

# Partner Preference Among Men Who Have Sex with Men: Potential Contribution to Spread of HIV Within Minority Populations

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## Abstract

**Purpose:** Human immunodeficiency virus (HIV) disproportionately affects men who have sex with men (MSM) in the United States. Most prior research into drivers of HIV transmission has focused on individual characteristics rather than on dyadic-level behaviors such as sex partner selection. This article explores racial/ethnic preferences in sex and relationship partner selection among MSM to further contextualize the spread of HIV within minority groups.

**Methods:** Participants were recruited through a mobile application (app) for men to meet other men in 2015 and completed an online survey on behaviors related to HIV risk. All analyses on the sample of 530 MSM were conducted in 2015.

**Results:** There was significant homophily in partner selection within racial/ethnic minorities, but not for white MSM. In general, mobile app-using MSM reported a general preference for white and Hispanic men and a dispreference for black and Asian men, both for sex and relationship partners.

**Conclusion:** Racial/ethnic preferences were found to drive intentions to form partnerships within this sample. Combined with the stigma many of these racial/ethnic minorities may also feel from homophobic attitudes within their own racial/ethnic communities, these MSM may be at particular risk for social isolation. These partner preferences likely affect the structure of the sexual networks of MSM and may contribute to increased clustering within high HIV incident sexual networks.

**Key words:** apps, human immunodeficiency virus (HIV), men who have sex with men (MSM), partner preference.

## Introduction

THE HUMAN IMMUNODEFICIENCY VIRUS (HIV) epidemic in the United States has significantly and disproportionately affected men who have sex with men (MSM). In 2013, an estimated 81.0% of new HIV infections among male adults and adolescents were attributed to male-to-male sexual contact.<sup>1</sup> Most prior research into HIV risk and transmission has focused on individual characteristics (race, ethnicity, socioeconomic status [SES], etc.) and an individual's engagement in sexual behaviors that increase their risk for HIV acquisition (i.e., condomless sex). However, this view of sexual activity and partnership ignores the fact that sex is a dyadic behavior—characteristics of both individuals play a role in determining whether partnering occurs and the behaviors that take place within the partnership. Therefore, partner selection should be an important consideration in all HIV prevention work, specifically with regard to epidemiological differences in HIV rates by race and ethnicity.

Network literature has shown that romantic and nonromantic social relationships are often homophilous or that there is a tendency for individuals who are similar to each other to form connections.<sup>2</sup> McPherson et al. indicate two main mechanisms that lead to homophily in relationships: one driven by population demography and limited potential ties and the other driven by individual preference.<sup>2</sup> Although both are relevant to partner selection, this article will focus on the process of personal preference, with specific attention to racial/ethnic preferences.

Extending the work of McPherson et al.,<sup>2</sup> researchers have investigated the roles that preferences and dispreferences play in partner selection and spread of HIV among MSM. Research has shown that MSM often hold certain racial and age preferences<sup>3–5</sup>: predominantly, these preferences lead men to select sex partners who share similarities across age, income, and race.<sup>3,4</sup> Conversely, dispreferences also drive the formation of sexual partnerships. For example, studies have shown that non-black MSM (BMSM) consistently rank black as the

least preferred race of sex partner.<sup>4</sup> This dispreference is likely explained by a combination of racist attitudes<sup>6–8</sup> and the perception that BMSM are at greater risk for HIV acquisition.<sup>4</sup> These racial dispreferences result in increased insularity within BMSM sexual networks<sup>9</sup> and are hypothesized to influence the spread of HIV, in that numerous studies have demonstrated that HIV infection is more prevalent among MSM who are black, older, and of lower SES.<sup>10–12</sup> Concentration of HIV transmission risk within specific communities is likely a significant contributor to the high incidence of HIV within this group.<sup>13–15</sup> This is particularly relevant when considering the research that has shown no evidence that BMSM engage in more high-risk sexual behaviors than other MSM, despite the higher rates of HIV within this community.<sup>16,17</sup>

Racial stereotypes and preferences may also affect other racial groups. For example, some work has shown that men find Asian MSM less desirable as sex partners because they are perceived to be less masculine and more submissive.<sup>18,19</sup> This too has led to insularity, with many sex ties among Asian MSM being intraracial,<sup>20</sup> although within a population with significantly lower HIV prevalence.<sup>1</sup> Thus, further research into the methods by which MSM select partners may help our understanding of the spread of HIV within and between racial/ethnic communities.

Relatedly, investigating how preferences differ across paradigms in partner selection, specifically between sexual and romantic partnerships, could provide further context for drivers of particularly high-risk sexual partnerships. Numerous publications have shown that sexual behaviors of MSM differ depending on whether their partner is casual or serious. Specifically, MSM tend to engage in more condomless sex with, and are more likely to disclose their HIV status to, serious partners (e.g., someone they felt committed to above all others).<sup>21–23</sup>

Therefore, this study sought to build on prior work by investigating the roles that racial/ethnic preferences play in formation of a sexual and romantic partnership and how they might explain disparities in HIV infection found with specific subpopulations. Furthermore, this study classified respondents into different groupings based on similarities in their preferences and dispreferences to contextualize the characteristics that drive the partner decision-making process.

## Methods

We recruited participants through banner and pop-up advertisements placed on a geosocial networking (GSN) mobile phone application (app) for MSM to meet each other. Advertisements ran from November 2014 through February 2015 and described a university survey that provided an opportunity to provide input to better understand and serve the health needs of the lesbian, gay, bisexual, transgender, and queer community. Advertisements were shown throughout the United States, with pop-up advertisements shown five times—each time shown the first time a user logged onto the application within the scheduled 24-hour advertising period. In addition to pop-up messages, we ran banner advertisements continuously during the period. No incentives for participation were provided for completing the surveys, although depending on responses, participants may have been routed to a randomized controlled trial that provided

compensation. This study was approved by the Northwestern University Institutional Review Board.

Additional details on general screening and enrollment procedures for this study have been published elsewhere.<sup>24</sup> Briefly, participants who completed the screener, provided informed consent, did not identify as female, and were at least 18 years of age were eligible. Of the 2098 eligible participants, 548 (26.1%) started the section on partner preference (having been routed to the survey through a predetermined algorithm of administration<sup>24</sup>) and, of those, 543 (99.1%) completed the entire section. An additional six individuals were dropped from analysis due to missing responses for the majority of the partner preference questions, and seven individuals who identified as another race/ethnicity were dropped to quantify participants into four racial/ethnic categories that corresponded with preference categories for the cluster analysis. This reduced the analytic sample to 530. Participants who started the section on partner preference were significantly more likely to identify as white ( $P < 0.0001$ ), have a college education ( $P < 0.0001$ ), and have an annual salary of more than \$50,000 ( $P = 0.002$ ) than those who did not start the section.

## Measures

Participants completed demographic measures (age, race/ethnicity, sexual orientation, education, employment status, and HIV status).

## Partner preference

Participants were asked two sets of seven questions regarding their likelihood to contact a man based on a series of demographic characteristics:

- “How likely would you be to message a man on mobile dating apps with the intent to have sex if he was?”
- “How likely would you be to message a man on mobile dating apps with the intent to pursue a relationship if he was?”

Individuals could indicate that they were very likely, somewhat likely, or not at all likely to message a man if he was black or African American, white, Hispanic or Latino, Asian, HIV positive, in a relationship, and more than 5 years older. We used these constructs as surrogates for partner preference as we were able to compare reported likelihood of contacting men across demographic characteristics within individuals.

## Analyses

All statistical analyses were conducted using SAS v9.4 (SAS Institute, Inc., Cary, NC) in 2015. Means and standard deviations were calculated for all partner preference variables, with not at all likely = 1, somewhat likely = 2, and very likely = 3. Ordinal logistic regression models were constructed to test for homophily in partner preference (e.g., were black men more likely to indicate they would have sex with a black man than non-black men?).

Preference for a particular race/ethnicity of sex partner was assessed by ranking participant responses to the four sex partner preference questions referencing race/ethnicity. If a participant indicated that he was very likely to seek a sex partner for

one item, but not for any others, he was coded as having a preference for that racial/ethnic group. Otherwise, if a participant indicated equal likelihood to seek a partner from multiple groups, then he was coded as having no preference.

Preference for a relationship partner versus a sex partner was assessed by comparing responses to the corresponding items by partner race/ethnicity. For instance, if a participant indicated that he was very likely to seek a black man for sex, but either somewhat likely or not at all likely to seek a black man for a relationship, then he was coded as only being interested in sex, not a relationship. In addition, if a participant indicated very likely for both, he was coded as being interested in both sex and a relationship, and if he did not indicate very likely for either, he was coded as not being interested in either sex or a relationship.

To group respondents by similarities in racial and relationship preference and dispreference, Ward's Minimum Variance Cluster Analysis was conducted in SAS using PROC CLUSTER. Eight variables—four sex partner preference questions and four relationship partner preference questions, all regarding partner's race/ethnicity—were used to create the clusters. Determination of the optimal number of clusters used two statistics—the cubic clustering criterion (CCC)<sup>25</sup> and the pseudo  $t^2$  index. The CCC identified one peak at 10 clusters, and the pseudo  $t^2$  index indicated two peaks at 4 and 10 clusters. Therefore, a 10-cluster solution was selected since both criteria identified this as an optimal choice. Results are presented in Table 1.

## Results

The majority of the 530 participants included in this analysis identified as gay (84.9%), white (75.0%), had at least a college degree (69.2%), and were employed full time (65.3%). Mean age for study participants was 38.7 years (standard deviation [SD]=11.6). Self-reported HIV prevalence in this sample was 11.7%, with 11.2% of participants having never been tested for HIV (Table 2).

### *Sex partnership preference*

In terms of race/ethnicity, on average, participants reported being more likely to contact a white (mean=2.62; SD=0.58) or Hispanic man (mean=2.41; SD=0.65) and less likely to contact an Asian (mean=1.89; SD=0.78) or black man (mean=1.90; SD=0.78) for sex (Fig. 1). Overall, participants demonstrated a lower likelihood of contacting an HIV-positive man (mean=1.49; SD=0.73) or one who was in a relationship (mean=1.70; SD=0.72). MSM reported a mean of 2.04 (~Somewhat likely) for their likelihood of contacting a man who was more than 5 years older for sex (SD=0.75).

There was significant homophily for sex partner preference based on race/ethnicity, but this was only found within the three racial/ethnic minority groups (Fig. 1). Compared with non-black men, black men were significantly more likely to message a black man for sex (odds ratio [OR]=2.61; 95% confidence interval [CI]: 1.36, 5.03). Similar trends were found for Hispanic men (OR=2.18; 95% CI: 1.27, 3.74) and Asian men (OR=7.83; 95% CI: 2.09, 29.3). In contrast, white and non-white men were equally likely to contact a white man for sex (OR=1.30; 95% CI: 0.86, 1.97). Homophily was also present for HIV status as HIV-positive men

were significantly more likely to seek an HIV-positive partner for sex than were HIV-negative men (OR=19.4; 95% CI: 10.8, 35.1). In addition, each year of age decreased a man's likelihood of seeking a partner more than 5 years older than him for sex by 2% (OR=0.98; 95% CI: 0.96, 0.99).

Overall, the majority of participants reported an equal likelihood of messaging a man for sex regardless of his race or ethnicity (53.8%). The remainder who indicated an exclusive preference for one race/ethnicity predominantly favored white men (36.5%), followed by Hispanic (5.8%), black (2.1%), and Asian men (1.8%).

### *Relationship partnership preference*

Similar to sex partner preference, MSM were more likely to contact a white (mean=2.50; SD=0.72) or Hispanic man (mean=2.27; SD=0.75) for a relationship, and less likely to contact a black (mean=1.77; SD=0.80) or Asian man (mean=1.82; SD=0.79) (Fig. 1). They were also less likely to contact an HIV-positive man (mean=1.49; SD=0.71) or one who was in a relationship (mean=1.23; SD=0.51) to pursue a relationship. In addition, men reported a mean of 1.94 (SD=0.77) for their likelihood of contacting a man more than 5 years older than they were for a relationship.

As in sex partner preference, there was significant homophily for relationship partner preference across non-white men based on race/ethnicity (Fig. 1). Black men were significantly more likely to contact another black man for a relationship than non-black men (OR=4.08; 95% CI: 4.08, 7.94), Hispanic men were significantly more likely to contact another Hispanic man for a relationship than non-Hispanic men (OR=2.67; 95% CI: 1.57, 4.56), and Asian men were significantly more likely to contact another Asian man for a relationship than non-Asian men (OR=3.26; 95% CI: 1.05, 10.1). Similar to sex partner preference, white men were no more likely to message a white man for a relationship than non-white men (OR=1.14; 95% CI: 0.76, 1.71). Homophily persisted with HIV status: HIV-positive men were more than seven times as likely to contact an HIV-positive man for a relationship as were HIV-negative men (OR=7.80; 95% CI: 4.58, 13.3). With regard to age, each year increase was associated with a 4% decrease in likelihood of pursuing a relationship with a man more than 5 years older (OR=0.96; 95% CI: 0.95, 0.97).

### *Sex partner versus relationship partner*

Within each category, there was a substantial portion of respondents who indicated they favored men for either a relationship or sex, not both, based on some characteristic. For potential partnerships with black men, 7.7% said they were interested only in sex and 4.7% said they were only interested in a relationship (Fig. 2). Similar patterns were seen in other demographics, where the proportion interested in sex only was greater than that for those interested exclusively in a relationship. This includes white partners (sex: 13.8%; relationship: 9.4%), Hispanic partners (sex: 12.5%; relationship: 7.2%), Asian partners (sex: 7.9%; relationship: 6.2%), HIV-positive partners (sex: 4.4%; relationship: 2.9%), and partners more than 5 years older (sex: 8.7%; relationship: 5.3%).

TABLE 1. CLUSTER ANALYSIS OF SEX AND RELATIONSHIP PARTNER PREFERENCES AND DISPREFERENCES (n=530)

|                             | Partner preference clusters                  |             |             |  |   |   |                                 |                                    |   |                                    | Total                                    |             |        |             |        |             |        |             |
|-----------------------------|--|-------------|-------------|--|---|---|---------------------------------|------------------------------------|---|------------------------------------|--|-------------|--------|-------------|--------|-------------|--------|-------------|
|                             | 1<br>n=61                                    | 2<br>n=55   | 3<br>n=46   | 4<br>n=50                                | 5<br>n=118  | 6<br>n=61   | 7<br>n=59                       | 8<br>n=32                          | 9<br>n=24   | 10<br>n=24                         |  | n=530       |        |             |        |             |        |             |
|                             | <i>mean (standard deviation)</i>             |             |             |  |   |   |                                 |                                    |   |                                    |  |             |        |             |        |             |        |             |
|                             | <i>I = not at all likely 3 = very likely</i> |             |             |  |   |   |                                 |                                    |   |                                    |  |             |        |             |        |             |        |             |
| Sex partner preference      | 2.08 (0.45)                                  | —           | 3.00 (—)    | 1.08 (0.27)                              | ↓   | 1.33 (0.49)                                       | ↓                               | 2.49 (0.57)                        | ↑   | 2.12 (0.42)                        | ↓  | 1.03 (0.18) | ↓      | 1.13 (0.34) | ↓      | 2.46 (0.51) | ↑      | 1.90 (0.78) |
| Black                       | 2.46 (0.50)                                  | ↑           | 2.98 (0.13) | 1.70 (0.51)                              | —   | 2.53 (0.52)                                       | ↑                               | 2.39 (0.56)                        | ↑   | 2.73 (0.45)                        | ↓  | 1.22 (0.42) | ↓      | 2.88 (0.34) | ↑      | 2.08 (0.65) | —      | 2.41 (0.65) |
| Hispanic                    | 2.43 (0.50)                                  | ↑           | 2.87 (0.34) | 1.76 (0.52)                              | —   | 1.20 (0.40)                                       | ↓                               | 1.61 (0.49)                        | ↑   | 2.37 (0.52)                        | ↓  | 1.00 (—)    | ↑      | 2.92 (0.28) | ↑      | 1.21 (0.41) | ↓      | 1.89 (0.78) |
| Asian                       | 2.15 (0.51)                                  | —           | 2.80 (0.45) | 2.36 (0.80)                              | ↑   | 2.77 (0.42)                                       | ↓                               | 2.98 (0.13)                        | ↓   | 2.78 (0.42)                        | ↑  | 2.38 (0.79) | ↑      | 3.00 (—)    | ↑      | 1.71 (0.46) | —      | 2.62 (0.58) |
| White                       | Relationship partner preference              |             |             |  |   |   |                                 |                                    |   |                                    |  |             |        |             |        |             |        |             |
| Black                       | 1.92 (0.42)                                  | —           | 3.00 (—)    | 1.26 (0.44)                              | ↓   | 1.22 (0.47)                                       | ↓                               | 2.51 (0.54)                        | ↑   | 2.29 (0.53)                        | ↓  | 1.00 (—)    | ↓      | 1.00 (—)    | ↓      | 2.46 (0.51) | ↑      | 1.77 (0.80) |
| Hispanic                    | 2.18 (0.47)                                  | —           | 2.98 (0.13) | 2.06 (0.59)                              | ↓   | 2.53 (0.52)                                       | ↓                               | 2.33 (0.63)                        | —   | 2.88 (0.33)                        | ↓  | 1.09 (0.30) | ↓      | 2.63 (0.49) | ↓      | 1.96 (0.69) | —      | 2.27 (0.75) |
| Asian                       | 2.20 (0.44)                                  | —           | 3.00 (—)    | 2.14 (0.35)                              | —   | 1.14 (0.38)                                       | ↓                               | 1.57 (0.50)                        | ↓   | 2.53 (0.54)                        | ↓  | 1.03 (0.18) | ↓      | 2.79 (0.41) | ↓      | 1.25 (0.44) | ↓      | 1.82 (0.79) |
| White                       | 1.89 (0.32)                                  | —           | 2.93 (0.26) | 2.72 (0.54)                              | ↑   | 2.75 (0.49)                                       | ↑                               | 2.95 (0.22)                        | ↑   | 2.98 (0.13)                        | ↑  | 2.19 (0.82) | —      | 2.96 (0.20) | ↑      | 1.71 (0.46) | —      | 2.50 (0.72) |
| Clusters driven by          | X  | X           |             | X  | X   | X   | X                               | X                                  | X   | X                                  | X  | X           | X      | X           | X      | X           | X      | X           |
| Response style              |  |             |             |  |   |   |                                 |                                    |   |                                    |  |             |        |             |        |             |        |             |
| Racial/ethnic preference    |  |             |             |  |   |   |                                 |                                    |   |                                    |  |             |        |             |        |             |        |             |
| Relationship/sex preference |  |             |             |  |   |   |                                 |                                    |   |                                    |  |             |        |             |        |             |        |             |
| Interpretation              | Somewhat likely                              | Very likely | Sex only    | White preference and black dispreference | Hispanic/white preference and black/Asian dispreference | Black/Hispanic preference and Asian dispreference | White/Hispanic/Asian preference | Black/Asian/Hispanic dispreference | White/Asian/Hispanic preference and black dispreference | Black/Asian/Hispanic dispreference | Black preference and Asian dispreference |             |        |             |        |             |        |             |
| Participant race/ethnicity  | 11.11%                                       | 12.00%      | 0.00%       | 4.08%                                    | 3.67%   | 7.02%   | 9.62%                           | 0.00%                              | 9.09%   | 0.00%                              | 22.73%                                   | 6.94%       | 6.94%  | 9.09%       | 0.00%  | 13.64%      | 13.27% | 2.24%       |
| Black                       | 11.11%                                       | 16.00%      | 11.63%      | 2.04%                                    | 23.85%  | 7.02%   | 15.38%                          | 6.25%                              | 9.09%   | 0.00%                              | 6.25%                                    | 6.25%       | 6.25%  | 9.09%       | 0.00%  | 13.64%      | 13.27% | 2.24%       |
| Hispanic                    | 5.56%  | 6.00%       | 4.65%       | 4.08%                                    | 0.92%   | 0.00%   | 0.00%                           | 0.00%                              | 0.00%   | 0.00%                              | 0.00%                                    | 0.00%       | 0.00%  | 0.00%       | 0.00%  | 0.00%       | 0.00%  | 2.24%       |
| Asian                       | 72.22%                                       | 66.00%      | 83.72%      | 89.80%                                   | 71.56%  | 85.96%  | 75.00%                          | 85.96%                             | 81.82%  | 93.75%                             | 63.64%                                   | 77.50%      | 77.50% | 81.82%      | 81.82% | 63.64%      | 77.50% | 77.50%      |

1.00–1.66 = ↓; 1.67–2.33 = —; 2.34–3.00 = ↑.

“X” indicates that cluster is driven by specific characteristic.

TABLE 2. DEMOGRAPHICS OF MOBILE APP-USING MEN WHO HAVE SEX WITH MEN ( $n=530$ )

|                                      | n   | %    |
|--------------------------------------|-----|------|
| <b>Race/ethnicity<sup>a</sup></b>    |     |      |
| Black/African American               | 34  | 6.7  |
| White                                | 380 | 75.0 |
| Hispanic/Latino                      | 65  | 12.8 |
| Asian                                | 11  | 2.2  |
| American Indian/Alaska Native        | 2   | 0.4  |
| Other                                | 15  | 3.0  |
| <b>Sexual identity<sup>b</sup></b>   |     |      |
| Gay                                  | 448 | 84.9 |
| Bisexual                             | 55  | 10.4 |
| Queer                                | 15  | 2.8  |
| Questioning/Unsure                   | 5   | 1.0  |
| Straight/Heterosexual                | 2   | 0.4  |
| Other                                | 3   | 0.6  |
| <b>Education<sup>c</sup></b>         |     |      |
| Less than high school degree         | 3   | 0.6  |
| High school graduate                 | 28  | 5.3  |
| Some college or technical school     | 131 | 24.9 |
| College graduate or higher           | 364 | 69.2 |
| <b>Employment status<sup>d</sup></b> |     |      |
| Employed full-time                   | 344 | 65.3 |
| Employed part-time                   | 51  | 9.7  |
| Full-time student                    | 43  | 8.2  |
| Unemployed                           | 59  | 11.2 |
| Other                                | 30  | 5.7  |
| <b>HIV status<sup>e</sup></b>        |     |      |
| Negative                             | 405 | 76.6 |
| Positive                             | 62  | 11.7 |
| Unknown                              | 3   | 0.6  |
| Never tested                         | 59  | 11.2 |
| <b>Age (years)</b>                   |     |      |
| 18–25                                | 59  | 11.1 |
| 26–30                                | 86  | 16.2 |
| 31–40                                | 169 | 31.9 |
| 41–50                                | 128 | 24.2 |
| 51+                                  | 88  | 16.6 |

<sup>a</sup>23 missing.<sup>b</sup>Two missing.<sup>c</sup>Four missing.<sup>d</sup>Three missing.<sup>e</sup>One missing.

### Cluster analysis

A cluster analysis using racial/ethnic preferences/dispreferences for sex and relationship partners identified 10 distinct clusters. An examination of these clusters determined that they could be categorized by one of three main drivers: participant response style (Clusters 1 and 2), participant sex/relationship preferences (Cluster 3), and participant racial/ethnic preferences (Clusters 4–10). The major drivers of these clusters along with the racial/ethnic composition of respondents by cluster are shown in Table 1.

Participant response style drove 21.9% of responses: participants in Cluster 1 tended to answer somewhat likely on nearly every item, while participants in Cluster 2 tended to answer very likely on nearly every item. Cluster 3 accounted for 8.7% of responses, with those participants reporting being very likely to message a man for sex, but being not

likely to message a man for a relationship. Finally, we found that racial/ethnic preferences drove seven clusters of 368 (69.4%) respondents. In breaking down the seven clusters driven by racial/ethnic preferences, a majority of these clusters showed a strong dispreference for both black and Asian partners and a preference for Hispanic and white partners. For example, white partners were preferred across five clusters and never dispreferred, Hispanic partners were preferred in four clusters and dispreferred in one, Asian partners were preferred in two clusters and dispreferred in four, and black partners were preferred in only two, but dispreferred in four. Associations between an individual's race/ethnicity and the predominant preference in their cluster were also reflective of homophily.

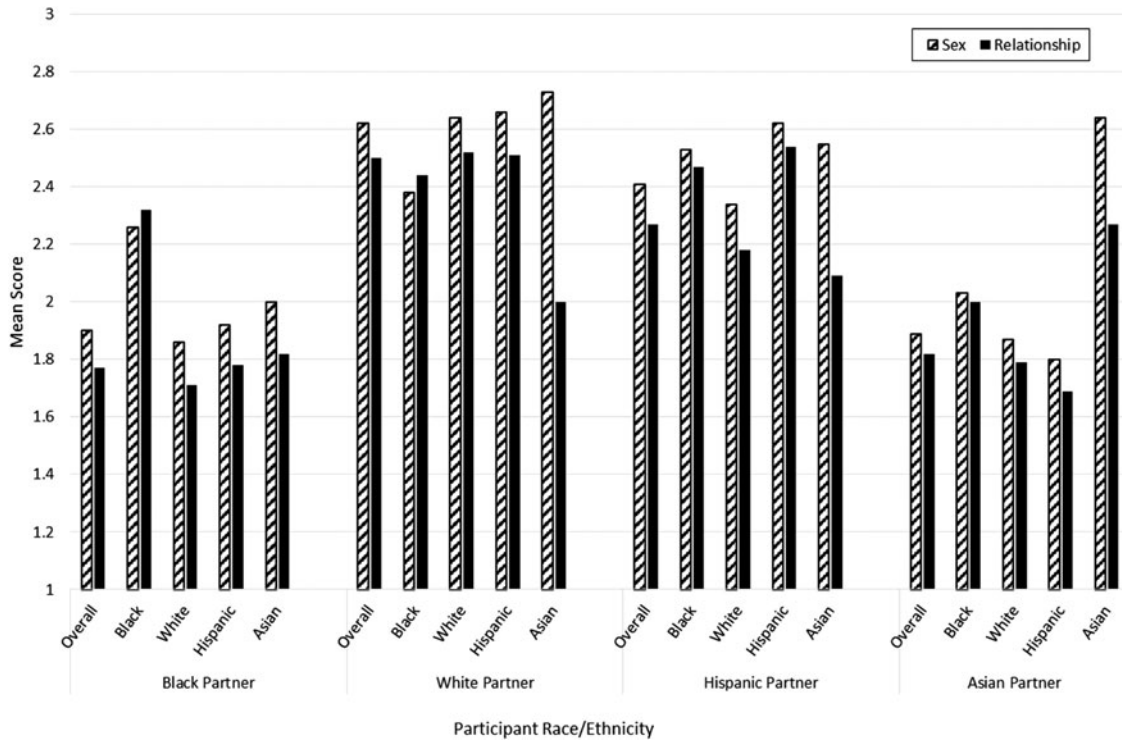
### Discussion

This study presents a nuanced examination of how partner characteristics and preferences shape sexual and romantic ties. Mobile app-using MSM showed strong personal preferences for partners based on various attributes. Overall, younger MSM and HIV-negative men were preferred for both sex and for relationships. In addition to these, MSM also had strong racial/ethnic preferences in romantic and sexual partners. For example, MSM predominantly favored white and Hispanic men, with only 2.1% of respondents preferring black men and 1.8% preferring Asian men.

Results from the cluster analysis suggest that racial preferences and dispreferences drive partner selection for most mobile app-using MSM. In addition, by studying the race of respondents within each cluster, it is clear that racial preference or dispreference is very much driven by the respondent's own race/ethnicity. For instance, Cluster 8—Black/Asian/Hispanic Dispreference—was comprised predominantly of white MSM. Even though race/ethnicity of the participant was not included as a factor in the cluster analysis, its role in partner selection is clearly demonstrated here.

The cluster analysis also suggests that individuals may be driven by both racial/ethnic biases, which could have a major impact on furthering our understanding of the spread of HIV throughout MSM. Similar to prior research,<sup>9</sup> the insularity of the black and Asian MSM sexual networks is highlighted through these preferences. While this insularity may prove protective in communities with low HIV prevalence (i.e., Asian MSM), it facilitates the spread of infection through high prevalence communities (i.e., BMSM). Hispanic MSM were often preferred; therefore, their communities are likely not as insular and will often connect multiple racial groups. However, their lower dispreference for black sex partners could potentially place them at greater risk for HIV exposure, on average, given the higher HIV prevalence in that community.<sup>26</sup> Finally, because white MSM demonstrated a dispreference for BMSM, their likelihood of being exposed to HIV from a community with a higher incidence is decreased. Therefore, these racial preferences and their influence on population dynamics could be major drivers and perpetuators of HIV disparities. Since the potential role of racism and bias in partner selection of MSM was not explicitly explored within this study, future research should clarify the influence that these factors may have on preferences.

Finally, we found that nearly one-third (30.6%) of respondents were driven by factors beyond race/ethnicity, such as a



**FIG. 1.** Sex and relationship partner preference by participant race/ethnicity ( $n = 530$ ). Note: 1 = not at all likely to 3 = very likely.

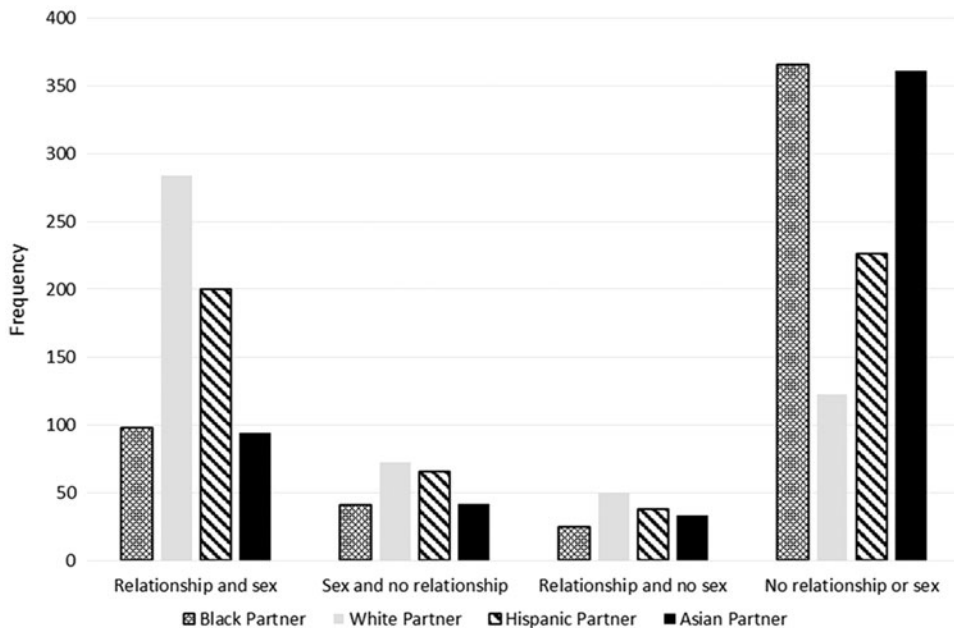
preference for sex over relationships and either a moderate or a high response across all items. That sex was wanted more than relationships is not surprising considering that the sample was recruited from an online hookup site.<sup>27,28</sup>

In general, findings from the cluster analysis allowed us to see the natural groupings of individuals by race/ethnicity and preference within this sample of mobile app-using MSM. However, future research is needed to test out the reproducibility of this clustering methodology among a larger, more

racially/ethnically diverse sample of MSM and to assess its broader generalizability.

*Limitations*

This study has several limitations. Participants consisted of a convenience sample of MSM recruited through a GSN mobile application. However, national studies have shown that nearly all American males (93%) own a cell phone,<sup>29</sup> and a



**FIG. 2.** Preferential selection of men for relationship partners versus sex partners by partner race/ethnicity ( $n = 530$ ).

study of MSM found that 72% owned a smartphone, which would allow for access to such an application.<sup>30</sup> In addition, research has found that the majority of MSM (63.6%) report using a GSN mobile application, but that there are demographic disparities—older and non-white MSM are less likely to use these apps.<sup>28</sup> Due to the widespread access to smartphones and use of mobile apps, plus having more than 40% of participants over the age of 40 years, these facts increase the external validity of this sample of MSM. All data were reliant on self-report and could be biased. Social desirability bias was minimized through the use of an anonymous survey completed by individuals on their own phone. Another limitation of our study is the inability to tease apart true preferences from those that may be shaped by an avoidance of potential partner rejection. For example, white MSM may have a greater ability to pursue any of their particular preferences without fear of rejection, whereas the same may not be true for black or Asian MSM. Specifically, reporting a preference to contact a man may not translate into actual behavior. Although this is not a perfect measure, we believe it lays a strong basis for future validation. Despite these limitations, this work presents some of the strongest empirical data reporting the complicated preferences and dispreferences of MSM that drive their romantic and sexual partnerships.

### Conclusions

As these partner preferences suggest, the social and sexual relationships of racial/ethnic minority MSM, and particularly of black and Asian MSM, may be affected not only by their own preferences and dispreferences but also by the preferences and dispreferences of other mobile app-using MSM. The potential roles of racism and biases in these preferences and dispreferences warrant further study. Combined with the stigma many of these racial/ethnic minorities may also feel from homophobic attitudes within their own racial/ethnic communities, these MSM may be at particular risk for social isolation. These partner preferences likely affect the structure of the sexual networks of MSM and may contribute to increased clustering within high HIV incident sexual networks.

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