresented is multiracial users (at between 7% and 8%), who are often counted as 2% in the national population.<sup>13</sup> For the following analyses, we focus only on Asian, black, Hispanic, and white users.<sup>14</sup>

### Dependent Variables

We focus our analysis on initial messages exchanged between any two users who both reside in the same metropolitan area. These filters yield 2,750,893

dismiss them as illegitimate or less engaged prospects because their profile is incomplete on other important factors as well.

<sup>12</sup> Since Hispanic is often conceptualized as an ethnic rather than a racial category, those who are conventionally counted as Hispanic might identify with both Hispanic and white on the website. Our analysis shows that such inclusion would add two additional percentage points for the Hispanic population.

<sup>13</sup> Our ongoing analysis of biracial groups shows that users who identify as white-Asian, white-Hispanic, and white-Native American behave similarly to those who identify only as white and do not show a particular preference for users of their minority identity. However, those who identify as white-black show a preference for both users who identify as white only and those who identify as black only.

<sup>14</sup> Though Hispanic is officially defined as an ethnic rather than a racial category, we believe that it is analytically meaningful to juxtapose it with Asian, black, and white as a distinct racial group. The reason is not only that Hispanics, along with Asians, are often considered as occupying the racial middle (Bonilla-Silva 2004; O’Brien 2008) but also that scholars argue that the Hispanic population has been increasingly racialized in the past decades (Massey 2007).

initial messages from straight men to straight women and 1,180,260 from straight women to straight men. Although we do not know the content of these messages, we believe that they are an indication of romantic attraction between users, not just because the website is explicitly geared toward dating singles, but also because of the related statistics on these initial messages (see table 2). Initiation and response rates are, on the whole, quite low across all the groups, which indicates that when solicitations and responses do occur, they are meaningful behaviors in this setting. Furthermore, we find asymmetrical interaction between men and women. Men in our sample sent 80% more messages and received two-thirds fewer messages than women. Looking at total numbers of initial messages sent and response rates among men and women, we see that only 2.6% of the messages sent by men were responded to, in contrast with 5.6% of messages sent by women. Some of this difference is a result of the gender imbalance of supply and demand on the website. Not only are there 30% more male members, but male members, on average, have a 35% longer account lifetime than female members (see tables 1 and 3).

The second half of table 2 presents the means and the standard deviations of the number of initial messages received by gender and racial groups. We find that race operates differently between men and women. Among men, white men receive significantly more initial messages than any other group. Asian men, on the other hand, receive the fewest unsolicited messages, followed closely by Hispanic and black men. For women, Asian women, on average, received the most messages, followed by white and Hispanic women. Black women received the fewest messages.

A comparison of this sort reveals an unequal opportunity structure among daters of different racial groups in a mainstream dating market and is in alignment with the basic hierarchical ordering predicted by gendered racial formation theory. However, because it focuses solely on the receiving

TABLE 2  
DESCRIPTIVE STATISTICS ON INITIAL MESSAGES EXCHANGED AMONG USERS

	STRAIGHT MEN		STRAIGHT WOMEN	
	Mean	SD	Mean	SD
Average no. messages received . . . . .	2.232	4.694	6.792	10.244
Average no messages sent . . . . .	5.202	30.142	2.914	12.356
Total no. messages sent . . . . .	2,750,893		1,180,260	
Others' response rate (%) . . . . .	2.55		5.62	
Average no. messages received by racial identity:				
Asian . . . . .	1.309	2.931	8.825	11.54
Black . . . . .	1.489	3.159	3.246	5.016
Hispanic . . . . .	1.554	3.225	7.052	9.888
White . . . . .	2.959	5.392	7.959	10.74



side of the interaction, it does not shed light on how unequal group composition and the likely variance in racial preference across racial groups may jointly generate the observed differences. This shortcoming motivates our multivariate analysis. Following previous studies on interracial friendship (Hallinan and Teixeira 1987; Hallinan and Williams 1989), we shift the analytical focus to dyadic interaction. We first examine, among all probable dyads, how the racial identity of the potential sender and that of the receiver jointly predict whether an initial message is sent. To do so, we randomly sample a subset of users and reconstruct their opportunity structure on the website, which generates all probable dyads on the website for this subset of users.<sup>15</sup> We then merge these dyads with the initial messages that were actually sent, yielding a binary outcome in which 1 indicates that the probable dyad was realized and 0 otherwise.

We also examine the likelihood of responding to an initial message. Particularly, we estimate how the likelihood of a response is conditional on both the racial identity of the sender and that of the receiver. The sample of this analysis is all initial messages sent among the daters, each with a binary outcome in which 1 indicates that the initial message was responded to by the receiver and 0 otherwise.

### Control Variables

Since racial identity tends to correlate with other critical mate selection variables such as parental status, socioeconomic status, and body type, the observed racial discrepancies might be biased upward. That is, some observed racial disparities might reflect preference on other important aspects of social life that are correlated with race rather than racial preference. Four sets of variables are utilized to control for confounding factors:

<sup>15</sup>We randomly sample 300 users by racial identity, by gender, and from each metropolitan area who joined the website in 2009. We construct the opportunity space as such: Say there are  $n$  men of racial group  $i$  and  $m$  women of racial group  $j$  in a given metropolitan area. Presumably, each man can send  $m$  initial messages, and so the total number of potential combinations of initial messages from a man of group  $i$  to a woman of group  $j$  is  $n \times m$ . Among these dyads, we exclude any cases in which the account lifetime of the potential sender did not overlap with that of the potential receiver. We also exclude the cases in which the potential receiver is younger or older than the potential sender's default age range. By the website's default, the minimum age a man sees on the website is his  $\text{age}/2 + 7$ , and the maximum is  $(\text{his age} + 2) \times 10/9$ ; for women, the minimum is her  $\text{age} \times 9/10 - 2$  and the maximum is  $(\text{her age} - 7) \times 2$ . We then calculate the overlap between two users for each dyad as a measure of exposure. Finally, for ease of computation, we randomly draw 1 million dyads from each sender group as the sample of analysis. It should be noted that, by doing so, we make the assumption that the daters do not discriminate spatially within their own metropolitan area. This is an assumption we need to make because of the lack of more detailed information on daters' location.



basic demographic information, lifestyle, socioeconomic status, and the degree of online engagement. Basic demographic information includes age, height, body type, and geographic location.<sup>16</sup> Lifestyle variables include smoking, drinking, drug use habits, and parental status/preferences. Socioeconomic status consists of education level, income level, and the number of languages one speaks. In addition, we control for the daters' degree of engagement, which includes total time spent on the website, total account lifetime (from registration to the last log-in), the number of photographs uploaded to the website, and the number of personality questions answered on the website.

Table 3 presents the descriptive statistics for the control variables. Because we are mainly interested in these variables only for how they might confound our variable of interest, race, we review just a few highlights from the table. As one might expect, the average age of the sample is younger than that of the general population. The users also have higher educational attainment: 35% of men and 40% of women report a college degree or more, in contrast with 32.8% of Americans ages 25–34.<sup>17</sup> The heights of male and female users are also about 10 centimeters/4 inches higher than the average American (<http://www.cdc.gov/nchs/fastats/bodymeas.htm>). We suspect that this is due to the tendency for users to overreport their height rather than the selectivity of Internet daters. In any case, inconsistencies of this sort should not bias the results since other daters are also using this same information, however exaggerated, to determine whether or not to interact with any given online dater.

Table 3 also shows that there are several differences between men and women, all of which are reflective of gender-specific social expectations. For example, a possible indication of the greater scrutiny to which female bodies are subject, women users are more likely than men to consider themselves overweight, while men are more likely to describe themselves as fit. Gender differences also extend to reporting behaviors. Female daters more often report their parental status or attitude toward children than their male counterparts do. Male daters, on the other hand, are more prone to report their income level than female daters. There are also differences in online engagement. Although women spend similar amounts of time on the web-

<sup>16</sup> Owing to anonymity concerns, we do not have access to birth dates beyond year for each user. The age here is calculated as the difference between one's birth year and the year he or she last logged in to the website. If someone did not report his or her height, we impute the average height minus a standard deviation by gender. For very few cases, we also top- or bottom-code one's height by gender if the reported number is dramatically above or below the mean. Three dichotomous variables are added in our model to indicate imputation, top-coding, and bottom-coding in the regression analysis.

<sup>17</sup> U.S. Census Bureau, 2010 Current Population Survey, table 3 (<http://www.census.gov/hhes/socdemo/education/data/cps/2010/tables.html>).

site, they have shorter account lifetimes. This might reflect the gender dynamic of the website that female users are in greater demand and thus can more quickly find potential dates. Men, on the other hand, tend to have longer account lifetimes and answer more personality questions on their profiles.

#### Analytical Strategy

We examine how racial identity on both ends of the dyad jointly predicts the likelihood of sending and responding to an initial message. We estimate a separate model for each race-gender group (such as Asian women, black men, etc.) and thus allow racial preference to vary by racial identity and gender. We specify the model predicting the sending behavior for users of group  $k$  as

$$\ln \left[ \frac{P(y_{i,j} = 1)}{1 - P(y_{i,j} = 1)} \right] = \alpha_{1,k} + \beta_{1,k}G_j + \sum_{p=1}^q \beta_{p,2,k}X_{p,j} + \beta_{3,k}W_{i,j} + \beta_{4,k}M_i + \varepsilon_{i,j},$$

where  $y_{i,j}$  denotes whether an initial message was sent from  $i$  to  $j$ ,  $G$  denotes the group membership of user  $j$ ,  $X$  denotes all other attributes of user  $j$  in table 3, and  $q$  denotes the number of attributes. The variable  $W$  denotes the log-transformed overlapping website membership periods between  $i$  and  $j$ , which is a measure of exposure time in which the potential sender and potential receiver in the same metropolitan area could have encountered one another on the website. We expect  $W$  to be positively associated with the likelihood of  $i$  sending an initial message to  $j$  but with diminishing returns. The variable  $M$  is a popularity control for the sender  $i$ , denoting the number of messages user  $i$  received from other daters per 100 days. A given dater's popularity is likely to influence how inclined he or she is to initiate contact with others. Since we fit a separate model for each race-gender group, we allow all the coefficients to vary by race-gender group. Similarly, we specify the model predicting the responding behavior for users of group  $k$  as

$$\ln \left[ \frac{P(y_{j,i} = 1)}{1 - P(y_{j,i} = 1)} \right] = \alpha_{2,k} + \beta_{5,k}G_i + \sum_{p=1}^q \beta_{p,6,k}X_{p,i} + \beta_{7,k}S_{j,i} + \beta_{8,k}M_j + \varepsilon_{j,i},$$

where  $y_{j,i}$  denotes whether user  $j$  responded to the initial message sent by user  $i$ ,  $G$  denotes the group membership of user  $i$ ,  $X$  denotes all other attributes of user  $i$  in table 3,  $q$  denotes the number of attributes,  $S$  denotes the matching score between  $j$  and  $i$ , and  $M$  denotes the number of messages

TABLE 3  
DESCRIPTIVE STATISTICS ON CONTROL VARIABLES

	Straight Men	Straight Women
Age . . . . .	30.1 (9.25)	29.54 (9.47)
Height (cm) . . . . .	177.36 (7.85)	165.29 (6.59)
Height not specified . . . . .	.208	.191
Height top coded . . . . .	.0009	.0007
Height bottom coded . . . . .	.0012	.0006
Body type:		
Thin . . . . .	.061	.084
Overweight . . . . .	.056	.173
Average . . . . .	.165	.159
Fit . . . . .	.243	.108
Unspecified . . . . .	.475	.476
Region:		
Northeast . . . . .	.328	.375
Southeast . . . . .	.107	.093
Midwest . . . . .	.136	.132
West . . . . .	.329	.308
Southwest . . . . .	.100	.092
Smoking:		
Yes . . . . .	.212	.193
No . . . . .	.548	.587
Unspecified . . . . .	.24	.22
Drinking:		
Often . . . . .	.106	.106
Socially . . . . .	.482	.516
Rarely . . . . .	.12	.122
Not at all . . . . .	.069	.054
Unspecified . . . . .	.223	.202
Drug use:		
Never . . . . .	.445	.413
Sometimes . . . . .	.281	.24
Unspecified . . . . .	.274	.347
Parental status/preference:		
Has children . . . . .	.092	.131
Likes children . . . . .	.373	.399
Doesn't like/want children . . . . .	.067	.072
Unspecified . . . . .	.468	.398
Education:		
High school or less . . . . .	.301	.287
Some college . . . . .	.04	.034
College . . . . .	.277	.305
Professional . . . . .	.075	.096
Unspecified . . . . .	.307	.278
Income:		
<\$20,000 . . . . .	.057	.054
\$20,000-\$50,000 . . . . .	.124	.082
\$50,000-\$80,000 . . . . .	.061	.026
\$80,000-\$150,000 . . . . .	.035	.008
>\$150,000 . . . . .	.019	.006
Unspecified . . . . .	.704	.824

## Mate Selection in Cyberspace

TABLE 3 (Continued)

	Straight Men	Straight Women
Engagement:		
Online time (in 15 min.) . . . . .	145.14 (535.87)	149.67 (531.82)
Account lifetime (in days) . . . . .	342.21 (458.05)	253.73 (386.05)
Photos uploaded . . . . .	3.453 (2.526)	3.595 (2.589)
Questions answered . . . . .	183.44 (360.15)	148.98 (305.5)

NOTE.—Numbers in parentheses are SDs.

user  $j$  received per 100 days.<sup>18</sup> We expect  $S$  to be positively associated and  $M$  to be negatively associated with the likelihood of  $j$  responding to the initial message from user  $i$ .

Since interaction decisions are nested within individuals ( $i$  in the sending model and  $j$  in the responding model), a dependence structure is expected. We thus model both the sending and the responding behaviors by fitting a series of generalized estimating equations (GEEs; Liang and Zeger 1986; Hanley et al. 2003; Zuur et al. 2009) with the logit link function and an exchangeable correlation structure.<sup>19</sup>

### RESULTS

Figure 1 presents the results in two  $4 \times 4$  matrices (estimates are shown in table A1 in the appendix), where the rows represent the race of the potential sender and the columns represent the race of the potential receiver. With the diagonal used as the reference, cell  $[i, j]$  represents the predicted odds ratios of a user of group  $i$  sending an initial message to a user of group  $j$ .

The left matrix of figure 1 presents the sending pattern of female users. Within each matrix, the darker the shading in the cell, the more likely the sender (left) is to send a message to the receiver (top). Looking first at Asian women, we see that they are most likely to send initial messages to Asian men followed by white men and least likely to message Hispanic and black

<sup>18</sup>The matching score is determined by the answers to the personality questions on the website; it is shown to both users as an indicator of compatibility.

<sup>19</sup>There are advantages to analyzing our data with the GEE approach. First, the GEE approach addresses dependency among observations and optimizes the statistical power of the correlated data by estimating clustered correlations. In contrast to mixed effects or hierarchical models, the GEE approach makes little demand of within-cluster variance and thus is more suitable in our situation in which the participation of the users follows a power-law distribution and a significant number of our observations are singletons. We believe that exclusion of the singletons would create serious selection bias and therefore do not think that the random intercept approach is suitable for our analysis.

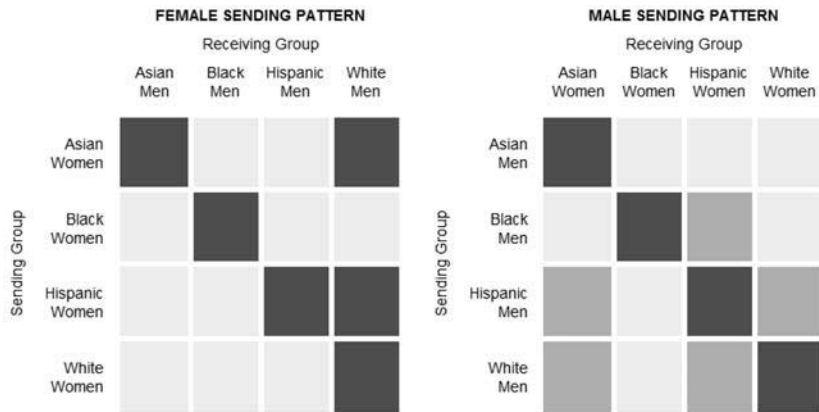


FIG. 1.—Predicted odds ratios of sending an initial message (darker cells represent higher probabilities).

men. Black women show the highest levels of homophily. They rarely message white, Asian, and Hispanic men. Hispanic women are also most likely to message their coethnics, though the tendency is not as strong as it is for black women. Hispanic women’s second preference is white men, and they rarely initiate contact with Asian or black men. Finally, white women most prefer white men, their second preference is Hispanic men, and they rarely send initial messages to other minority men. Stated from the men’s perspective, white men have the best odds of being contacted by women even if all racial groups are equally represented on the dating website, largely because they are among the top choice groups for Asian, Hispanic, and white women. Asian and black men, on the other hand, receive messages only from their coethnics.

Among men, we observe a similar but weaker tendency toward homophily. Asian men contact primarily Asian women and, secondarily, white and Hispanic women; they are unlikely to contact black women. Similarly, black men contact other black women first and foremost but also send messages to Hispanics and Asians and, slightly less frequently, to white women. Hispanic men likewise prefer their own group first but also send messages to whites and Asians while least frequently contacting black women. Finally, white men contact other white women most but secondarily Hispanic and Asian women. Like Asians, they almost completely avoid contacting black women. Told another way, the main story here is the experience of black women, who receive the lion’s share of their messages from black men, a tiny amount from Latino men, and practically no messages from either Asian or white men. Asian and white women, on the other hand, consistently receive messages from all men, both inside and outside their ethnic group.

Thus far, our finding is consistent with previous findings and shows that racial homophily dominates daters' sending behavior. Women in general send messages only to their coethnics or to white men, and men, while appearing to cross some ethnic boundaries with relative fluidity, draw the line at black women. These results shed light on the gendered racial disparities observed in the descriptive statistics (table 2). The disadvantage suffered by Asian men, black men, and black women is not entirely driven by white preference as many previous studies have assumed. Instead, the experience of Asian and black daters on this online dating site is driven by the sending behaviors of nonwhite groups as well. Furthermore, these results show that the reason black men receive more messages than Asian men in table 2 is not that black men are more popular in general but that black women have greater homophily tendency than Asian women. Overall, our results contradict the popular belief that black men prefer white women over black women and white men prefer Asian women over white women. Black men in fact demonstrate the strongest homophily tendency among male daters.

Our next set of logistic models focuses on the response behaviors of daters when the sender has demonstrated interest. That is, we ask, among all initial messages received, how does the racial identity of the sender and receiver affect which messages are more likely to receive a response? We refer to this as our reciprocal models.

Figure 2 shows the results of the response models with two  $4 \times 4$  matrices (estimates in table A2 in the appendix). Figure 2 is set up similarly to figure 1 with the diagonal as the reference, but here cell  $[j, i]$  represents the odds ratios of group  $j$  responding to the initial message sent by group  $i$ . We first focus on the likelihood of women responding to men who have initiated contact. Looking first at the responses of Asian women, it becomes clear that, when given a choice, Asian women are most likely to respond to white men, followed by Asian men. They are less likely to respond to Hispanic men or black men. Black women, by contrast, respond to daters who contact them fairly equally, with a preference for white men. The responding behavior of Hispanic women is comparable to that of Asian women. They are most responsive to white men, followed by their coethnics, and least responsive to black men. White women's reciprocal behaviors look little different from their sending behaviors. They respond predominantly to white men. In brief, black men are least likely to receive responses from anyone except black women, Hispanic and Asian men are somewhere in the middle, and white men enjoy the highest likelihood of response.

Next we examine the reciprocal behavior among men. Asian men's response patterns indicate a willingness to respond equally to white and co-ethnic women. But they tend to ignore messages from black and Hispanic women. Black men, like their female coethnics, operate with the most equal opportunity across the board (the differences are not statistically signifi-

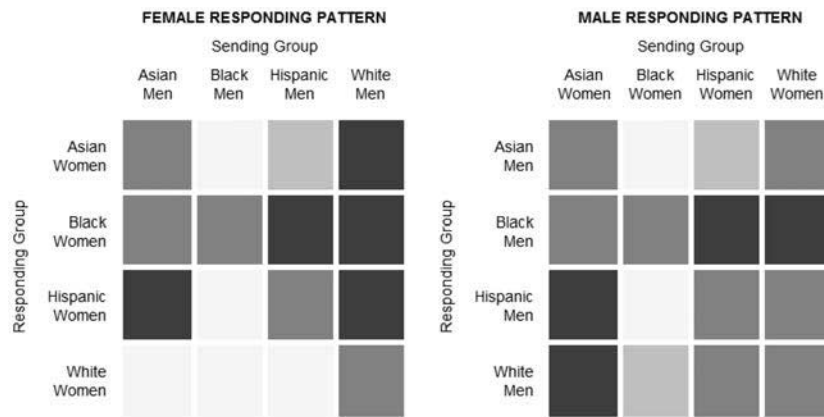


FIG. 2.—Predicted odds ratios of responding to an initial message (darker cells represent higher probabilities).

cant; see table A2). Hispanic men, when approached, appear to be most interested in Asian women, but the likelihood is not statistically greater from that of Hispanic women. Similarly to their sending behavior, Hispanic men particularly avoid responding to black women. Finally, white men are equally likely to respond to Asian, Hispanic, and white women but not to black women.

Overall, the reciprocal models present a picture very different from that of the sending models. While homophily dominates the sending behavior, racial hierarchy overshadows the responding process. Daters tend to respond to those of the dominant or same racial status while rejecting racially marginalized groups. Messages from white men and women are likely to be reciprocated by daters of other groups, but white women reciprocate only to white men. Black daters, particularly black women, tend to be ignored when they contact nonblack groups, even though they do not discriminate against any out-groups.

Finally, we examine how education might mediate the observed racial preferences by adding an interaction term between race and educational level. To simplify the analysis, we focus on white men and white women, the largest group of daters. We analyze these interaction effects first in sending behaviors in figure 3 and then in responding behaviors in figure 4 (estimates are shown in table A3 in the appendix).

Figure 3 shows the predicted likelihoods that white daters with and without a college degree contact each of the racial and educational subgroups. The results show that, regardless of their own educational level, white women are still more likely to contact white men than any other

## Mate Selection in Cyberspace

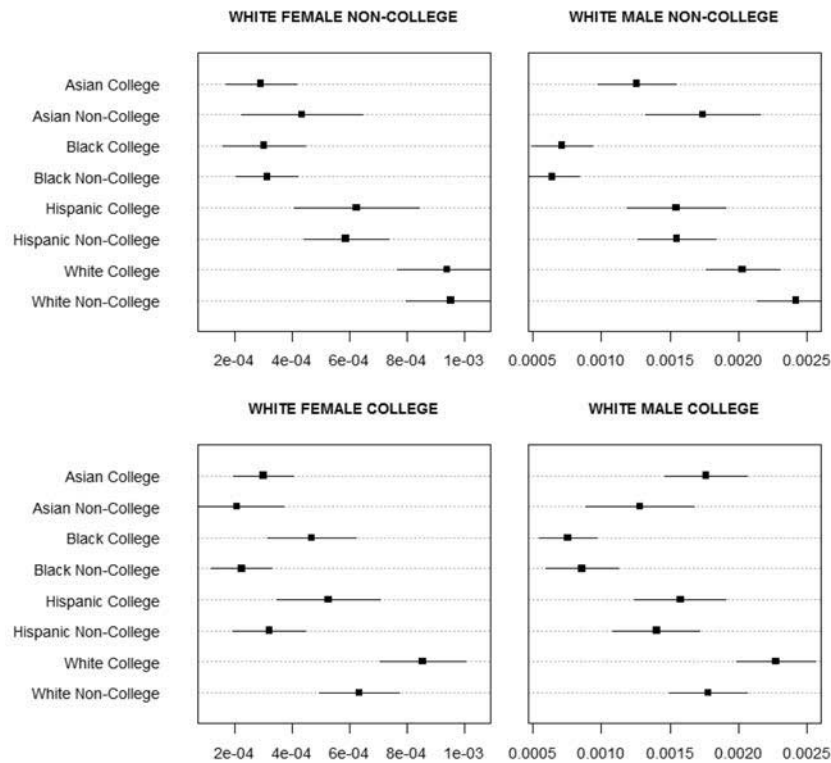


FIG. 3.—Predicted probability of sending an initial message, white daters

group. College-educated white women even prefer non-college-educated white men over college-educated Asian men. White men show similar preferences as we saw in the previous sending models. Black women, with or without a college degree, are marginalized as the least contacted group.

When it comes to response patterns, as shown in figure 4, we again see persistent racial preference. White women are more likely to respond, overall, to men with a college degree than to men without; however, this behavior does not break the constraints of race. White women respond most often to white men above all other ethnicities. College-educated white women treat college-educated minority men similarly to those without a college degree. This tendency to privilege a man’s whiteness over his achieved status is even more pronounced among non-college-educated women, who are even more likely to respond to white men’s messages regardless of their level of education.

Educational attainment of potential dating partners also means little to white men in mitigating the ethnic response patterns we saw earlier in



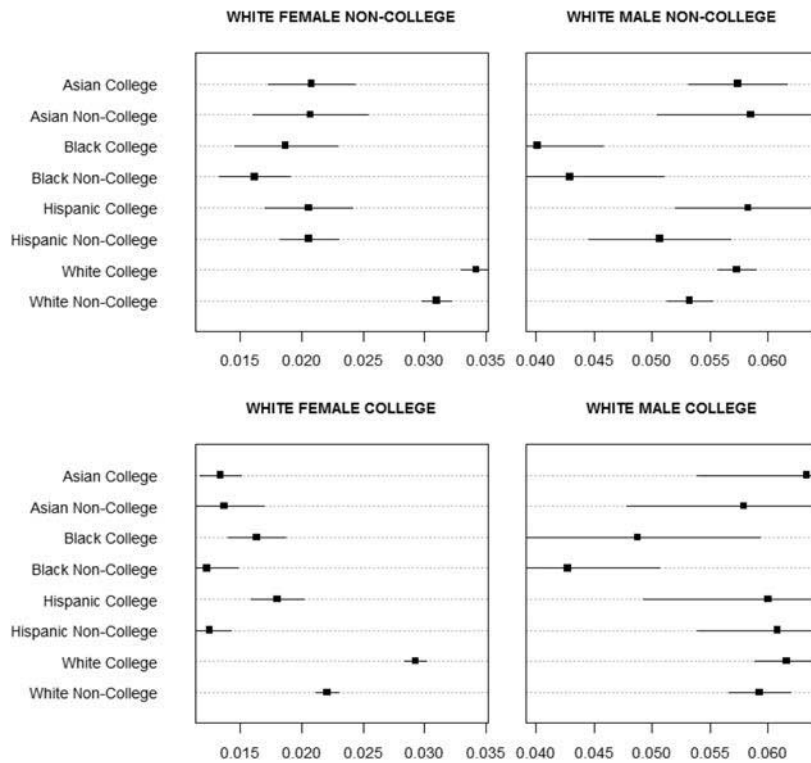


FIG. 4.—Predicted probability of responding to an initial message, white daters

figure 3. White, Hispanic, and Asian women are equally likely to receive responses from white men whether they have a college degree or not, while black women are least likely to receive any response. One notable exception is that college-educated white men appear to be more responsive to college-educated black women than to black women who lack a college degree. Overall, figures 3 and 4 indicate that educational homophily in general matters far less than racial homogamy in predicting white women's and men's sending and responding behavior.

#### DISCUSSION

Utilizing data from one of the largest dating websites in the United States, we examine how race, gender, and education jointly shape the interaction among Internet daters. Existing studies of interracial marriage and cohabitation observe only the outcome of mate selection and thus provide limited knowledge on how racial preferences shape the dynamics in the searching

process. Attitudinal studies, on the other hand, are vulnerable to social desirability bias. This article improves on previous studies by directly observing the dynamics in the mate selection process within a bounded social space. We extend previous studies using online dating data by examining both the initiating and reciprocating behaviors. Our analysis shows that racial preferences are not only gendered but contingent on the stage of action.

We find that homophily dominates the searching behavior for both men and women. When Internet daters search for potential mates, they are most likely to approach those who have the same racial identity. Yet a salient racial hierarchy dominates in the reciprocating process. White men's and women's messages are likely to be reciprocated by daters of other groups, but white women reciprocate mostly only to white men. Black daters, particularly black women, tend to be ignored when they contact nonblack groups, even though they respond to out-groups no less frequently. Asian and Hispanic daters seem to be at the middle of the racial hierarchy. They are responsive to whites, their coethnics, and to some extent each other but not to black daters. Importantly, we find that education does not mediate the observed racial preferences among white men and women. White men and women with a college degree prefer to contact and reciprocate to white daters without a college degree over black daters with a college degree.

While previous studies show that the preference for similarity is the dominant pattern of interaction (Hitsch et al. 2010*b*; Skopek et al. 2011), our results suggest that both homophily and racial hierarchies are at play in generating the observed pairing pattern. Daters tend to search for potential mates within racial boundaries, even when the social and physical barriers to contacting other groups are relatively weak in cyberspace. Racial hierarchy, on the other hand, manifests itself most strongly in the reciprocating process. Conditional on confounding factors, daters tend to respond to those of equal or more dominant racial status and ignore those of more marginalized groups. These findings suggest that racial boundaries operate differently at various levels of social interaction. At the stage of initiation, the distinction is placed between in-groups and out-groups, while at the stage of reciprocation, the actors are likely to consider those of dominant racial status as equals or more desirable while rejecting marginalized groups.

Where is the crucial divide among racial groups in the dating market? Our results suggest that the racial divide is gendered. For American men, the racial hierarchy of preference and privilege appears to fall into Bonilla-Silva's (2004) tri-racial stratification model, with white men at the top, receiving the most contacts and fewest rejections, followed by Asians and Hispanics in the middle and black men trailing at the bottom of the hierarchy. But for American women on the dating market the racial divide in preference and privilege appears to be in line with Feagin's (2000) black

versus nonblack model. Most importantly, our results show that although these patterns differ by gender, a common thread is that black women and black men are clearly disadvantaged in the dating market relative to other ethnic groups. Being black on the dating market—particularly being a black female—means that one's invitations are most likely to be ignored. Black men and women are the only ones who regularly respond to one another.

While some attitudinal surveys suggest that women have more liberal attitudes toward interracial relationships (Johnson and Marini 1998; Meier et al. 2009), our results are consistent with studies of stated preferences (Feliciano et al. 2009; Robnett and Feliciano 2011) and studies of online interaction (Hitsch et al. 2010*b*; Skopek et al. 2011), indicating that men, in fact, are more willing than women to date out-groups. We are hesitant, however, to conclude that men are less race conscious than women, given that men and women confront a differing terrain of demand and supply in the dating market. On the basis of the fact that women receive many more messages than men and that there are more men than women populating dating websites, men may simply be less able to be as selective as women can. Furthermore, since women's own social status has been historically more dependent on that of their partners because of the norms of patriarchal tradition (Spickard 1991; Root 2001), it may still be more socially acceptable for men to date out-groups than for women.

Our findings show some support for gendered racial formation theory (Omi and Winant 1994; Collins 2004; Nemoto 2006, 2008), but only insofar as racial preferences are conditioned by gendered conceptions of race. While Asian women receive responses from men of all groups, Asian men do not receive responses from white women. Yet when we see how white women respond to other minorities, we find that Asian men are no more marginalized than black and Hispanic men. Our results also contradict some of the other predictions of gendered racial formation theory, such as the notion that black men should prefer black women less than they do Asian and white women or that white and Hispanic women should be less responsive to Asian men than they are to black men. This is not to deny the prominence of controlling images or racialized and gendered stereotypes that are associated with certain groups. Rather, when it comes to this particular economy of romantic interaction, the pattern is more monolithic than that stipulated by gendered racial formation theory. Simply stated, white women prefer white men over nonwhite men while white men prefer nonblack women over black women. Furthermore, because gendered racial formation theory juxtaposes the racialized experience of minority women with that of their minority male counterparts, it has the potential to obscure the magnitude of distinctions. For example, an implicit suggestion of gendered racial formation theory is that Asian men's marginaliza-

tion is equivalent to that of black women. Our results, however, make a strong case that the discrimination against black women is the single largest marginalization of note.

Does education, an increasingly important achieved status, trump racial preferences in the dating market? The answer is a resounding no, at least in our sample. Though college-educated daters in general receive more unsolicited messages than their non-college-educated counterparts, white men without a college degree still receive more messages than college-educated black and Asian men. College-educated black women receive fewer messages than other women of any education level. Furthermore, we find that, for white male and female daters, race of potential daters has a far greater effect than education does in predicting an online interaction. White men and women with a college degree are more likely to contact and reciprocate to white daters without a college degree over black daters with a college degree.

Overall, our study has three theoretical implications for future studies of intermarriage and racial relations. First, we show that mate selection should be conceptualized as a multistep process. An emphasis on outcomes such as marriage or cohabitation is useful in delineating national trends of racial relations but provides little insight into how race operates in the mate selection process. Our analysis suggests that racial boundaries are more salient when daters are searching for potential mates and more porous when responding to others' initiation. That is, though daters in general do not search outside their coethnics, women are open to interacting with those of a similar or more dominant racial status and men are open to interacting with all but black women.

Second, previous theories often presume that coupling patterns reflect white preferences. Our study suggests that the racial preferences of minorities are likely to be as consequential in generating the observed patterns. For example, gendered racial formation theory attributes the prevalence of Asian women–white men pairing to white men's preference toward stereotypically submissive women. Yet we do not find that white men show particular preference for Asian women. Instead it is Asian women who are more responsive to white men.

Finally, our study finds that the racial hierarchy pattern does not manifest itself as a difference in desirability but as a difference in exclusivity in the dating market. Daters of all groups are first and foremost attracted to daters of their own group. Yet when attracted to other groups, only some daters are welcomed to cross the borders. In this sense, racial boundaries function similarly to one-way turnstile gates. While nonblack daters, particularly white men, are well received when they contact daters of other groups, black daters, particularly black women, are largely confined to a segregated dating market.

APPENDIX

TABLE A1  
PARTIAL COEFFICIENTS AND SEs OF LOGISTIC REGRESSIONS PREDICTING SENDING  
AN INITIAL MESSAGE WITH FULL CONTROLS (Corresponds to Fig. 1)

Sending Pattern	Asian	Black	Hispanic	White
Female:				
To Asian men . . . . .	...	-1.904*** (.198)	-1.186*** (.209)	-1.166*** (.213)
To black men . . . . .	-1.229*** (.250)	...	-.996*** (.176)	-.960*** (.172)
To Hispanic men . . . . .	-.843*** (.207)	-1.564*** (.158)	...	-.396** (.135)
To white men . . . . .	-.544** (.167)	-1.613*** (.125)	-.375** (.114)	...
Unique senders . . . . .	2,766	3,036	3,571	8,961
Male:				
To Asian women . . . . .	...	-.862*** (.0847)	-.490*** (.0810)	-.182* (.0927)
To black women . . . . .	-1.933*** (.155)	...	-1.292*** (.106)	-1.134*** (.127)
To Hispanic women . . . . .	-1.166*** (.104)	-.639*** (.0690)	...	-.381*** (.0872)
To white women . . . . .	-.842*** (.0777)	-1.180*** (.0660)	-.483*** (.0587)	...
Unique senders . . . . .	2,257	3,027	3,582	7,977

NOTE.—We estimate a separate logistic regression for each race-gender group. Error terms are assumed to be correlated within each sender with an exchangeable structure. The in-group is the reference group in all eight models.  $N = 1,000,000$ . Numbers in parentheses are SEs.

- \*  $P < .05$ .
- \*\*  $P < .01$ .
- \*\*\*  $P < .001$ .

TABLE A2  
PARTIAL COEFFICIENTS AND SEs OF LOGISTIC REGRESSIONS PREDICTING RESPONDING  
TO AN INITIAL MESSAGE WITH FULL CONTROLS (Corresponds to Fig. 2)

Responding Pattern	Asian	Black	Hispanic	White
Female:				
To Asian men . . . . .	...	.0475 (.196)	.0829 (.120)	-.636*** (.0386)
To black men . . . . .	-.599*** (.166)	...	-.421*** (.113)	-.615*** (.0392)
To Hispanic men . . . . .	-.197 (.109)	.0851 (.124)	...	-.504*** (.0282)
To white men . . . . .	.198** (.0651)	.234** (.0731)	.213*** (.0573)	...
$N$ . . . . .	101,727	40,202	102,409	1,325,340
Unique responders . . . . .	12,717	10,043	15,108	178,405
Male:				
To Asian women . . . . .	...	-.0893 (.181)	.161 (.102)	.0368 (.0272)

TABLE A2 (Continued)

Responding Pattern	Asian	Black	Hispanic	White
To black women . . . .	-.482** (.165)	...	-.585*** (.123)	-.282*** (.0408)
To Hispanic women . . .	-.224 (.153)	.138 (.127)	...	.0111 (.0289)
To white women . . . . .	.00724 (.0767)	.0912 (.0722)	-.113 (.0596)	...
<i>N</i> . . . . .	15,828	19,170	28,243	567,733
Unique responders . . .	6,611	7,331	10,929	157,556

NOTE.—We estimate a separate logistic regression for each race-gender group. Error terms are assumed to be correlated within each responder with an exchangeable structure. The in-group is the reference group in all eight models. Numbers in parentheses are SEs.

\*  $P < .05$ .

\*\*  $P < .01$ .

\*\*\*  $P < .001$ .

TABLE A3  
PARTIAL COEFFICIENTS AND SEs OF LOGISTIC REGRESSIONS WITH  
FULL CONTROLS, WHITE DATERS (Corresponds to Figs. 3 and 4)

	WHITE MALE		WHITE FEMALE	
	Noncollege	College	Noncollege	College
Sending pattern:				
To Asian noncollege . . . .	-.272* (.117)	-.512*** (.147)	-.776** (.249)	-1.375*** (.394)
To Asian college . . . . .	-.772*** (.120)	-.312*** (.0818)	-1.491*** (.253)	-1.138*** (.184)
To black noncollege . . . .	-1.283*** (.141)	-1.359*** (.178)	-1.245*** (.184)	-1.489*** (.259)
To black college . . . . .	-1.367*** (.160)	-.983*** (.123)	-1.252*** (.255)	-.543*** (.165)
To Hispanic noncollege . . . . .	-.365*** (.0868)	-.478*** (.111)	-.671*** (.143)	-1.179*** (.222)
To Hispanic college . . . .	-.527*** (.121)	-.468*** (.107)	-.476* (.192)	-1.205*** (.241)
To white noncollege . . . .	...	-.208**	...	-.382** (.127)
To white college . . . . .	-.254*** (.0715)	...	.0851 (.102)	...
Responding pattern:				
To Asian noncollege . . . .	-.0244 (.0941)	.0224 (.0749)	-.413*** (.118)	-.776*** (.122)
To Asian college . . . . .	.0702 (.0818)	.00178 (.0396)	-.409*** (.0893)	-.799*** (.0646)
To black noncollege . . . .	-.344*** (.0973)	-.304** (.100)	-.668*** (.0920)	-.884*** (.105)
To black college . . . . .	-.206 (.116)	-.374*** (.0741)	-.518*** (.118)	-.596*** (.0744)
To Hispanic noncollege . . . . .	.0272 (.0610)	-.130* (.0656)	-.420*** (.0598)	-.866*** (.0708)

TABLE A3 (Continued)

	WHITE MALE		WHITE FEMALE	
	Noncollege	College	Noncollege	College
To Hispanic college . . . .	.0135 (.0984)	.0179 (.0586)	-.422*** (.0915)	-.497*** (.0613)
To white noncollege . . . .	...	-.078*** (.0213)	...	-.289*** (.0215)
To white college . . . . .	.0411 (.0267)	...	.101*** (.0233)	...

NOTE.—We estimate a separate logistic regression for each gender-education group. Error terms are assumed to be correlated within each responder with an exchangeable structure. The in-group is the reference group in all eight models. Numbers in parentheses are SEs.

\*  $P < .05$ .

\*\*  $P < .01$ .

\*\*\*  $P < .001$ .

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