ORIGINAL PAPER

Accurate Identification of a Preference for Insertive Versus Receptive Intercourse from Static Facial Cues of Gay Men

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Abstract In intercourse between men, one of the partners typically assumes the role of an insertive partner (top) while the other assumes a receptive role (bottom). Although some research suggests that the perceptions of potential partners' sexual roles in gay men's relationships can affect whether a man will adopt the role of top or bottom during sexual intercourse, it remains unclear whether sexual roles could be perceived accurately by naïve observers. In Study 1, we found that naïve observers were able to discern men's sexual roles from photos of their faces with accuracy that was significantly greater than chance guessing. Moreover, in Study 2, we determined that the relationship between men's perceived and actual sexual roles was mediated by perceived masculinity. Together, these results suggest that people rely on perceptions of characteristics relevant to stereotypical male–female gender roles and heterosexual relationships to accurately infer sexual roles in same-sex relationships. Thus, same-sex relationships and sexual behavior may be perceptually framed, understood, and possibly structured in ways similar to stereotypes about opposite-sex relationships, suggesting that people may rely on these inferences to form accurate perceptions.

Keywords Gender roles · Masculinity · Person perception · Sexual orientation · Nonverbal behavior

Introduction

Many gay men label themselves to communicate their preferred sexual role in intercourse (Kippax & Smith, 2001). Gay men typically self-identify as "tops," "bottoms," or "versatiles" (Hart,

Wolitski, Purcell, Gómez, & The Seropositive Urban Men's Study Team, 2003; Moskowitz, Rieger, & Roloff, 2008). In anal and oral intercourse, the top assumes the insertive role and the bottom assumes the receptive role (Kippax & Smith, 2001; Gil, 2007; Wegesin & Meyer-Bahlburg, 2000; Zhou et al., 2012). Furthermore, men who show a preference for being a penetrative partner in sexual relationships most of the time tend to self-identify as tops and those who generally prefer being penetrated self-identify as bottoms; versatile men report enjoying both penetrating their sexual partners and being penetrated by them equally (Moskowitz et al., 2008). These sexual roles extend beyond just anal and oral sexual intercourse and are evident in other sex-related behaviors of gay men (e.g., verbal behavior during intercourse) (Moskowitz et al., 2008). Additionally, these roles tend to be correlated with the sexual practices that men tend to engage in (Moskowitz et al., 2008). Interestingly, the sexual roles described above seem to be largely interconnected with ideas of submissiveness, vulnerability, and masculinity (Kippax & Smith, 2001). As such, the role of the bottom tends to be associated with more effeminate traits and the role of the top with more masculine traits, reflecting stereotypical gender roles.

Reinforcing this relationship between gender and sexual roles, gay men tend to place a greater general emphasis on masculinity than heterosexual men (Bailey, Kim, Hills, & Linsenmeier, 1997). Not only do they tend to describe themselves as "masculine" and "straight-acting" in online advertisements and surveys, but they also tend to look for more masculine partners (Bailey et al., 1997; Moskowitz, Rieger, & Seal, 2009; Rule & Ambady, 2008). This phenomenon, however, does not extend to sexual preferences—gay men tend to look for a sexually-compatible partner (i.e., tops seek to have sexual relationships with complementary bottoms). Interestingly, one study reported that versatile gay and bisexual men indicated that their sexual role was largely determined by their perception of potential partners:

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when these men perceived the partner to be more masculine and having a larger penis, they assumed a receptive sexual role whereas the opposite was true if they perceived the partner to be more effeminate (Carballo-Diéguez et al., 2004). Thus, perceptions of masculinity and inferences of the sexual roles of one's potential partners may determine whether a gay man will take on an insertive or receptive sexual position. Questions about whether these sexual roles are perceived accurately and whether these perceptions are perhaps influenced by impressions of masculinity remain unanswered.

Consistent with our hypothesis that sexual roles may be related to generalized concepts of gender, it is possible that perceptions of the sexual roles of gay men could occur via processes similar to those underlying perceptions of sexual orientation. Although some research has demonstrated that sexual orientation can be perceived from dynamic cues (Ambady, Hallahan, & Conner, 1999; Johnson, Gill, Reichman, & Tassinary, 2007; Rieger, Linsenmeier, Gygax, Garcia, & Bailey, 2010), recent evidence suggests that it is also perceptible from the face alone. These perceptions are accurate (Tskhay & Rule, 2013), occur within the first 50 ms of exposure to the face (Rule & Ambady, 2008), and seem to arise without participants' conscious awareness (Rule, Macrae, & Ambady, 2009). Further research has suggested that information about sexual orientation can be communicated from individual facial features (the eyes, mouth, and hair) (Rule, Ambady, Adams, & Macrae, 2008) and that women tend to be most accurate at making these judgments at the peak of their menstrual cycle when their unconscious motivation is highest (Rule, Rosen, Slepian, & Ambady, 2011). Some evidence suggests that the perception of sexual orientation is driven, in part, by cross-gendered behavioral and appearance cues and the application of cross-gendered stereotypes (Freeman, Johnson, Ambady, & Rule, 2010; Rieger et al., 2010). It is, therefore, possible that people would rely on information about relative masculinity to infer the sexual roles of gay men.

Researchers have suggested that the perception of sexual roles in gay relationships could be scaffolded on the perception of stereotypically heterosexual sexual and gender roles (Kippax & Smith, 2001). Narrative examinations of interviews with gay couples further suggest that many gay men perceive their sexual encounters to be associated with stereotypical gender roles and some even described the intercourse as occurring between "*man* and *woman*" (Kippax & Smith, 2001, emphasis in original). Indeed, one study showed that, at least for Latino gay men, sexual role preference could be structured along stereotypically gendered lines such that Latino gay men, in comparison to White or Black gay men in the United States, were more polarized in their preferences for insertive versus receptive roles (Jeffries, 2009). Furthermore, men who self-identified as tops also tended to report an increased degree of internalized homophobia, possibly because of discomfort associated with being perceived as effeminate (Hart et al., 2003). Similarly, other investigations suggested that bottoms tend to behave in a more feminine manner than tops

or versatiles (Bailey et al., 1997; Wegesin & Meyer-Bahlburg, 2000; Weinrich et al., 1992). Additionally, people who self-identified as tops reported more masculine behavior and more stereotypically masculine physical characteristics (e.g., larger penis size) (Moskowitz & Hart, 2011). This suggests that tops could, indeed, be more masculine than bottoms and that naïve perceivers may use this information to make inferences about sexual roles that might therefore be accurate. More specifically, because previous research suggests that tops are perceived to be more masculine than bottoms, and because these perceptions appear to be somewhat valid, we propose that people will make accurate inferences about gay men's sexual roles by using information about the relative perceived masculinity of the targets being judged. Furthermore, most studies to date have concerned the masculinity of behaviors expressed by tops and bottoms and how that relates to participation in the respective sexual practices semantically reflective of insertive versus receptive roles during intercourse. The main goal of the current study, however, was to see whether these sexual roles could be *perceived* with accuracy exceeding chance levels and to determine the role that perceptions of masculinity play in making these judgments. Additionally, we relied on observational, as opposed to self-report, methods to answer these questions. Although imperfect, the use of the observational method allows us to draw conclusions that may be higher in external validity.

Study 1

Method

Participants

A total of 23 participants (7 female) were recruited from Amazon's Mechanical Turk (see Buhrmester, Kwang, & Gosling, 2011) to participate in a study examining person perception. The participants were told that they would be reporting their impressions of faces presented to them on their computer's screen. Eighteen of the participants identified as Caucasians, two as Black, two as Asian, and one as Latino. The mean age was 35 years old (SD = 14.00 years). Sample size was modeled on previous research examining accuracy in categorizations of sexual orientation (e.g., Rule & Ambady, 2008). We did not balance the sex of the participants because we had no a priori assumption that the participants' sex would have any effect on the accuracy of categorizing people according to their preferred sexual roles. The participants received monetary compensation for their participation.

Procedure and Measures

Hypothesis-blind research assistants downloaded 200 photographs of gay men (100 bottoms, 100 tops) from online dating

profiles posted in major U.S. cities.[1] Each man in the photograph unambiguously self-identified as either a top or a bottom, was looking directly into the photographer's camera, and was free of facial adornments (e.g., glasses, beards). We selected only men who self-identified as tops and bottoms because we were interested in examining the sexual roles that men preferred to participate in most frequently (Moskowitz et al., 2008); versatile men's photographs were not downloaded because these men enjoy sexual intercourse as a receptive or insertive partner equally (Hart et al., 2003; Moskowitz et al., 2008). The faces were removed from their original background, cropped to the limits of the hair and chin, converted to grayscale, placed on a white background, and standardized in size. The targets' actual sexual orientations and sexual roles were never disclosed to the participants.

Participants were first provided with a definition of each sexual role (i.e., bottom and top). Participants were told that a top acts as an insertive partner during sexual intercourse ("a person who penetrates"), whereas a bottom is a receptive partner during sexual intercourse ("one who receives penetration"). Participants read the definitions and then proceeded to a dichotomous categorization task. Participants viewed each face individually in a random order and categorized the person as either a "bottom" or a "top" at a self-paced rate; each face was presented only once.

Statistical Analyses

In the current study, we were primarily interested in whether the sexual roles of men could be identified with accuracy exceeding chance level (.50). First, we calculated the proportions of tops and bottoms identified correctly, which served as a percent-correct index for each group. We compared these estimates to each other and then calculated the overall, combined proportion of correctly identified tops *and* bottoms by each participant. Furthermore, we used a more sensitive measure of accuracy derived from signal detection theory analysis—A' (Macmillan & Creelman, 2005)—to estimate accuracy while controlling for participants' tendency to label stimuli in a systematic and directional way (i.e., response bias). This analysis not only allowed us to take into account the correct rejections of targets that do not belong to a given group, but also allowed for an examination of accuracy across both groups of targets. Thus, signal detection provided a more sensitive test to examine the accuracy of the participants in the sample.

Results

Examining the correct identifications of tops and bottoms separately showed that the participants were able to identify tops better than chance [$M = 64.56\%$, SD $= 16.73\%$, $t(22) = 4.94$, $p < .001$, $r = .73$]. Identifications of bottoms, however, were

significantly lower than chance guessing [$M = 38.82\%$, SD $= 16.74\%$, $t(22) = 3.40$, $p = .003$, $r = .59$], reflecting a potential response bias towards labeling targets in a manner congruent with heterosexually-inspired stereotypes about men (i.e., top). Indeed, the comparison of the means revealed that tops were identified more accurately than bottoms, $t(22) = 3.88$, $p = .001$, $r = .64$. Although it seems that participants could not identify bottoms more accurately than chance guessing, the participants were able to accurately decide who was a top and who was a bottom as indicated by the percent-correct index aggregated across the entire target sample [$M = 51.69\%$, SD $= 0.03$, $t(22) = 2.44$, $p = .02$, $r = .46$]. This result could be misleading, however, because it still does not consider the response bias of the participants. Response bias is a general tendency of participants to categorize target stimuli in a certain way (Macmillan & Creelman, 2005). For example, in the current study, the participants may have been more biased to categorize targets as tops than bottoms, as suggested by the difference in accuracy between the two target types in the percent-correct analysis above. This, in turn, would bias the overall estimation of the perceivers' accuracy to distinguish tops from bottoms. We therefore used a more conservative analysis based on signal detection theory (Macmillan & Creelman, 2005) to estimate accuracy while accounting for response bias, which can then be measured separately.

To analyze the data using signal detection theory, we calculated hit and false-alarm rates based on arbitrary assignment. Thus, the faces of gay men who had self-identified as bottoms and were correctly categorized by the participants as bottoms constituted the hits whereas the faces of self-identified tops that were incorrectly categorized as bottoms constituted the false-alarms. This yielded a hit and false-alarm score for each participant, lending itself to a participant-based analysis that indexes a given perceiver's ability to distinguish tops from bottoms when accounting for his or her individual response bias (see Ambady et al., 1999; Rule & Ambady, 2008). We used the nonparametric signal detection statistic A' to estimate the accuracy of categorization for each participant while correcting for response bias, which was estimated by the complementary index B''. It is important to note that A' is orthogonal to B'' and that the two values are estimated independently from each other using separate mathematical formulae (see Macmillan & Creelman, 2005). Thus, A' is considered to be an estimate of accuracy that is free from the participant's personal tendency to respond in a particular direction (e.g., categorizing more targets as tops vs. bottoms).

Overall, the participants were significantly more accurate than chance guessing (.50) in categorizing gay men's sexual roles, $M_{A'} = .63$, SD $= 0.13$, $t(22) = 6.08$, $p < .001$, $r = .79$; this is functionally equivalent to a bias-corrected value of 63% correct, over all (Rule & Ambady, 2008). One participant had an A' score more than three SDs beyond the group's mean; removing this score did not change the statistical significance of this result. As expected based on the percent-correct analyses

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[1] Three faces were removed due to a technical error.

above that did not account for response bias, the participants demonstrated an overall tendency to categorize men in the photographs as tops than bottoms, $M_{B''} = .04$, SD $= 0.07$, $t(21) = 3.17$, $p = .005$, $r = .57$.[2] Together, these results demonstrated that people were able to successfully infer gay men's sexual roles from viewing just their faces and were biased to ascribe a more gender-congruent and dominant sexual role (i.e., top) to men in general. Neither accuracy nor response bias differed according to participant sex, $p > .33$.

Study 2

In Study 1, we found that participants were able to correctly identify men's sexual roles from information communicated by their faces and that participants were prone to categorize men according to the sexual roles consistent with stereotypical gender roles in heterosexual intercourse (i.e., men as insertive partners). In Study 2, we therefore examined whether information about men's perceived masculinity might facilitate these accurate categorizations of individuals into their self-reported sexual roles.

Method

Participants

A total of 27 participants (11 females) were recruited via Amazon's Mechanical Turk to participate in a study examining person perception. We were aiming for at least 25 participants to ensure that our measure of masculinity was reliable. Twenty-one participants identified as Caucasian, two as Black, two as Asian, and two as Hispanic. The mean reported age in this sample was 38 years old (SD $= 12.30$ years). The participants were compensated for their participation.

Measures and Procedure

Stimuli were the same as those in Study 1. The participants rated each face for masculinity using an 8-point Likert-type scale (0 = *Not Masculine at All*, 7 = *Very Masculine*). The faces were presented in the center of the screen individually in random order. The question "How masculine is this person?" appeared adjacent to the scale below each face as it was presented.

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[2] Data for the outlier whose score was more than 3 SDs away from the sample mean were removed. The response bias data were further transformed using the negative reciprocal transformation to successfully approximate normality prior to inferential statistical tests ($W = .92$, $p = .09$). The means and SDs are presented here as raw scores to ease interpretation.

Statistical Analyses

In Study 2, we hypothesized that the accurate perception of sexual roles could be explained through perceptions of masculinity. We used statistical mediation to test this hypothesis (e.g., Baron & Kenny, 1986). Thus, we drew 5,000 bootstrap resamples, as recommended by Preacher and Hayes (2004), to test the strength of the indirect effect of self-reported sexual role's prediction of perceived sexual role through perceptions of masculinity.

Results

First, we examined the ratings of masculinity for the two groups of targets. The results indicated that the judges perceived tops ($M = 3.84$, SD $= 0.95$) to be significantly more masculine than bottoms [$M = 3.61$, SD $= 0.83$, $t(26) = 2.56$, $p = .02$, $r = .49$]. There were no significant effects of participants' sex on the ratings of masculinity.

To investigate the role that targets' masculinity played in their categorizations as tops and bottoms in Study 1, we conducted a target-level analysis of these data. Thus, we used the data obtained in Study 1 to calculate the probability of any face being categorized as a bottom (Cronbach's $\alpha = .64$) and related this to the mean masculinity score given to each target in Study 2, averaging across participants (Cronbach's $\alpha = .91$).

We hypothesized that the accurate categorization of faces as tops and bottoms would be due to participants' perceptions of facial masculinity and tested this using a standard model of statistical mediation (see Baron & Kenny, 1986). We therefore drew 5,000 bootstrap resamples to assess the strength of the indirect effect of actual sexual role in predicting perceived sexual role according to perceptions of masculinity (Preacher & Hayes, 2004).

The analysis revealed that participants relied on facial masculinity to accurately infer men's sexual roles, $ab = -.11$, 95 % CI [$-.21, -.02$]. Although the participants were almost marginally accurate in categorizing men's sexual roles when examining accuracy with targets as the unit of analysis outside of a signal detection framework [$c = -.11$, $t(195) = 1.56$, $p = .12$] when the indirect effect through perceived masculinity was taken into account, this effect became completely nonsignificant [$c' = .00$, SE $= t(194) < 1$; see Fig. 1] a difference that was statistically significant: *Sobel Z* $= 2.23$, $p = .025$.[3] It is important to note that the total effect did not reach traditional levels of statistical significance when conducting target-level analyses, possibly because this analysis did not control for response biases as the signal detection analyses in Study 1 had allowed. Nevertheless, because we were primarily interested in the strength and reliability of the

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[3] We did not find any significant differences in the magnitude of the relationship between masculinity and perceived sexual role when examining the model including the interaction between the two predictor variables (i.e., actual sexual role and perceived masculinity).
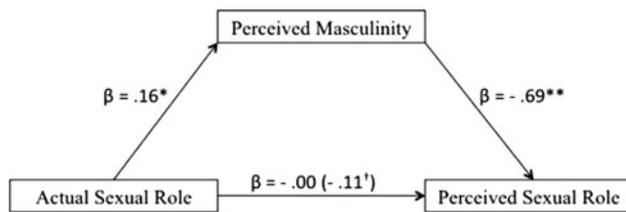
Fig. 1 Mediation of the effect of actual sexual role on perceived sexual role through perceived masculinity. The value in parentheses reflects the direct effect of actual sexual role on perceived sexual role. Note: $^{†}p < .12$, $^{*}p < .05$, $^{**}p < .001$

indirect effect, this limitation does not obstruct the conclusion that people relied on the reflection of stereotypical gender roles to infer the sexual role of each man accurately (see Preacher & Hayes, 2004).

Discussion

In two studies, we demonstrated (1) that gay men's sexual roles can be perceived with accuracy that exceeds chance levels, (2) that people exhibit a significant tendency to categorize gay men as occupying an insertive sexual role (i.e., tops), and (3) that accurate perceptions of sexual roles were facilitated by perceptions of men's relative masculinity. These results suggest not only that perceivers apply stereotypes associated with gender roles to infer the sexual roles of gay men, but also that these stereotypes may be valid. In this sample, we observed that tops were more masculine than bottoms, a finding consistent with previous studies using self-report measures (Wegesin & Meyer-Bahlburg, 2000; Weinrich et al., 1992). Furthermore, we observed that men who were perceived to be more masculine were also perceived to be tops, consistent with the previous finding that versatile gay and bisexual men reported relying on information about masculinity to decide which sexual position to take during anal intercourse (Carballo-Diéguez et al., 2004).

These findings are interesting because they suggest that people may tend to generalize their stereotypical perceptions of heterosexual gender roles to other forms of sexual relationships. People may therefore interpret a variety of relationships through the lens of conventional male–female sexual dichotomies. Although we only demonstrated this in relation to the sexual relationships of gay men in the present work, it is possible that similar effects could be observed in non-sexual relationships, such as friendships and more general interpersonal interactions. Future researchers may wish to examine this possibility. Moreover, it may be important to consider these effects for same-sex female relationships, particularly as previous research has suggested that heterosexually-inspired "butch" and "femme" dichotomies may be particularly influential in governing the construction of lesbian relationships (Bailey et al., 1997). Additionally, future work could investigate the facial features that aid the

accurate categorization of people's sexual roles. Although we did not examine such facial features here, previous research found that both men's and women's sexual orientation could be perceived from minimal facial information (e.g., eyes, hair, mouth) (Rule et al., 2008; Rule, Ambady, & Hallett, 2009). Thus, it is possible that the same cues could be relevant in the accurate identification of sexual role preferences.

Indeed, similar to other work in this area, the present study was not without limitations. Gay men who use online dating websites could have listed an inaccurate sexual role and many tops and bottoms could be versatile outside of how they advertise themselves online. Furthermore, it could be the case that some bottoms may have a preference for sometimes taking an insertive role whereas some tops may occasionally prefer assuming a receptive role (Wei & Raymond, 2011). Although this is an important limitation, previous research suggests that less than 10 % of tops and approximately 20 % of bottoms would participate in sexual intercourse in a role contradicting their stated preference (Moskowitz et al., 2008). Furthermore, other researchers have demonstrated that men on dating websites are looking for sexually-compatible partners (Bailey et al., 1997), suggesting that gay men posting personal advertisements are likely to be honest about their preferred sexual roles. Although we took special care to ensure that the stimuli we collected were standardized (e.g., removed from original background), many online users may be concerned with self-presentation, limiting the representativeness of the photos used. Thus, the effects found here could be driven not only by stable appearance cues, but also by the way tops and bottoms present themselves in their dating advertisements. Even considering these limitations, however, the data observed in the current work are important and may help to bring us closer to understanding the perception and dynamics of same-sex male relationships. Furthermore, it is possible that similar effects may be found in opposite-sex relationships: women may be able to identify submissive versus dominant men from brief observations of appearance or behavior. This could be a fruitful new direction for future research.

In summary, we demonstrated that not only do people infer sexual roles of gay men by basing their judgments on masculinity (Carballo-Diéguez et al., 2004), but that these perceptions are somewhat accurate and communicated by a very rich, yet limited, source of static information: the human face. Furthermore, this work showed that our conceptions of stereotypical gender roles extend beyond the conceptual bounds of heterosexual relationships and may be applied by the mind to interpret other forms of relationships.

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