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Emotions Facilitate the Communication of Ambiguous Group Memberships

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It is well known that emotions intersect with obvious social categories (e.g., race), influencing both how targets are categorized and the emotions that are read from their faces. Here, we examined the influence of emotional expression on the perception of less obvious group memberships for which, in the absence of obvious and stable physical markers, emotion may serve as a major avenue for group categorization and identification. Specifically, we examined whether emotions are embedded in the mental representations of sexual orientation and political affiliation, and whether people may use emotional expressions to communicate these group memberships to others. Using reverse correlation methods, we found that mental representations of gay and liberal faces were characterized by more positive facial expressions than mental representations of straight and conservative faces (Study 1). Furthermore, participants were evaluated as expressing more positive emotions when enacting self-defined "gay" and "liberal" versus "straight" and "conservative" facial expressions in the lab (Study 2). In addition, neutral faces morphed with happiness were perceived as more gay than when morphed with anger, and when compared to unmorphed controls (Study 3). Finally, we found that affect facilitated perceptions of sexual orientation and political affiliation in naturalistic settings (Study 4). Together, these studies suggest that emotion is a defining characteristic of person construal that people tend to use both when signaling their group memberships and when receiving those signals to categorize others.

Keywords: emotional expression, person construal, person perception, political affiliation, sexual orientation

Emotions shape a large part of social perception and cognition (Hess, Adams, & Kleck, 2008). Intergroup perceptions, in particular, are especially imbued with emotion (Smith & Mackie, 2008). Researchers have demonstrated that sex, for example, is intertwined with expressions of happiness and anger (Becker, Kenrick, Neuberg, Blackwell, & Smith, 2007; Hess, Adams, & Kleck, 2005; Zebrowitz, Kikuchi, & Fellous, 2010). Similarly, perceptions of race and emotion influence each other reciprocally such that specific affective expressions are better recognized from the faces of some group members versus others due to stereotypes and overlapping physiognomy (e.g., Adams, Nelson, Soto, Hess, & Kleck, 2012; Bijlstra, Holland, & Wigboldus, 2010; Hugenberg & Bodenhausen, 2003). Thus, emotions seem to readily intersect with perceptions of the three major social dimensions of age, race, and sex.

Indeed, previous research has demonstrated that perceptually obvious markers of group membership activate emotion stereotypes. For example, Hugenberg and Bodenhausen (2003) found that participants were biased towards perceiving neutral Black faces as angry. Conversely, other studies employing racially ambiguous computer-generated faces reported that targets were categorized as Black earlier in a morph sequence when expressing anger (e.g., Hugenberg & Bodenhausen, 2004; Hutchings, & Haddock, 2008). Similar research found that people were more likely to categorize point-light displays of anger as male, illustrating a relationship between sex and emotion (Johnson, McKay, & Pollick, 2011). All these findings demonstrate robust associations between perceptually obvious social categories and emotions. Yet, whereas emotionally neutral faces of Black people may be misperceived as angry, angry faces are not necessarily misperceived as Black. Similarly, the emotions displayed on a male face are not likely to be so influential as to result in categorization of the target as female. But for social categories that are not demarcated by cues as obvious as those for age, race, and sex, emotions may play a more defining role in perceivers' decisions about targets' group membership.

Despite the consistent demonstration that emotional expressions may activate associations between various social categories and stereotypically related emotions, it remains unclear how these effects might manifest among perceptually ambiguous groups where their influence may be more powerful. In the current research, we therefore examined two perceptually ambiguous social categories (sexual orientation and political affiliation) to address whether people are aware of the stereotypes they hold regarding emotions and ambiguous social categories, whether people use emotional information to communicate their less obvious group memberships, and whether perceivers can reliably infer perceptu-

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ally ambiguous group memberships from ephemeral emotional displays.

Ambiguous Distinctions

Unlike groups distinguished by obvious identifying physical markers (e.g., skin tone; Maddox, 2004), sexual orientation and political affiliation are fairly ambiguous. The accuracy of categorizing perceptually obvious dimensions such as race, sex, and age is typically very high, even when based on very minimal cues. For instance, perceivers can be quite accurate at judging race (99.2%; Remedios, Chasteen, Rule & Plaks, 2011) whereas rates of accuracy for ambiguous groups tend to be much lower (64.5%; Tskhay & Rule, 2013), though still significantly better than chance. Past studies have reasoned that this significant but impaired accuracy may be an advantage for gaining insight into general processes involved in person perception (e.g., Rule, Ambady, Adams, & Macrae, 2008). Thus, here we focused on sexual orientation and political affiliation to examine how emotional cues can be used in the interpersonal communication of these subtly distinguished group memberships.

Sexual Orientation

Although the accuracy observed for judgments of sexual orientation is lower than that for more obvious groups (e.g., race, sex), data suggest that sexual orientation is subject to similar rapid and automatic processing (Rule, Ambady, & Hallett, 2009; Rule, Macrae, & Ambady, 2009). In turn, research has begun to explore the cues that contribute to perceptions of sexual orientation and that may constitute the prototypes for these groups. Some work has demonstrated that perceptions of masculinity and gender atypicality provide valid cues to sexual orientation (Freeman, Johnson, Ambady, & Rule, 2010; Kite & Deaux, 1987; Rieger, Linsenmeier, Gygax, Garcia, & Bailey, 2010). Furthermore, specific facial features, such as a person's hairstyle and eyes, can signal sexual orientation from faces (Rule et al., 2008; Rule, Ambady, & Hallett, 2009). Additional research has suggested that facial symmetry (Hughes & Bremme, 2011) and face shape (Valentova, Kleisner, Havlicek, & Neustupa, 2014) may cue men's sexual orientation. Although these studies have identified structural features in the face that communicate sexual orientation, there is still unexplained variance in its accurate perception. It is therefore plausible that sexual orientation might also be expressed through ephemeral cues: we propose that emotional expressions may be one such signal.

Gay men are generally perceived to be more sex role incongruent, and thus more feminine, than straight men (Freeman et al., 2010; Rieger et al., 2010; Taylor, 1983). Work on the emotion overgeneralization effect in social perception, which associates positive emotions with femininity, might therefore suggest that gay men's faces would also express more positive affect due to this perceived association with femininity (Dotsch, Wigboldus, Langner, & van Knippenberg, 2008; McArthur & Baron, 1983; Zebrowitz, 1997; Zebrowitz & Collins, 1997; Zebrowitz et al., 2010). In parallel, other research has shown that facial features associated with masculinity actually predict stereotypically masculine behavior: individuals with greater facial width-to-height ratios (fWHR), which connote masculinity, have been found to behave more aggressively across a variety of domains (e.g., Carré & McCormick, 2008; Stirrat & Perrett, 2010). Furthermore, women tend to smile more (LaFrance, Hecht, & Paluck, 2003), whereas men are thought to be more likely to express anger or to simply express fewer emotions in general (Fabes & Martin, 1991). It is interesting to note that Becker et al. (2007) recently demonstrated an automatic association between anger and men, and happiness and women, whereby increasing the femininity of faces increased perceptions of happiness and increasing the masculinity of faces increased perceptions of anger. Collectively, this body of work suggests that femininity is associated with happiness and masculinity with anger. Thus, as facial femininity has been previously associated with male homosexuality (e.g., Rieger et al., 2010; Tskhay & Rule, 2015), expressions of happiness and anger could be interconnected with the perception of gay and straight men's faces, respectively.

Importantly, however, emotions could also affect perceptions of sexual orientation over and above perceptions of femininity. Thus, whereas perceptions of sexual orientation could be scaffolded on the emotion stereotypes associated with men and women, it may not always be the case; emotions might therefore act independently of masculinity and femininity in person construal. Prototypes and mental representations of sexual orientation may therefore contain cues to both affect and femininity to mark group membership. In fact, if the perception of affect predicts perceived sexual orientation over and above masculinity, this would suggest that both cues contribute to prototypes of gay and straight men. If masculinity eliminates the effect of affect on sexual orientation, however, then one might conclude that perceivers utilize more general stereotypes associated with men and women, such as sex prototypes that themselves encompass affect, in their categorizations.

Political Affiliation

Similar to sexual orientation, political group membership is another ambiguous distinction that is perceptible with accuracy that exceeds chance guessing (Tskhay & Rule, 2013). Researchers have demonstrated that Democrats and Republicans can be distinguished based on their appearance and body movement (Benjamin & Shapiro, 2009; Carpinella & Johnson, 2013; Olivola, Sussman, Tsetsos, Kang, & Todorov, 2012; Olivola & Todorov, 2010; Rule & Ambady, 2010; Wilson & Rule, 2014). Similar effects have been found for European politicians, suggesting that broad dimensions might underlie these judgments (Jahoda, 1954; Samochowiec, Wänke, & Fiedler, 2010). Emotional expressions were only scarcely considered in these studies, however, with only Rule and Ambady (2010) mentioning emotion at all and, in that case, only to eliminate it as a covariate in one of their two samples of targets.

Other work has suggested that holistic impressions from faces and inferences of personality impact perceptions of political affiliation. Impressions of personality have been found to predict candidates' electoral success across cultures (Antonakis & Dalgas, 2009; Poutvaara, Jordahl, & Berggren, 2009; Rule et al., 2010; Todorov, Mandisodza, Goren, & Hall, 2005). In addition, people seem to stereotype Democrats as warmer than Republicans (Rule & Ambady, 2010), though this can vary depending on the perceiver's own political beliefs (Wilson & Rule, 2014). Moreover, separate research has demonstrated that the facial structures associated with inferences of specific personality traits overlap with the facial structures that signal emotions (Said, Sebe, & Todorov, 2009). For example, one study found that the structural pattern of happy expressions was associated with impressions of individuals

as less dangerous, signifying warmth (Zebrowitz et al., 2010). In complement, a greater degree of perceived happiness has been shown to covary with impressions of both greater dominance and greater affiliation (Montepare & Dobish, 2003). To the extent that inferences of personality from faces are intertwined with emotional expressions and also meaningfully relate to judgments of political affiliation, we hypothesized that emotional expressions might influence how individuals are categorized according to political affiliation.

Overview

In the current work, we therefore explored whether emotions could be used as cues to distinguish perceptually ambiguous social categories (i.e., sexual orientation and political affiliation). Specifically, in the first part of this research, we examined whether people have a mental association between affect and male homosexuality such that straight men are mentally represented as angry and gay men are represented as happy (Study 1A). Similarly, we examined whether people conceive of Democrats as happy and Republicans as angry (Study 1B), building on stereotypes about the personality traits of members of the two groups. We therefore used reverse correlation methods (Dotsch et al., 2008) to test whether people's mental representations (indicators of prototypes) of gay men and liberals are more affectively positive than those of straight men and conservatives, respectively. In Studies 2A and 2B, we asked participants to pose as if they wanted others to perceive them as homosexual or liberal (respectively) and expected them to enact happy expressions, consistent with our hypothesis that people conceive of both gay men and liberals as happy. Next, in Studies 3A and 3B, we expected that faces morphed with happy expressions would be more likely perceived as gay (liberal) compared to neutral or angry expressions, which we expected to be perceived as straight (conservative). Thus, our first three studies addressed the question of whether people are aware that emotions may serve as cues to ambiguous group memberships and whether people use emotions as cues in communicating sexual orientation and political affiliation.

Finally, in Studies 4A and 4B, we examined sexual and political affiliation in more naturalistic settings. Specifically, we investigated whether people might use emotional expressions to communicate their sexual orientation and political affiliation in dating and professional environments, respectively, and whether these perceptions might indeed facilitate accurate inferences of group membership, as demonstrated in a number of previous studies (see Tskhay & Rule, 2013). Thus, the present investigation aimed to test whether perceptions of affect are embedded within mental representations of ambiguous social categories and whether people use this to communicate their group membership.

Study 1A

In our first study, we examined the association between happy and angry affect within mental representations of male homosexuality. To test this, we sampled individuals' mental representations of gay and straight men using reverse correlation methods borrowed from Dotsch et al. (2008). Specifically, we superimposed random sinusoidal noise over a base face that consisted of a morphed average of a number of neutral male faces from a validated database. On each trial, participants then selected the face that they thought better represented a gay or a straight man (between subjects) from a pair of faces in which the same sinusoidal noise pattern was added versus subtracted. For each participant, we then aggregated the visual noise patterns for all of the images selected as gay (straight). This overall average theoretically represents the participant's internal representation of the target category (Todorov, Dotsch, Wigboldus, & Said, 2011). We then asked independent samples of participants to rate the apparent affect expressed by the mean image averaged across all of the participants' mental representations in each condition.

Method

Participants

A total of 260 participants from the university subject pool and Mechanical Turk (MTurk) participated in the current study. Participants received either course credit or financial compensation for their participation. The study consisted of two stages (face construction and face rating). One hundred participants (all female) were assigned to the face construction task whereas all other participants ($N = 160$; 60 female, 100 male; 115 White, 20 Asian, 7 Hispanic, 9 Black, 9 Other Race; Age Range: 18–64 years) provided the ratings of the faces generated in the face construction task.[1]

Procedure

Face construction. We borrowed the stimulus-generation materials described in Dotsch et al. (2008). Hence, neutral male faces from the Karolinska Face Database (Lundqvist & Litton, 1998) were used to construct an average male morph that served as the base face. Random noise patterns were then superimposed onto this face to generate a bank of approximately 120,000 unique stimuli (60,000 images with a novel noise pattern added to the base face and 60,000 images with the same noise pattern subtracted from the base face).

Participants in each trial of the face construction task saw two pictures containing the base face and random noise: a pair of images consisting of the same noise pattern respectively added to and subtracted from the base face. Participants were randomly assigned to either select which of the two pictures better resembled a gay man ($n = 40$) or to select the picture that they thought most resembled a straight man ($n = 60$).[2] Participants made these categorizations for 770 trials at a self-paced rate, drawn pseudorandomly from the bank of 60,000 face pairs. We then effectively averaged the visual noise patterns from the stimuli that the participants had selected to generate images depicting their mental representations of a gay and straight man, according to experimental condition, and then averaged these across participants within the two groups to produce overall grand

[1] We did not record participants' races and ages in all studies reported in this article, and therefore provide this information only when available.

[2] The sample size is not equivalent due to miscommunication among research assistants regarding the assignment of participants to conditions. Given that classification images tend to be clear and reliable after as few as 100 trials (Lick, Carpinella, Preciado, Spunt, & Johnson, 2013); however, this difference in sample sizes should not bias the overall estimates once aggregated within and between the participants. That is, we should have had sufficient power in both conditions despite the imbalance.

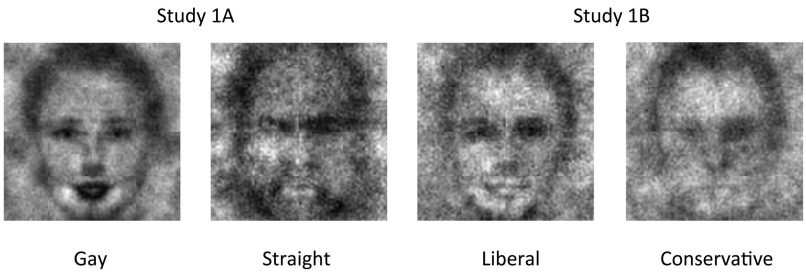

Figure 1. The classification images representing participants' prototypes of gay, straight, liberal, and conservative men rated for happiness and anger in Studies 1A and 1B.

mean gay and straight classification images representing the mentally represented prototypes for these groups (see Figure 1).

Face ratings. In the second stage, another 100 participants rated both the gay and straight classification images for affective expression. Because the aggregate classification images represented a group-level visualization beyond the individuals' idiosyncratic representations, we asked the participants to rate only the overall mean images for the two (gay and straight) groups. Specifically, we asked 50 participants to indicate how happy the person in the image appeared using a 7-point scale (1 = *not at all happy*, 7 = *very happy*) and 50 participants to rate how angry the person appeared (1 = *not at all angry*, 7 = *very angry*) for each of the two (i.e., gay and straight) mean group images.[3]

Manipulation check. We asked 60 participants to judge the gay and straight grand mean classification images on perceived masculinity ($n = 30$) and sexual orientation ($n = 30$) using 7-point scales (1 = *not at all masculine* [*gay*], 7 = *very masculine* [*gay*]) as a manipulation check. Indeed, participants judged the classification image representing the mean mental representation of a gay man as significantly more gay ($M = 3.40$, $SD = 2.09$) than the image that represented a straight man ($M = 1.47$, $SD = 0.82$): $t(29) = 5.21$, $p < .001$, $r = .70$. Similarly, participants rated the gay classification image ($M = 1.50$, $SD = 0.63$) as significantly less masculine than the straight classification image ($M = 6.53$, $SD = 0.73$): $t(29) = 27.58$, $p < .001$, $r = .98$.

Results and Discussion

Consistent with our predictions, participants rated the gay male classification image ($M = 4.50$, $SD = 1.27$) as significantly happier than the straight male classification image ($M = 1.40$, $SD = 0.57$): $t(49) = 17.77$, $p < .001$, $r = .93$. Complementarily, the straight classification image ($M = 5.62$, $SD = 1.19$) also appeared significantly angrier than the gay classification image: $M = 1.58$, $SD = 0.76$; $t(49) = 20.21$, $p < .001$, $r = .94$. Thus, people's internal perceptions of sexual orientation were associated with emotions such that when they visualized the faces of gay men, they tended to think of happier faces than when they visualized the faces of straight men; and when they visualized the faces of straight men, they tended to think of angrier faces than when they visualized the faces of gay men.

In addition, we were curious as to whether the affective nature of these representations is independent of masculinity. Previous work has shown that homosexuality is characterized by gender inversion but that this does not fully explain the relationship between perceived and actual sexual orientation (e.g., Freeman et al., 2010). Thus, we recruited an additional group of 121 participants (39 female, 82 male; 95 White, 7 Asian, 3 Hispanic, 9 Black, 7 Other Race; Age Range: 21–64 years) to rate both the gay and straight classification images on all three dimensions (i.e., happiness, anger, and masculinity; in random order) from 1 (*Not at all* X) to 7 (*Very* X) in a within-subjects design. We fit two random-intercept multilevel models with anger and happiness as dependent variables, using an unstructured variance-covariance matrix with degrees of freedom estimated using the between-within method. Both masculinity ratings and sexual orientation ratings (coded 1 = *Gay*, −1 = *Straight* for the respective classification images) were entered as independent variables. Consistent with the effects reported above, the sexual orientation of the mental representations predicted ratings of happiness [$b = 1.05$, $SE = .26$, $t(119) = 4.04$, $p < .001$] and anger [$b = -1.15$, $SE = .20$, $t(119) = 5.70$, $p < .001$] over and above the ratings of masculinity made by the same participants [happiness: $b = -0.14$, $SE = .10$, $t(119) = 1.41$, $p = .16$; anger: $b = 0.43$, $SE = .08$, $t(119) = 5.43$, $p < .001$].

Overall, the evidence from Study 1A therefore suggests that people's mental representations characterize gay men as happy and straight men as angry. Moreover, these prototypes of sexual orientation might contain emotional information that is not confounded with differences between gay and straight men in terms of masculinity.

Study 1B

In Study 1A, we demonstrated that the mental representations of straight men were perceived as significantly less happy and more angry than the mental representations of gay men. In Study 1B, we examined whether similar effects might differentiate the mental representations of an other ambiguous group distinction: political affiliation. Specifically, we hypothesized that mental representations of political groups (i.e., liberals and conservatives) might also contain emotional information, predicting that liberals would be imagined as expressing more happiness and less anger than conservatives.

[3] A separate sample of participants rated the same stimuli for use in an unrelated study not included in this report. If Bonferroni correction is applied to these studies to account for the repeated use of the same stimuli, all comparisons reported (including those reported here in Study 1A) remain statistically significant ($\alpha = .016$; $\alpha = .01$ when accounting for the additional manipulation-check judgments).

Method

Participants

We recruited 191 university students and MTurk Workers to participate in a study examining person perception for either course credit or monetary compensation. As in Study 1A, we assigned the participants to either a face construction ($n = 60$; 33 female, 27 male; 15 White, 34 Asian, 4 Black, 7 Other Race; Age Range: 17–52 years) or face rating ($n = 131$; 46 female, 85 male) task.

Procedure

Face construction. As in Study 1A, we used reverse correlation to extract participants' mental representations of liberals and conservatives. In the face construction stage, participants viewed pairs of faces and selected the one that appeared more liberal ($n = 30$) or more conservative ($n = 30$) following the same methods as described for the construction of the gay and straight classification images in Study 1A (see Figure 1). We then averaged the images to generate aggregate mental representations of liberals and conservatives.

Face ratings. Independent groups of participants rated the aggregate mental representations of liberals and conservatives on anger ($n = 50$) and happiness ($n = 50$) using 7-point scales (1 = *Not at all angry* [*happy*]; 7 = *Very angry* [*happy*]).

Manipulation check. As a manipulation check, another group of participants ($n = 31$) rated the classification images for their apparent political ideology using a 7-point scale (1 = *Very Conservative*, 7 = *Very Liberal*). This confirmed that the image corresponding to the participants' mental representation of a liberal person ($M = 4.58$, $SD = 1.18$) appeared significantly more liberal than the image corresponding to the participants' mental representation of a conservative person ($M = 2.81$, $SD = 1.22$): $t(30) = 5.43$, $p < .001$, $r = .70$.

Results and Discussion

Consistent with our predictions, participants perceived the liberal mental representation ($M = 5.06$, $SD = 1.06$) as significantly happier than the conservative mental representation ($M = 1.88$, $SD = 0.77$): $t(49) = 16.65$, $p < .001$, $r = .92$. In complement, participants perceived the mental representation of the liberal individual ($M = 1.68$, $SD = .79$) as significantly less angry than the mental representation of the conservative individual ($M = 5.00$, $SD = 1.26$): $t(49) = 17.63$, $p < .001$, $r = .93$. Like sexual orientation, mental representations of political affiliation therefore also seem to be imbued with emotional information.

Study 2A

In Study 1, we found that participants incorporated happiness into their mental representations of gay men and liberals, and anger into their mental representations of straight men and conservatives. An open question, however, is whether these cognitive links between emotion and group membership are simply in the mind of the beholder, or whether they might manifest in expressive behavior as well. In other words, do individuals use emotional expressions to communicate their membership in perceptually ambiguous groups? To explore this, we asked men to pose a gay (homosexual), straight (heterosexual), or neutral (control) facial expression and assessed their affect in each depiction. We expected that the participants would display a greater degree of happy affect to communicate a gay versus straight group membership.

Method

Participants

A total of 181 individuals (102 female, 79 male; 133 White, 21 Asian, 12 Hispanic, 7 Black, 8 Other Race; Age Range: 18–72 years) participated in exchange for monetary compensation.

Stimuli

We photographed 48 White men (24 self-identified gay, 24 self-identified straight) in the lab using a high-definition camera under conditions standardized for background, lighting, and distance from the camera.[4] We recruited the targets using snowball procedures that did not reveal that the study involved sexual orientation, which was first mentioned in demographic questionnaires completed after we took the photos. A hypothesis-blind research assistant asked the men to enact three expressions: gay (homosexual), straight (heterosexual), and neutral. The participants were not instructed about how to pose the expressions and, if prodded for additional instruction, the experimenter responded that the targets should self-define their best representation of what they thought a gay (straight) person looked like; thus, the participants' expressions were spontaneous and unstructured. We converted the images to grayscale, cropped them to the limits of the head, and standardized them to the same size. None of the men had any facial adornments, such as tattoos, beards, or jewelry (see Figure 2). We restricted the selection of the participants to White men to avoid any confounding effects of race and sex (e.g., Hugenberg & Bodenhausen, 2003; Johnson et al., 2011).

Procedure

To reduce the idiosyncratic effects of any one rater, we used multiple independent groups of participants in the current study (see Antonakis, Fenley, & Liechti, 2011, for similar procedures). This method assumes that different raters will rate the faces similarly and reliably, suggesting that perception might be the same irrespective of general rater context, which in turn would also suggest that the perceivers tend to rely on a similar overall prototype when producing relevant judgments.

We randomly assigned 88 participants to rate the men's faces posing either the neutral ($n = 30$, interrater reliability Cronbach's $\alpha = .97$), gay ($n = 28$, interrater reliability Cronbach's $\alpha = .97$), or straight ($n = 30$, interrater reliability Cronbach's $\alpha = .98$) expressions for how happy each target appeared using a 7-point scale (1 = *not at all happy*, 7 = *very happy*) in a between-subjects design. Additionally, another 93 raters (57 female; Age Range:

[4] Although we did not expect that gay and straight targets would necessarily enact these expressions any differently, we recruited participants from both groups to control for any such potential variation.

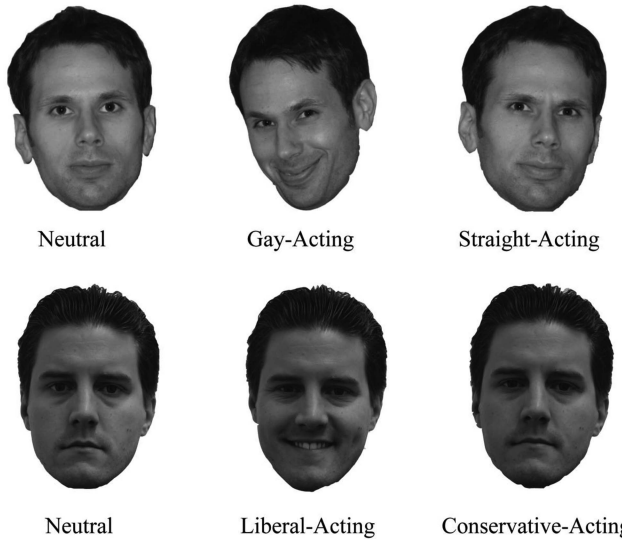

Figure 2. Examples of stimuli used in Studies 2A and 2B. The targets were asked to enact self-defined neutral, gay, and straight expressions in Study 2A (top row) and neutral, liberal, and conservative expressions in Study 2B (bottom row).

19–65 years) rated the men's faces posing the neutral ($n = 31$, interrater reliability Cronbach's $\alpha = .96$), gay ($n = 29$, interrater reliability Cronbach's $\alpha = .95$), or straight ($n = 33$, interrater reliability Cronbach's $\alpha = .97$) expressions for how angry they appeared (1 = *not at all angry*, 7 = *very angry*). Participants rated all of the faces in random order at a self-paced rate for a total of 48 trials.

Results and Discussion

We aggregated the ratings of happiness and anger within each group of raters for each target; thus, the targets served as the unit of analysis, allowing us to test whether individuals perceived the targets differently when they enacted different expressions. Because the ratings of anger and happiness were highly negatively correlated ($rs > -.81$, $p < .001$), we examined these two dependent variables separately. Aggregating the happiness and anger ratings for use as a single variable (with appropriate reverse-scoring) returned the same results.

Perceptions of Happiness

Prior to analysis, we transformed the average happiness rating to achieve normality using the square root transformation ($W = .99$, $p = .14$).[5] We then entered these scores into a mixed-effects ANOVA with expression (gay, straight, and neutral) as a within-subjects factor and targets' actual sexual orientation as a between-subjects factor. The omnibus test revealed that perceived happiness differed as a function of target expression [$F(2, 92) = 21.31$, $p < .001$, $\eta^2 = .23$]; no other effects reached significance, $Fs \leq 2.03$, $ps \geq .14$, $\eta^2s \leq .03$. Simple effects comparisons showed that targets appeared significantly happier when enacting a gay expression than when enacting both straight [$t(47) = 5.45$, $p < .001$, $r = .62$] and neutral [$t(47) = 5.50$, $p < .001$, $r = .63$] expressions, which did not significantly differ: $t(47) = 0.09$, $p = .93$, $r = .01$ (Figure 3A).

Perceptions of Anger

We performed parallel analyses for the perceptions of anger. Thus, we aggregated the ratings of anger and normalized these scores using the natural log transformation ($W = .98$, $p = .10$) before entering them into a mixed-effects ANOVA with target sexual orientation as a between-subjects factor and expression as a within-subjects factor.[6] Similar to the results for happiness, the omnibus test revealed that perceived anger differed as a function of target expression [$F(2, 92) = 28.87$, $p < .001$, $\eta^2 = .28$] but that no other effects were significant, $Fs \leq 1.86$, $ps \geq .18$, $\eta^2s \leq .02$. Simple effects comparisons showed that targets looked significantly angrier when posing as straight than when posing as either neutral [$t(47) = 3.60$, $p < .001$, $r = .47$] or gay [$t(47) = 7.58$, $p < .001$, $r = .74$]. Furthermore, men appeared significantly angrier when enacting a neutral expression than when enacting a gay expression: $t(47) = 3.91$, $p < .001$, $r = .50$ (Figure 3B).

Thus, participants' enactments of sexual orientation reflected the emotions that were associated with the sexual orientation classification images in Study 1A. Specifically, perceivers rated gay expressions as significantly happier and less angry than straight expressions. Together, the results of Studies 1A and 2A suggest not only that people conceive of sexual orientation partly through emotions, but also that they might use this emotional information to communicate this visually obscure group membership to others.

Study 2B

In Studies 1A and 1B, we demonstrated that emotions are an integral part of the mental representations of gay and straight men, and of liberals and conservatives. In Study 2A, we further demonstrated that people tend to express emotions when asked to pose gay and straight expressions such that participants expressed happiness to a greater degree when asked to pose a gay face than when asked to pose a straight face; we found complementary results for anger. In the current study, we replicated these effects for sexual orientation with political affiliation. Specifically, we photographed participants posing liberal and conservative expressions and asked independent groups of raters to judge the perceived intensity of happiness and anger in these displays. Similar to the results for sexual orientation in Study 2A, we expected that participants would express more happiness and less anger when posing liberal and conservative expressions, respectively.

[5] Square-root transformations were applied to meet the assumptions of the statistical tests used; however, violating these assumptions by not normalizing the data and running the analyses with raw scores produced similar results.

[6] As with perceptions of happiness, violating the statistical assumptions by not normalizing the data produced comparable results.

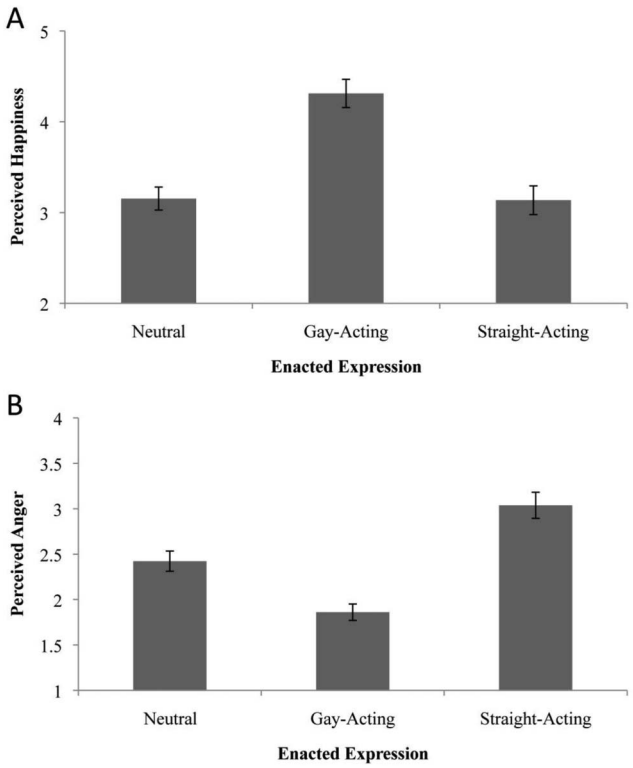

Figure 3. Untransformed means and standard errors for ratings of targets' happiness (Panel A) and anger (Panel B) as a function of the expression enacted in Study 2A.

Method

Participants

We recruited 183 MTurk Workers (103 female, 80 male) for a study examining person perception in exchange for monetary compensation.

Stimuli

We recruited 42 participants (19 female, 23 male; 11 White, 22 Asian, 1 Black, 8 Other race) from our university's participant pool to serve as targets. Hypothesis-blind research assistants photographed the targets enacting three expressions: conservative, liberal, and neutral. The research assistants provided the participants with similarly minimal instructions, as in Study 2A. We standardized the images by removing them from the original photo background, cropping them to the limits of the head, converting them to grayscale, and resizing them to the same height. Unlike Study 2A in which all of the targets were White men, experimenter error resulted in a more diverse sample here. We addressed the potentially confounding effects of target race and sex by modeling them in our analyses below.

Procedure

Similar to Study 2A, we randomly assigned separate groups of participants to rate the faces on happiness (liberal: $n = 29$, interrater reliability Cronbach's $\alpha = .98$; conservative: $n = 30$, interrater reliability Cronbach's $\alpha = .95$; neutral: $n = 31$, interrater reliability Cronbach's $\alpha = .95$) and anger (liberal: $n = 29$, interrater reliability Cronbach's $\alpha = .99$; conservative: $n = 31$, interrater reliability Cronbach's $\alpha = .97$; neutral: $n = 32$; interrater reliability Cronbach's $\alpha = .94$) in a between-subjects design following procedures nearly identical to those described above.

Results and Discussion

We again aggregated the ratings across the participants for each target and tested them in a repeated-measures design to control for the variance due to targets. Because the ratings of happiness and anger were highly negatively correlated ($rs > -.88$, $p < .001$), we analyzed the perceptions of happiness and anger separately (see Figure 4 for descriptive statistics).

Perceptions of Happiness

We subjected the aggregate happiness scores to a mixed effects ANOVA with enacted political affiliation (liberal, conservative, neutral) as a within-subjects factor and target race and sex as between subjects factors. The omnibus test revealed that perceptions of happiness varied as a function of expression: $F(2, 82) = 5.39$, $p = .006$, $\eta^2 = .06$. Specifically, participants perceived targets as significantly happier when enacting a liberal expression than when enacting either the conservative [$t(41) = 2.01$, $p = .05$, $r = .30$] or neutral [$t(41) = 3.07$, $p = .004$, $r = .43$] expressions,

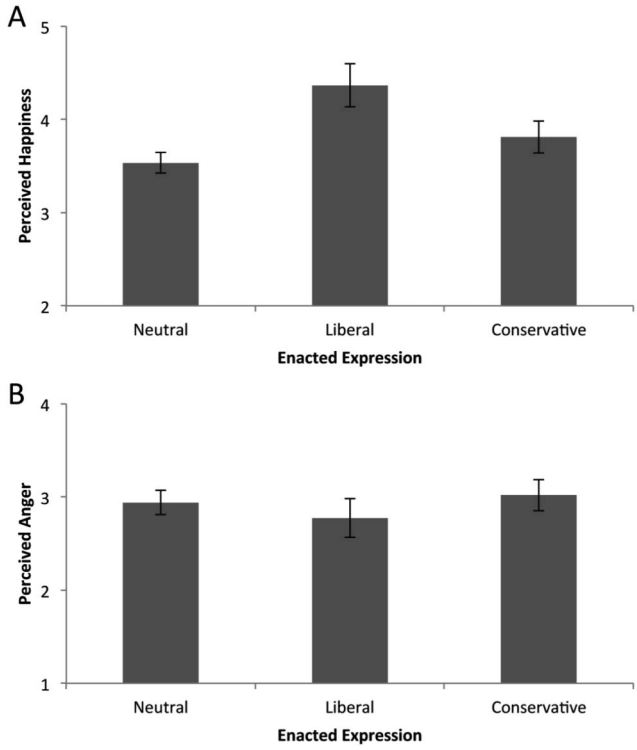

Figure 4. Untransformed means and standard errors for ratings of targets' happiness (Panel A) and anger (Panel B) as a function of the expression enacted in Study 2B.

which did not significantly differ: $t(41) = 1.29$, $p = .20$, $r = .20$. Additionally, we found a main effect of target sex [$F(1, 38) = 6.89$, $p = .01$, $\eta^2 = .09$], such that male targets ($M = 3.61$, $SD = 1.14$) were perceived as significantly less happy than female targets ($M = 4.26$, $SD = 1.17$). No other effects were statistically significant: all Fs ≤ 0.90, ps $\geq .41$, η^2s $\leq .01$.

Perceptions of Anger

We performed parallel analyses for perceptions of anger and found that target sex was the only significant predictor: $F(1, 38) = 6.33$, $p = .02$, $\eta^2 = .08$. Specifically, men ($M = 3.19$, $SD = 1.11$) were perceived to be angrier than women ($M = .2.57$, $SD = 1.17$); all other effects: all Fs ≤ 1.28, ps $\geq .28$, η^2s $\leq .02$.

Similar to the results of the above studies, other people may not only conceive of political affiliation via emotion, but may also use emotion to communicate this perceptually ambiguous group membership to others. Specifically, participants displayed happiness when asked to enact self-defined liberal versus conservative expressions, though complementary effects did not emerge for anger. These findings suggest that negatively valenced expressions may not play an important role in communicating distinctive information about political affiliation as they do for sexual orientation. Moreover, although sex and race did not affect these perceptions, future researchers may wish to specifically design studies to explore intersections with these different social categories.

Study 3A

In Study 2A, we found that individuals' spontaneous impressions of gay and straight men led them to enact facial expressions that others perceived as respectively happier and angrier than the same individuals' neutral expressions. In Study 3A, we tested the complementary effect: would expressions of happiness lead perceivers to construe a target as gay and would expressions of anger lead perceivers to think a target is straight? In other words, if these emotions are indeed interconnected with the prototypes of gay and straight men, then we would expect the participants not only to enact emotions when asked to pose gay and straight expressions, but also to utilize these affective cues to decode the group memberships of others. Thus, we morphed happy and angry emotional expressions with the neutral faces from Study 2A and asked participants to judge their sexual orientation.

Method

Participants

We recruited 132 participants (75 female, 57 male; 99 White, 5 Asian, 6 Hispanic, 7 Black, 15 Other race; Age Range: 18–65 years) from MTurk to participate in exchange for monetary compensation.

Stimuli

We morphed a random selection of 40 (20 gay, 20 straight) of the neutral expression photographs from Study 2A with subtle emotional expressions of anger and happiness using the muscle-level morph templates within FaceFilter3 (*Reallusion Inc.*, 2013) to produce happy and angry versions of the same targets (both set equidistantly at a morph level of 30% toward each emotion). This allowed us to manipulate the target's emotional expression to measure its effect on perceptions of sexual orientation across three conditions: angry morphs, happy morphs, and unmorphed neutral control faces (see Figure 5).

Procedure

We randomly assigned participants to rate the happy morph ($n = 40$), angry morph ($n = 45$), or neutral ($n = 47$) faces along an 8-point scale (1 = *very gay*, 8 = *very straight*) in random order at a self-paced rate (all interrater reliability Cronbach's αs $\geq .81$).

Results and Discussion

We again conducted a target-level analysis by averaging across the participants' ratings of each face. We entered the average scores for each target into a 3 (affective-expression: happy, angry, neutral) × 2 (actual target sexual orientation: gay, straight) mixed-model ANOVA with repeated measures on the first factor. The omnibus test revealed a significant main effect of expression, suggesting that perceived sexual orientation varied as a function of the morphed affect [$F(2, 76) = 27.57$, $p < .001$, $\eta^2 = .18$]; no other effects reached statistical significance: Fs ≤ 1.15, ps $\geq .32$, η^2s $\leq .01$. Simple effects comparisons showed that targets were rated as significantly more gay when morphed with a happy face than when morphed with an angry face [$t(39) = 5.82$, $p < .001$, $r = .68$] or compared to the neutral control: $t(39) = 8.16$, $p < .001$, $r = .79$; see Figure 6. Perceived sexual orientation did not differ between the morphed angry and neutral faces, however: $t(39) = 0.37$, $p = .71$, $r = .06$. Thus, these results suggest that perceivers not only hold emotional mental representations of sexual orientation (Study 1A) and utilize them to communicate sexual orientation (Study 2A), but also that they use this information to infer others' sexual orientation.

Study 3B

In Study 3A, we examined perceptions of sexual orientation among faces manipulated to vary in emotional expression. We found that happy faces were perceived as gay whereas angry faces were perceived as straight. To parallel these effects, we aimed to examine how variability in emotional expression affects perceptions of political affiliation in Study 3B. Given that participants in

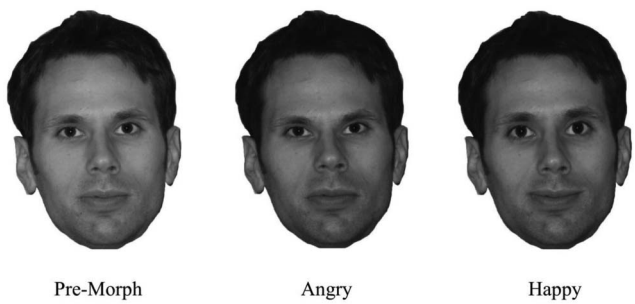

Figure 5. Example stimuli in which angry and happy expressions were morphed with targets' premorph neutral expressions in Studies 3A and 3B.

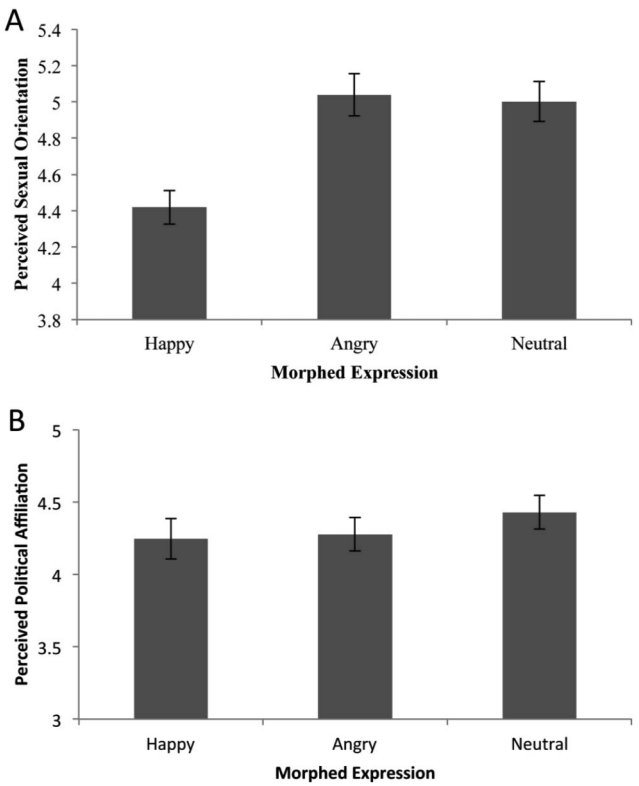

Figure 6. Means and standard errors for ratings of targets' perceived sexual orientation (Panel A) and political affiliation (Panel B) across morphing conditions in Studies 3A and 3B.

Study 2B expressed greater happiness when asked to pose a liberal versus conservative or neutral expression, we expected that faces morphed with happiness would be seen as more liberal than conservative here.

Method

Participants

We recruited 90 participants (49 female, 41 male; 61 White, 6 Asian, 5 Hispanic, 11 Black, 7 Other Race; Age Range: 19–73 years) from MTurk to participate in exchange for monetary compensation.

Stimuli

We used the same 40 pictures of White men structurally morphed to appear either happy or angry as in Study 3A.

Procedure

We randomly assigned participants to rate the happy morph ($n = 31$), angry morph ($n = 29$), or neutral ($n = 30$) faces along an 8-point scale (1 = *Very Liberal*, 8 = *Very Conservative*) in random order at a self-paced rate (all interrater reliability Cronbach's $\alpha s \geq .85$).

Results and Discussion

We subjected participants' aggregated ratings of each face to a one-way within-subjects ANOVA. Unlike the results for judgments of sexual orientation in Study 3A, however (and inconsistent with our hypothesis), the omnibus test did not show a significant effect: $F(2, 78) = 1.51$, $p = .23$, $\eta^2 = .01$ (see Figure 6). Thus, although people's mental representations of liberals and conservatives may be imbued with emotion (Study 1B) such that individuals also use these cues to communicate group membership (Study 2B), we did not find evidence that perceivers consciously use this information to infer political affiliation, as they seem to with sexual orientation (Study 3A). One explanation for this difference could be that, although people conceive of liberals and conservatives through the lens of emotion, this might apply more strongly when people think about political affiliation categorically.

A key distinction between political affiliation and sexual orientation is that the latter is perceived dichotomously. For instance, Ding and Rule (2012) found that perceivers conceptualize continuity in sexual orientation as a binary heterosexual versus nonheterosexual distinction; thus, they found that individuals intermediate between the categories of gay and straight (i.e., bisexuals) were misclassified as gay. Political affiliation may be more flexible, however. For example, political moderates are perhaps more common and more visible in society than are bisexuals. In recent years, in particular, political divisions in the US (where these data were collected) have grown less dichotomous, with splinter groups such as the Tea Party occupying an increasing share of public attention. The more graded nature of political affiliation might therefore undermine discrete associations with particular emotional expressions when the group distinction is treated continuously. In Study 1B, participants engaged in a two forced-choice task and participants enacted discrete nonverbal displays of liberals and conservatives comparatively in Study 2B. It is possible, then, that the continuous rating of political affiliation in the present study may have diluted differences between the groups. To address this, we therefore dichotomized political affiliation in Study 4B by specifying two political affiliations at opposing ends of the liberal-conservative spectrum: Democrats and Republicans.

Study 4A

The results of Study 1A showed that individuals' mental representations of gay and straight men differ in affect, the results of Study 2A showed that individuals enact expressions of happiness in their imitations of gay men and anger in their imitations of straight men, and the results of Study 3A showed that faces morphed to appear happy were more likely to be seen as gay whereas faces morphed with anger were more likely to be perceived as straight. Thus, people seem to be aware of the stereotypes between emotion and sexual orientation and use them to signal and decode group membership. Thus far, these demonstrations have been restricted to targets captured under controlled settings in the lab. Here, we aimed to test whether sexual orientation may be similarly communicated through emotion in the real world.

We undertook this question by employing a sample of unmanipulated photos posted by self-identified gay and straight men for use in online dating websites. Consistent with our suggestion that judgments of sexual orientation may be partly based on affective information, we specified a path model in which affect and indices

of masculinity served as instruments (i.e., composed the prototype) for perceptions of sexual orientation. We further tested whether utilizing this prototype information would help to explain the accurate perception of sexual orientation reported in previous work (e.g., Ambady et al., 1999; Rule & Ambady, 2008). Thus, if individuals hold and utilize emotion-based prototypes of sexual orientation, and are not merely basing their judgments on extensions of stereotypes between emotions and gender, we would expect to see that affect is a reliable component of perceptions of sexual orientation over and above perceptions of masculinity.

Method

Participants

We recruited 120 MTurk Workers (66 female, 54 male; 92 White, 6 Asian, 5 Hispanic, 10 Black, 7 Other Race; Age Range: 18–68 years) for monetary compensation.

Stimuli

We borrowed photos of faces downloaded from online dating advertisements posted in major US cities from previous work examining the accuracy of perceptions of sexual orientation (Rule & Ambady, 2008). All of the targets were White men seeking either a male ($n = 45$) or female ($n = 45$) dating partner who were free of adornments (e.g., glasses, piercings) and facial hair. The images had been extracted from their original backgrounds, cropped to the limits of the face, standardized in size, and converted to grayscale. We never disclosed the targets' sexual orientation to the participants.

Procedure

Independent groups of participants rated the faces for one of happiness ($n = 31$; 1 = *not at all happy,* 7 = *very happy*), anger ($n = 30$; 1 = *not at all angry,* 7 = *very angry*), or sexual orientation ($n = 29$; 1 = *definitely gay*, 7 = *definitely straight*) using 7-point scales (all interrater reliability Cronbach's $\alpha s \geq .87$).

Furthermore, because previous studies have identified gender atypicality (Freeman et al., 2010) and facial symmetry (Hughes & Bremme, 2011) as valid cues to sexual orientation, we collected measures of these so that we could examine their relative contribution to perceptions of sexual orientation simultaneously. To accomplish this, we asked two research assistants [interrater reliability $r(88) = .52$, $p < .001$] who were naïve to the study and its hypotheses to code each face for facial symmetry following the procedures described by Hughes and Bremme (2011). In addition, we assessed an objective physical index of facial masculinity (each target's fWHR) by asking five research assistants (interrater reliability Cronbach's $\alpha = .90$) who were blind to the study and its hypotheses to measure the width and height of the target faces following the procedures used by Carré and McCormick (2008). Finally, we assessed subjective perceptions of masculinity by assigning 30 participants (16 female, 14 male; Age Range: 18–68 years) to make inferences of masculinity from the faces along a 7-point scale (1 = *not at all masculine*, 7 = *very masculine*) and aggregated the scores for each face across participants (interrater reliability Cronbach's $\alpha = .91$).

Results

We again aggregated the scores across the participants for each target and performed a target-level analysis. Happiness and anger correlated strongly [$r(88) = -.90$, $p < .001$], suggesting that participants likely relied on general valence when judging affect; we therefore modeled positive affect (happiness ratings) and negative affect (anger ratings) separately.[7] In addition, we reverse-coded the degree to which the participants perceived any given face as straight such that higher numbers represented how gay the participants perceived the face to be.

We tested our hypothesis that perceptions of affect and masculinity contribute to sexual orientation prototypes, thereby facilitating accuracy. Thus, we specified a path model in which masculinity, affect, facial symmetry, and fWHR simultaneously generated prototypical perceptions of sexual orientation, which in turn predicted the accuracy of these perceptions (see Table 1 for zero-order correlations between the variables). Because one of the endogenous variables (i.e., actual sexual orientation) was binary, we estimated the model using a weighted least squares estimator and computed robust standard errors. We performed all of the analyses using the lavaan package designed for R (Rosseel, 2012).

The initial model fit was not satisfactory: Swain-corrected $\chi^2(4) = 10.07$, $p = .034$, CFI = .90, RMSEA = .13, 90% CI [.03, .24].[8] Upon examination of the estimates, however, we found general support for our predictions: both subjective masculinity ($b = -0.50$, $SE = 0.10$, $Z = 4.97$, $p < .001$) and perceived happiness ($b = 0.15$, $SE = 0.05$, $Z = 3.28$, $p = .001$) independently predicted perceived sexual orientation. In turn, perceived sexual orientation significantly predicted actual sexual orientation: $b = 1.00$, $SE = 0.14$, $Z = 7.06$, $p < .001$. Neither of the facial metrics (symmetry [$b = 0.41$, $SE = 0.43$, $Z = 0.95$, $p = .34$] or fWHR [$b = 0.08$, $SE = 0.47$, $Z = 0.17$, $p = .86$]), predicted perceived sexual orientation. To improve the model fit, we therefore constrained the paths between both of these facial metrics and perceived sexual orientation to zero. This resulted in a satisfactory model fit: Swain-corrected $\chi^2(6) = 8.89$, $p = .18$, CFI = .95, RMSEA = .08, 90% CI [.00, .17]. Perceptions of masculinity ($b = -0.50$, $SE = 0.10$, $Z = 5.01$, $p < .001$) and happiness ($b = 0.15$, $SE = 0.05$, $Z = 3.28$, $p < .001$) still independently predicted perceived sexual orientation, which in turn predicted actual sexual orientation to achieve accurate perception: $b = 0.98$, $SE = 0.14$, $Z = 6.88$, $p < .001$ (see Figure 7).

Examining the same trimmed model with perceived anger as an exogenous variable in place of happiness produced comparable results. Specifically, masculinity ($b = -0.49$, $SE = 0.11$, $Z = 4.67$, $p < .001$) and perceived anger ($b = -0.15$, $SE = 0.07$, $Z = 2.09$, $p = .037$) independently predicted perceived sexual orientation, which predicted actual sexual orientation: $b = 0.96$, $SE = 0.14$, $Z = 6.88$, $p < .001$. The overall model fit was good: Swain-corrected $\chi^2(6) = 8.67$, $p = .18$, CFI = .95, RMSEA = .07, 90% CI [.00, .17].

[7] Again, aggregating the happiness and anger ratings for use as a single variable returned the same results as in Study 2.

[8] Because the number of observations was relatively small, we applied Swain's correction to the chi-square statistic (see Herzog & Boomsma, 2009).

Table 1
Zero-Order Correlations Between the Predictor Variables in Study 4A

Variable	1	2	3	4	5	6	7
1. Actual SO	—	0.47***	0.26**	−0.25*	−.15	−.09	.20†
2. Perceived SO		—	0.35***	−0.30***	−0.59***	.13	−.02
3. Perceived happiness			—	−0.90***	−.16	.15	−.01
4. Perceived anger				—	0.26**	.00	−.07
5. Perceived masculinity					—	−.07	.06
6. Objective masculinity (fWHR)						—	−.16
7. Symmetry							—

Note. SO = sexual orientation; fWHR = facial width-to-height ratio.
† $p < .10$. * $p < .05$. ** $p < .01$. *** $p \leq .001$.

Discussion

The results of Study 4A suggest that affect and masculinity together contribute to perceptions of sexual orientation. Not only were gay men conceived as displaying more positive affect, as demonstrated in Studies 1–3, but real world photos showed that affect was one of the cues from which people inferred sexual orientation, which in turn correlated with actual sexual orientation. Moreover, it is unlikely that this effect is an artifact of the domain from which the photos were selected, as past research has shown that individuals strive to appear counterstereotypical in their personal advertisements (Bailey, Kim, Hills, & Linsenmeier, 1997; Rule & Ambady, 2008) such that gay targets accentuate their masculinity and straight targets accentuate their femininity.

Study 4A also compared the relative contribution of affective expression to other cues known to inform judgments of sexual orientation: facial symmetry and masculinity. These analyses showed that subjective inferences of masculinity and perceptions of positive affect significantly and independently predicted individuals' perceptions of targets' sexual orientation, consistent with Study 1A, which complementarily demonstrated that sexual orientation prototypes hold affective information that is independent of masculinity. Thus, masculinity and affect distinctly contribute to the formation of sexual orientation prototypes and affect is not merely a reflection of stereotypes associated with the perceptually obvious dimension of gender (measured here via masculinity). Furthermore, neither facial symmetry nor objective measures of facial masculinity (operationalized as measurements of fWHR) appeared to predict perceived sexual orientation when included among the other variables (cf. Hughes & Bremme, 2011); future research might help to explain differences between the present and past findings (e.g., target sample composition, design differences).

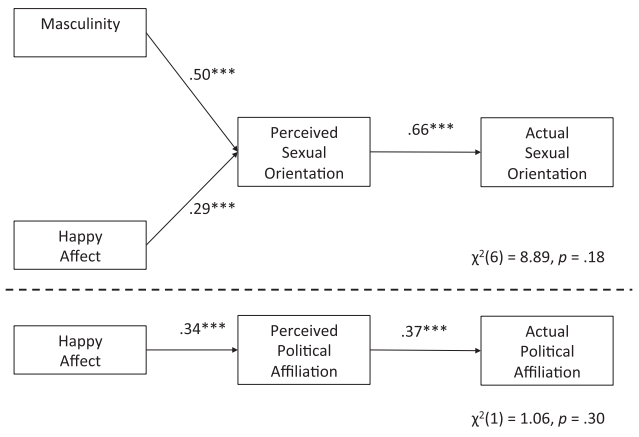

Figure 7. Graphical representations of the models examining the variables involved in the accurate perception of sexual orientation (upper model) and political affiliation (lower model).

Study 4B

Although the results of Studies 1B and 2B suggested that people partly conceptualize political affiliation in terms of affect, people did not seem to use affect to infer political affiliation in Study 3B. We speculated that this may be due to differences in the treatment of political affiliation as a discrete bivariate construct when serving as an independent variable in Studies 1B and 2B versus a continuous dimension when serving as a dependent variable in Study 3B—a distinction that did not emerge in our studies on sexual orientation because perceivers routinely think of it dichotomously (Ding & Rule, 2012). To address this discontinuity, we therefore examined political affiliation categorically as Democrats (more politically liberal) and Republicans (more politically conservative) in Study 4B. Like Study 4A, we used images obtained from a more naturalistic setting than photos taken in the lab—professional images of the political candidates from the 2004 and 2006 US Senate elections. We predicted that perceivers would incorporate affective cues into their prototypes of Democrats and Republicans, influencing their judgments of political affiliation so as to impact their accuracy.

Method

Participants

We recruited 60 MTurk Workers (30 female, 30 male; 46 White, 7 Asian, 2 Hispanic, 1 Black, 4 Other Race; Age Range: 18–62 years) in exchange for monetary compensation.

Stimuli

We borrowed photos of the faces of the 59 Democrat ($n = 15$ female) and 59 Republican ($n = 5$ female) White candidates from the 2004 and 2006 Senate elections from previous research (Rule & Ambady, 2010) in which they were originally retrieved from the website of the Cable News Network (CNN; http://www.cnn.com/

ELECTION/) or the candidates' campaign websites and cropped to the limits of the face, standardized in size, and converted to grayscale. The faces of one Republican and one Democrat target did not display during the experiment due to a programming error.

Procedure

Participants either categorized the faces as Democrats or Republicans at a self-paced rate ($n = 33$) or rated the faces for how happy they appeared using a 7-point scale ($n = 27$; 1 = *not at all happy*, 7 = *very happy*; interrater reliability Cronbach's $\alpha = .98$). Because we did not observe associations between anger and political affiliation in Studies 2B or 3B, we did not collect ratings of anger here.

Once the participants completed the main portion of the study, we probed them regarding any individuals that they might have recognized in the pictures they saw. Eighteen participants who categorized political affiliation and 11 participants who rated affect reported recognizing at least one target. We modeled the data from the entire sample, as well as from only the participants who made no positive recognitions. Both analyses yielded similar results; we therefore only report the results for the full sample below.

Results

To measure the relationship between perceptions of affect and categorizations of targets' political affiliation, we aggregated participants' responses to each face such that targets served as the unit of analysis. Thus, we averaged participants' ratings of happiness for each target and calculated the proportion of participants categorizing each target as a Democrat to estimate the perceived consensus of targets' political affiliations. We then examined a model similar to that described in Study 4A using path analysis with a weighted least-squares estimator, as actual political affiliation was a binary variable. Specifically, we expected that positive affect would predict perceptions of political affiliation, which would predict actual political affiliation to produce accurate judgments.

The hypothesized model fit the data well: Swain-corrected $\chi^2(1) = 1.06$, $p = .30$, CFI $> .99$, RMSEA $= .03$, 90% CI [.00, .25]. Indeed, perceived happiness predicted perceptions of political party membership: $b = 0.04$, $SE = 0.01$, $Z = 3.57$, $p < .001$. In turn, perceptions of political affiliation predicted actual political affiliation, replicating previous work (e.g., Rule & Ambady, 2010): $b = 2.20$, $SE = 0.59$, $Z = 3.75$, $p < .001$ (see Figure 7).

Discussion

As in Studies 1B and 2B, the results of Study 4B again suggest that affective expression is intertwined with the perception and expression of political affiliation. Perhaps because people may believe Democrats to express more positive affect (Rule & Ambady, 2010), they categorized happy targets as Democrats, which in turn led to accurate perceptions of political affiliation. Importantly, the combined results of Studies 3B and 4B suggest that affect is embedded in categorical but not continuous representations of political affiliation. Specifically, affective cues predicted political affiliation when presented dichotomously in Study 4B (i.e., as Democrat vs. Republican) but not when presented continuously (i.e., as a scale ranging from liberal to conservative) in Study 3B; future work may wish to address this more comprehensively. Perhaps more important, the present data also show that affect serves as a cue to political affiliation among the faces of real-world politicians in photos selected to represent professional politicians, presumably vetted by their staff. This suggests the possibility of a deep, and potentially explicit, relationship between emotion and the expression of political affiliation.

General Discussion

Across eight studies examining two perceptually ambiguous groups (sexual orientation and political affiliation), we found evidence for an intersection between affect and the construal of individuals into particular social categories. Importantly, this investigation shows not only that people seem to know that sexual orientation and political affiliation are associated with specific emotions, but that they may also employ affective expression to communicate these group memberships.

Specifically, our data showed that people mentally associated happiness with gay men and anger with straight men, as demonstrated in Study 1A. Participants spontaneously enacted happy expressions when asked to impersonate a gay man and enacted angry expressions when asked to impersonate a straight man (Study 2A). Furthermore, in Study 3A, faces morphed with happiness were perceived as significantly more gay (homosexual) whereas faces morphed with anger were perceived as more straight (heterosexual). Finally, we found that affect cued perceptions of sexual orientation among targets taken from an ecologically valid set of photos, subsequently predicting perceivers' accuracy in judging sexual orientation (Study 4A). Importantly, this effect was present even when targets' facial masculinity was taken into account (see Freeman et al., 2010), suggesting that affect was a marker of ambiguous group membership beyond the stereotypes and overgeneralizations associated with obvious related groups (Bijlstra et al., 2010; Johnson et al., 2011).

The results for political affiliation were more nuanced. Consistent with the results of Study 1A that examined sexual orientation, we demonstrated that people may imagine liberals as happy and conservatives as angry (Study 1B). Next, we found that people enacted a happy expression when asked to pose as liberal but did not enact an angry expression when trying to communicate that they are politically conservative (Study 2B). Interestingly, and in contrast to the results reported for sexual orientation (Study 3A), we found that participants did not perceive happy morphs to be any more liberal than angry morphs (Study 3B). Last, in Study 4B, we showed that perceivers incorporated positive affective expressions into their judgments of targets as Democrats and Republicans, and that these cues appeared to be diagnostic of the targets' actual political party membership.

Using multiple methods, we found that participants' mental representations, participants' expression and perception, and explicit models of our theoretical predictions all converged on the conclusion that prototypes of group membership seem to contain an affective component. Affective cues therefore appear to facilitate perceptions of various group memberships. Not only does emotional expression influence the perception of groups whose distinguishing characteristics are perceptually obvious (e.g., race and sex; Becker et al., 2007; Hugenberg & Bodenhausen, 2003), it

also impacts the perception of groups whose demarcating features are perceptually ambiguous. Moreover, by extending the previous effects to such ambiguous groups, we were able to cull evidence that emotion and social categorization may influence each other reciprocally in the person construal process.

Importantly, the current data suggest that group prototypes of sexual orientation and political affiliation may be at least partly emotion-based, rather than affectively neutral. In the case of sexual orientation, for example, we found that participants might hold and utilize a happy prototype when thinking about gay men. Furthermore, we also found an independent effect of affect on perceptions of sexual orientation, even after we controlled for perceived masculinity. Thus, emotional expression influenced person construal above and beyond the general differences in sexual orientation that are associated with sex (i.e., masculinity; Studies 1A and 4A). Additionally, the current research suggests the possibility of a dissociation between cognitions (perceiver effects) and stereotypes (target effects) regarding gay men. Although perceivers may associate gay men with positive emotions as targets of perception, they may also think of them as disgusting (Herek & McLemore, 2013; Madon, 1997). This could be due to an incongruence between mental representations of the groups and the feelings that the groups elicit. Future research should examine this dissociation further to try to understand the potential complexities behind how targets associated with happiness can elicit other emotions (e.g., disgust and anger) among perceivers. This may be particularly relevant to political affiliation where individual differences may promote the association of specific emotions with ideological outgroups (e.g., Helzer & Pizarro, 2011; Wilson & Rule, 2014). Thus, future work may wish to explore how perceivers' own sexual orientation and political affiliation influence the present effects.

In theory, the current work suggests that affect can be an important cue to social categorization because of its co-occurrence with mental representations. Specifically, the present studies provide some evidence for a possible mechanism underlying the emotion-category association. Just as a perceiver assessing a target's race may rely on skin color to make a decision about group membership, perceivers attempting to guess a target's political affiliation or sexual orientation may use emotional expression to infer whether the person fits the prototype for that particular group. Fleeting expressions of emotion could therefore act as affordances (see Zebrowitz & Collins, 1997) to prototypes of group membership and social categorization when other perceptual information is nondiagnostic. Thus, the current work demonstrates not only that people know the association between emotions and perceptually ambiguous social categories, but also that they utilize these cues effectively for the purpose of communicating their unseen group memberships.

Although the current studies are informative, they may not be entirely consistent with other work examining the relationship between affect and perceptions of sexual orientation. In Study 4A, we demonstrated that affective expression is a diagnostic cue to sexual orientation. However, some previous work using the same stimuli reported that the gay and straight targets did not differ in their expression of happiness, neutrality, or other affect (Rule et al., 2008). This inconsistency may be because Rule et al. (2008) assessed affect categorically, whereas here we measured affect continuously. Indeed, as even neutral faces can appear expressive (Adams et al., 2012; Malatesta, Fiore, & Messina, 1987), it is possible that faces discretely categorized as neutral still possess some variability in the emotional signals that they convey.

Furthermore, another limitation of the current work is that it does not fully account for the effects of intersectional identities. For example, Remedios et al. (2011) found that perceptions of likability depend on the intersection of race and sexual orientation. Consistent with this, Johnson and colleagues found that racial categories can exert reliable effects on perceptions of sex and sexual orientation (Johnson, Freeman, & Pauker, 2012; Johnson & Ghavami, 2011). We therefore attempted to control the racial composition of targets to account for any such effects in almost all studies by recruiting only White men. The only exception to this rule was in Study 2B where the sample of targets was more racially diverse and included both men and women. Thus, one should be cautious about generalizing the results of the current investigation to broader populations and should consider the intersectionality of multiple social categories in future work.

Conclusion

In sum, the current investigation suggests that the mental representation of a particular group may manifest through facial expressions of emotion. The perception of an individual's membership in a perceptually ambiguous group may therefore depend on the emotion that the target is expressing. Moreover, the typical emotion expressed by members of a particular group may systematically accumulate to produce kernels of truth that precipitate accurate judgments. Indeed, affect appears to play a central role in constructing group-level prototypes for sexual orientation and political affiliation, illustrating that the association between affect and group membership is deeply embedded in how people think about and mentally represent various social categories.

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