You Are What You Emote:

Gendered Connotations of Facial Expressions Impact Sexual Orientation Judgments

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Abstract

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Emotional facial expressions – facial expressions such as smiles or frowns that are typically associated with emotions – convey more than just sentiment. Many emotional facial expressions are stereotyped as masculine or feminine. Here, I demonstrated that gendered connotations of emotional facial expressions explain how emotional facial expressions modulate our perceptions of others' sexual orientation. I found that feminine emotional facial expressions (e.g., smiles) make men's faces look more gay (Experiments 1, 2, 3, and 5), feminine emotional facial expressions (e.g., smiles) make women's faces look more straight (Experiment 4), and masculine emotional facial expressions (e.g., anger) make men's faces appear more straight (Experiment 3). Moreover, the effects of emotional facial expression were not the same for all faces, they were *context-dependent* – the effects depended on the masculinity/femininity context

provided by the rest of the face. For instance, straight and gay men's faces looked more gay when smiling (vs. neutral), but the effect was greater in the context of straight men's faces than in the context of gay men's faces. Similarly, smiling made men's faces appear more gay, but the effect was greater in the context of Black men's faces than White men's faces due to the greater perceived masculinity of Black faces.

Five experiments showed that something as impermanent as a smile influences perceptions of something as important and personal as sexual orientation. Moreover, the magnitude of effects of emotional facial expressions differed depending upon information conveyed by the rest of the face – the context in which the emotional facial expressions resided. The data further indicated that stereotypes of gender atypicality may substantially drive how others' sexual orientation is judged. Altogether, the results suggest that, at least in the eye of the beholder, *you are what you emote*.

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Chapter 1: Introduction

How might your impression of a person differ depending on the person's emotional facial expression? Emotional facial expressions – facial expressions such as smiles or frowns that are typically associated with emotions – convey more than just sentiment. Many emotional facial expressions are stereotyped as masculine or feminine. The gendered connotations of emotional facial expressions may explain how emotional facial expressions are relevant to impression formation. Perceived masculinity/femininity predicts a variety of trait (e.g., dominance) and identity (e.g., ethnicity) impressions; in particular, judgments of others' sexual orientation seem to be driven by perceived masculinity or femininity. In fact, popular beliefs conceptualize gay men and lesbians as feminine men or masculine women, respectively (e.g., Freeman, Johnson, Ambady, & Rule, 2010a). This raises the possibility that emotional facial expressions might affect sexual orientation judgments by conveying masculinity or femininity. If men's faces are more likely to be perceived as gay when they contain femininity cues and a smile connotes femininity, could something as impermanent as a smile make it more likely for a man to be seen as gay? And if femininity cues contrast more with the greater masculinity of straight (vs. gay) men's faces, could the impact of smiles on sexual orientation judgments actually be greater for straight men's faces than for gay men's faces?

Here, I argue that emotional facial expressions impact sexual orientation judgments by conveying masculinity or femininity. Moreover, I argue that emotional facial expressions will exert greater influence on these social perceptions to the degree that the connoted masculinity or femininity contrasts with the gender prototypicality of the rest of the face. In the following paragraphs, I briefly describe the foundation of my arguments. The succeeding sections of this chapter will delve more deeply into my hypotheses and relevant literature.

There is widespread belief that people's character can be read from their faces (e.g., Tickle, 2003; Zebrowitz, 1997). Indeed, after even brief glances at people's faces, perceivers can reach high levels of agreement on whether people look friendly, competent, or trustworthy (e.g., Bar, Neta, & Linz, 2006; Willis & Todorov, 2006), and can even judge people's sexual orientation (e.g., Rule & Ambady, 2008a; Tabak & Zayas, 2012) with above-chance accuracy. The finding that women's and men's sexual orientation can be judged with above-chance accuracy from no more than brief glances at greyscale facial photographs has been of keen interest to person perception researchers in part because sexual orientation is generally believed to be phenotypically ambiguous. That is, in comparison to obvious social categories such as gender or race, sexual orientation lacks distinctive facial indicators (cf. Rule & Ambady, 2008a).

Like most snap judgment research, research on snap judgments of sexual orientation from faces has treated emotional facial expressions as an extraneous factor to be controlled. Generally, research on snap judgments of person characteristics (e.g., traits or identities) from faces controls for possible effects of emotional facial expressions either by equating all faces on facial expression (e.g., using all neutral faces or all smiling faces) or by stating that the distribution or average of emotional facial expressions does not differ across experimental conditions (cf. Kubota & Ito, 2007). Many published reports on personality inferences from faces, including my own publication on judging sexual orientation from faces (Tabak & Zayas, 2012), altogether neglect to mention emotional facial expressions.[1] But in everyday life, the motley faces we see vary in facial expression. The interaction between emotional facial expressions and people's personalities (e.g., traits or identities) when forming person perceptions

[1] In fact, emotional facial expressions were "controlled" in Tabak & Zayas (2012) by testing for a difference in the proportion of smiling vs. neutral expressions in the gay vs. straight faces (there was no significant difference). However, this detail was not included in the manuscript, and was never requested by reviewers.

has been largely ignored in research (cf. Kubota & Ito, 2007). Understanding the intersection between emotional facial expressions and personality inferences will be essential to understand person perception processes.

Sexual orientation judgments provide a suitable platform for studying the impact of emotional facial expressions on person perceptions. First, because sexual orientation is relatively phenotypically ambiguous and average judgment accuracy is substantially below 100% – in contrast to judgments of perceptually obvious categories such as sex or race, where impressions may be less malleable (Ito & Urland, 2003) – emotional facial expressions could plausibly alter sexual orientation judgments. Second, unlike personality characteristics such as extraversion or dominance (cf. Oosterhof & Todorov, 2009), sexual orientation does not have a direct definitional relationship to emotional facial expressions like smiles or frowns.[2] Third, there is substantive overlap between stereotypes of gay men and lesbians as generally gender atypical (e.g., Freeman et al., 2010a; Johnson, Gill, Reichman, & Tassinary, 2007) and stereotypes of emotional facial expressions including smiling or anger as feminine or masculine (e.g., Hess, Adams Jr, & Kleck, 2005; LaFrance, 2011; LaFrance, Hecht, & Paluck, 2003). Indeed, it is precisely this overlap in gendered stereotypes of sexual orientation and of emotional facial expressions that I believe will explain how emotional facial expressions impact sexual orientation judgments.

In the sections that follow, I will review relevant existing research in greater detail. First, I will review studies on sexual orientation judgments, and the role of gender atypicality – femininity among men or masculinity among women – in perceptions of sexual orientation.

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[2] One could argue that sexual orientation and the emotional facial expression of smiling share a direct semantic link in that accepted definitions of the word "gay" include both (1) homosexual and (2) happy (e.g., Merriam-Webster's Online Dictionary, 2012). This potential mechanism for the impact of smiling on sexual orientation judgments is effectively ruled-out in Experiment 4 and is discussed further in the context of that experiment.

Next, I will describe work on how emotional facial expressions impact person perceptions. Then, I will integrate evidence in support of my present research propositions that (a) emotional facial expressions convey masculinity or femininity and will therefore modulate sexual orientation judgments and (b) emotional facial expressions will impact sexual orientation judgments especially when their gendered connotations are in contrast to the gender prototypicality of the rest of the face. Finally, I will provide an overview of my experiments.

Sexual Orientation Judgments are Driven by Gender Atypicality Cues

Sexual orientation, at least when it is reduced to the two most common identifications (straight and gay[3]), can be perceived with some level of accuracy from a variety of nonverbal cues. Men's and women's sexual orientation can be judged with considerable accuracy from brief (10s or 1s) silent video clips (Ambady, Hallahan, & Conner, 1999). Ambady and colleagues replicated their effect using 10s video clips that had been modified using a special effects generator such that the target people appeared as sketched outlines on a white background and faces were obscured (see Ambady et al., 1999, Figure 1). Even when the video clips contained only sketched outlines of men or women, people could perceive their sexual orientation with some level of accuracy, suggesting that gesticulations or other dynamic physical cues could inform sexual orientation judgments (Ambady et al., 1999). Indeed, later research showed that body morphology (shape) and swagger (movement) alone could allow above-chance accuracy in sexual orientation judgments (Johnson et al., 2007).

Sexual orientation judgments do not require perceiving dynamic behavioral information or a person's whole body; they can be based on still images or faces alone. In the research by

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[3] Throughout this paper, unless a gender is specified, the term "gay" refers both to gay men and lesbians. "Gay" is meant to broadly refer to people who identify as primarily romantically/sexually attracted to members of their own gender; these people may self-identify as gay, lesbian, queer, homosexual, etc. A discussion about the many different ways sexual orientation can be defined is provided by Savin-Williams (2006).

Ambady and colleagues (1999), still images were extracted from arbitrary points in the brief video clips of target people, and these still images could be judged with above-chance accuracy, though sexual orientation judgment accuracy was lower than accuracy from dynamic cues. More recently, research has shown that men's (Freeman et al., 2010a; Rule, 2011; Rule & Ambady, 2008a; Rule, Ambady, Adams Jr, & Macrae, 2008; Tabak & Zayas, 2012) and women's (Freeman et al., 2010a; Rule, Ambady, & Hallett, 2009; Tabak & Zayas, 2012) sexual orientation can be judged with above-chance accuracy from facial photographs, alone. Moreover, sexual orientation judgments retain above-chance accuracy even when "face" is defined in strict terms – that is, facial photographs in these studies generally exclude non-face cues such as hair and do not allow facial alterations or adornments such as obvious makeup, piercings, tattoos, spectacles, and so on. Excluding such cues is important because they are entirely controllable, potentially embodying self-presentation, and, at least in the case of men's hairstyle, can, alone, convey sexual orientation to some degree (Rule et al., 2008, Studies 3 and 4).

The common thread among these disparate lines of research is that in all cases, cues to gender atypicality – that is, femininity among men or masculinity among women – appear to drive sexual orientation judgments. Ambady et al. (1999) did not assess gender cues in their stimuli. However, a similar research program in which participants rated brief video clips of gay and straight men and women on either sexual orientation or gender atypicality found that perceived gender atypicality corresponded strongly both to targets' self-reported gender atypicality and to others' judgments of the targets' sexual orientation (Rieger, Linsenmeier, Gygax, Garcia, & Bailey, 2010). This result held for still images of men's and women's whole body (Rieger et al., 2010).

Perhaps more convincing evidence about the link between gender atypicality and perceived sexual orientation comes from experimental work in which gender atypicality was manipulated. Johnson and colleagues (2007) created brief animations of moving bodies that were manipulated along two gendered dimensions: waist-to-hip ratio, which is a strong morphological gender cue (with a male prototypical ratio of 1.0 and a female prototypical ratio of 0.7) and shoulder swagger or hip sway, with shoulder swagger being a strong masculinity cue and hip sway being a strong femininity cue (Johnson & Tassinary, 2005; Kozlowski & Cutting, 1977). As expected, on average, stimuli in which the two gendered bodily cues matched were perceived as straight and stimuli in which the two gendered bodily cues conflicted (i.e., masculine body shape with hip sway or feminine body shape with shoulder swagger) were perceived as gay (Johnson et al., 2007).

Results based on this method are not restricted to bodily cues; Freeman and colleagues (Freeman et al., 2010a) used a conceptually similar technique with faces. Specifically, Freeman et al. (2010a) computer-generated faces varying on two gendered dimensions: face shape, with cues such as prominent brow ridges and square chins indicating masculinity, and face texture, with cues such as smoother complexion and lighter skin indicating femininity. Paralleling Johnson et al.'s (2007) results, Freeman et al. (2010a) found that faces in which facial shape and texture were concordant were perceived as straight, but faces in which facial shape and texture were discordant (i.e., masculine shape but feminine texture or vice-versa) were perceived as gay. Moreover, Freeman and colleagues replicated this result using actual faces of gay and straight men and women obtained from online dating websites, and, in fact, facial gender atypicality predicted a face being perceived as gay regardless of the face's actual (self-reported) sexual orientation. Moreover, when judging sexual orientation of counterstereotypical faces – i.e.,

masculine gay men's faces and feminine straight men's faces – judgment accuracy was significantly *below* chance levels (Freeman et al., 2010a, Study 3). Earlier research focusing only on perceptions of sexual orientation from faces (but not the accuracy of those perceptions) similarly found that faces are more likely to be judged as gay as gender atypicality (femininity in men's faces or masculinity in women's faces) increases (Dunkle & Francis, 1990).[4]

Existing research coheres to paint a unified picture: perceived gender atypicality – femininity in men and masculinity in women – seems to underlie sexual orientation judgments across an array of channels through which a person can be perceived, including judgments based on faces. To date, no research has examined whether impermanent facial cues that connote masculinity or femininity, such as emotional facial expressions, might impact perceptions of sexual orientation. To the extent that emotional facial expressions act as masculinity or femininity cues, could emotional facial expressions modulate how gay or straight a face appears? Before addressing this question, I will provide some general background about how emotional facial expressions impact perceptions of person characteristics.

Emotional Facial Expressions Impact Person Perceptions

Though no comprehensive theory currently exists to explain how emotional facial expressions impact inferences of personality (e.g., traits or identities), research generally shows that emotional facial expressions are interpreted as conveying more about a person than the fleeting states they represent (e.g., Knutson, 1996). For instance, people who smile are perceived to be more extraverted (Borkenau & Liebler, 1992; Knutson, 1996; Naumann, Vazire, Rentfrow,

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[4] I have highlighted research showing that perceived masculinity/femininity is related to perceptions of sexual orientation. However, there is no reason to believe that masculinity/femininity is the only predictor of perceived sexual orientation. E.g., average sexual orientation judgment accuracy is in the 60% range in most studies – so although masculinity/femininity might predict some level of accuracy (i.e., above-chance accuracy), there is still a lot of room for improvements in accuracy, which could be driven by factors other than masculinity/femininity. This will be discussed further in the General Discussion section.

& Gosling, 2009; see Zebrowitz & Collins, 1997). Attributing a smile to a person's stable traits rather than to something situational such as emotion is essentially a person perception example of the Fundamental Attribution Error (Heider, 1958; Ross, 1977). However, smiling is an integral behavioral component of extraversion or friendliness (e.g., Borkenau & Liebler, 1992; LaFrance et al., 2003). So, the finding that smiling people are seen as more extraverted may not be surprising because of the direct link between conceptualizations of the emotional facial expression and the trait.

There are also cases in which emotional facial expressions impact perceptions of person characteristics in the absence of any direct emotion–characteristic link. For example, racially ambiguous faces are more likely to be categorized as Black (vs. White) when the faces are angry than when the faces are smiling (Hugenberg & Bodenhausen, 2004). In contrast to cases like smiling–extraversion, being Black is not a consequence of being angry, nor is being angry a consequence of being Black. There are several indirect paths through which the concepts anger and race could be linked. One possibility is that stereotypes provide a link between the two ideas, along the lines of anger → masculine (e.g., LaFrance et al., 2003); Black → masculine (e.g., Wilkins, Kaiser, & Rieck, 2010); therefore anger → Black (cf. Hugenberg & Bodenhausen, 2004).[5] The possibility of a stereotype-driven link between this emotional facial expression and person characteristic rather than a direct definitional or perceptual link is consistent with the finding that angry or hostile facial expressions do not make faces look more Black when face race is obvious from other cues such as skin tone (Kubota & Ito, 2007). That is, the impact of

[5] This type of syllogism, though common, is a logical fallacy because the middle term in the argument is "undefined" – i.e., this syllogism takes the form A→B, C→B, therefore A→C, but B is never declared as an antecedent (Copi & Cohen, 1998, pp. 275-276). Conclusions based on this type of syllogism can be correct, but *not* due to the (illogical) syllogistic reasoning.

emotional facial expression on race perceptions seems to be greatest under conditions of ambiguity – exactly when stereotypes are most influential (e.g., Petty & Cacioppo, 1996).

As with perceptions of race, emotional facial expressions modulate perceptions of gender without a direct emotion–characteristic link, at least when gender is ambiguous. Encountering infants is one common situation in which gender is indistinct. When wearing clothing that is not gender-typed, infants' gender is virtually undetectable from physical appearance alone (Shakin, Shakin, & Sternglanz, 1985). Experiments have shown that based on videos or still images of infants in gender-neutral clothing, people label significantly more of the gender-ambiguous infants as girls when the infants are smiling (vs. neutral) (Nagy, Nemeth, & Molnar, 2000). Whereas meta-analyses reveal robust evidence of gender differences in smiling behaviors of adolescents and adults, there is no evidence that female infants out-smile their male counterparts (Hall & Halberstadt, 1986; LaFrance et al., 2003).[6,7] This makes the finding that smiling impacts infants' perceived gender especially interesting because it shows that people allow emotional facial expressions (e.g., smiles) to impact their person perceptions (e.g., of gender) even when relying on the expressive facial cue could not increase judgment accuracy (i.e., infants' gender).

Smiling (vs. neutral) adults' androgynous faces are also categorized as female (Hess, Adams, Grammer, & Kleck, 2009). Our inclination to see smiling faces as female is so pervasive that people are actually slower at identifying the presence of smiles (but not sadness) in male faces than in female faces (Hugenberg & Sczesny, 2006). Of note, despite the strong gender differences in smiling behavior, theorists argue that gender differences in emotional expressivity are better explained by social-cognitive factors (e.g., cultural display rules or norms)

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[6] The specific age at which the gender difference in smiling behavior becomes reliable is not known, but the gender difference is reliable by 13 years of age (the earliest age group included in meta-analyses) (LaFrance et al., 2003).
[7] No research to date has examined whether smiling behavior differs as a function of sexual orientation.

than by evolutionary processes (i.e., prolonged directional selection for emotionality to differ by gender) (Zayas, Tabak, Günaydýn, & Robertson, 2009).

Though the bodies of literature on facial expressions of emotion and on non-emotion inferences from faces are relatively large, there is only a small amount of work on the intersection of emotional facial expressions and non-emotion inferences (cf. Kubota & Ito, 2007, pp. 738-739). But, the existing research is intriguing and coherent. Emotional facial expressions can impact judgments of person characteristics whether (e.g., Hess et al., 2009; Hess & Thibault, 2008; Oosterhof & Todorov, 2009) or not (e.g., Hess, Adams, & Kleck, 2004; Hess & Thibault, 2008) there is a direct behavioral link between the emotion and the characteristic. Most relevantly, smiling impacts perceptions of gender because smiling is interpreted as a femininity cue. Given that masculinity/femininity appears to be central to perceptions of sexual orientation, could smiles or other emotional facial expressions modulate sexual orientation judgments?

The Present Research

The primary goal of the present research is to examine how emotional facial expressions impact sexual orientation judgments. There are several reasons that sexual orientation judgments are an appropriate domain for studying the impact of emotional facial expressions on person perceptions, as described earlier. Importantly, in contrast to perceptually obvious categories such as race or gender, for which the plethora of strong cues that are typically available may leave little flexibility for emotional facial expressions to alter judgments, sexual orientation is phenotypically ambiguous – that is, sexual orientation lacks known, distinctive facial markers (see Rule & Ambady, 2008a).

How does smiling impact perceptions of men's sexual orientation? Because sexual orientation judgments are based on gender atypicality (Dunkle & Francis, 1990; Freeman et al.,

2010a; Johnson & Ghavami, 2011; Johnson et al., 2007; Rieger et al., 2010), I predict that, in general, emotional facial expressions (vs. neutral) will make faces look more gay when the expression is stereotypically atypical of the face's gender. The first portion of this research will focus on smiling. Smiling is likely the world's most common facial expression (see LaFrance et al., 2003). Moreover, smiling seems particularly relevant to sexual orientation judgments because judgments of sexual orientation appear tightly tied to gendered cues (e.g., Dunkle & Francis, 1990; Freeman et al., 2010a), and smiles connote gender (e.g., Kawamura, Komori, & Miyamoto, 2008; LaFrance et al., 2003). Additionally, this research will primarily focus on perceptions of men's sexual orientation (one of the five experiments will test my hypotheses with women's faces). The decision to focus on perceptions of men is arbitrary, but simplifies design and interpretation of studies because the processes for judging sexual orientation may differ for men's and women's faces (Tabak & Zayas, 2012). So, restated in this context, I predict that, generally, smiling (vs. neutral) men's faces will be perceived as more gay because smiling adds femininity – and therefore gender atypicality – to men's faces.

How does the impact of smiling on perceptions of sexual orientation differ depending on facial context? In addition to the overarching prediction that smiling will make men's faces appear more gay, I predict that smiles will exert *context-dependent effects* – effects that vary depending on contextual information such as what is conveyed by the rest of the face. Specifically, I predict that smiles (vs. neutral expressions) will increase the degree to which men's faces appear gay more strongly when the face is otherwise gender prototypical (i.e., masculine). Broadly, this prediction reflects the idea that the impact of an emotional facial expression will depend on context, where the context is conceptualized as the rest of the face.

There is some evidence that emotional facial expressions are interpreted in relation to the context provided by the rest of the face. In a clever study, Hess and colleagues took real people's faces with emotional expressions and experimentally manipulated the faces' gender by showing the face with a masculine or feminine hairstyle. Faces were rated as happier when the exact same faces with smiles were presented as men (vs. women), and faces were rated as angrier when the exact same faces with anger expressions were presented as women (vs. men) (Hess et al., 2004). This shows that physically identical emotional facial expressions were interpreted as more intense when they contrasted with the stereotypes of the face's apparent gender (see Hess et al., 2005; Hess & Thibault, 2008). Here, this translates into the prediction that the impact of a smile on perceptions of men's sexual orientation will be greater for straight men's faces than for gay men's faces because the smile, a femininity cue, should contrast more with the relative masculinity of straight (vs. gay) men's faces. Experiment 1 will address this.

The prospect that emotional facial expressions might exert context-dependent effects – effects that vary depending on contextual information such as the gender prototypicality that is conveyed by the rest of the face – raises questions about how emotional facial expressions may impact the *accuracy* of sexual orientation judgments. If, as I predict, smiling is more impactful in straight men's faces than gay men's faces, then any potential smile-induced increase in the proportion of gay men's faces correctly identified as gay would be outweighed by a bigger increase in the proportion of straight men's faces incorrectly identified as gay, resulting in an overall decrease in sexual orientation detection accuracy for smiling vs. neutral faces. This opposes the alternative hypothesis, wherein if smiles (vs. neutral expressions) increased how gay all men's faces appear to the same degree, then any increase in the proportion of gay men correctly identified as gay would be offset by an approximately equal increase in the proportion

of straight men incorrectly identified as gay, rendering overall sexual orientation detection accuracy equivalent in smiling vs. neutral faces. Experiment 2 will address the consequences of context-dependent effects for sexual orientation judgment accuracy.

Do gender stereotypes of emotions explain how emotional facial expressions impact perceptions of men's sexual orientation? Studying smiling will be informative, but not definitive. Comparing judgments only of smiling and neutral faces would not be sufficient to determine the mechanism through which emotional facial expressions impact sexual orientation judgments. A plausible alternative explanation would be that men's faces appear more gay when they contain any emotion. Such an alternative is consistent with stereotypes of gay men as broadly more emotional than straight men (Madon, 1997).

I predict that particular emotional facial expressions will modulate judgments of men's sexual orientation due to the gendered stereotypes of each specific emotional facial expression. Accordingly, whereas a feminine stereotyped emotional expression such as smiling should make men's faces look more gay, a masculine stereotyped emotional expression such as anger (e.g., Hess et al., 2005; Hess et al., 2009; LaFrance, 2011) should make men's faces look more straight. Experiment 3 addresses this issue, examines whether different types of smiles (e.g., with lips together vs. parted) exert comparable effects on perceived sexual orientation, and also tests whether statistically controlling for perceptions of faces' masculinity/femininity reduces the power of emotional facial expressions to uniquely predict perceptions of sexual orientation.

How does smiling interact with gender and racial stereotypes to impact sexual orientation judgments? Imbued in the foregoing discussion is the idea that emotional facial expressions are not directly linked to sexual orientation, but rather are linked to masculinity/femininity, which is in turn linked to sexual orientation judgments since the sexual

orientation judgments appear to be based on gender atypicality. One alternative hypothesis is that if emotional facial expressions directly impact perceptions of sexual orientation, then smiles would make both men's and women's faces look more gay. Such an alternative is consistent with the possibility that impressions might be influenced by the fact that both "happy" and "homosexual" are acceptable definitions of "gay" (Merriam-Webster's Online Dictionary, 2012). In contrast, I predict that whereas smiles will make men's faces look more gay, smiles will make women's faces look more straight. That is, because smiling is a femininity cue, smiling women's faces are less gender atypical than neutral women's faces and therefore should be less likely to be perceived as gay. Moreover, if we observe context-dependent effects of the smile, then the impact of the smile would be greater for gay women's faces than for straight women's faces due to the relative masculinity of gay (vs. straight) women's faces. Showing this reverse pattern of effects of the impact of smiling on sexual orientation judgments in women's (vs. men's) faces is a critical step in demonstrating that the impact of emotional facial expressions depends upon gender stereotypes in the domain of sexual orientation judgments. Experiment 4 addresses this.

Finally, I will explore the generalizability of the context-dependent effects of emotional facial expressions by testing how smiling interacts with racial stereotypes to impact sexual orientation judgments. Similar to my prediction that the impact of smiling on sexual orientation judgments will differ for straight vs. gay men's faces (Experiments 1, 2, and 3) and for straight vs. gay women's faces (Experiment 4), I predict that the impact of smiling will differ for Black vs. White men's faces, as well. Though there are no known racial differences in prevalence of emotional facial expressions (see Zebrowitz, Kikuchi, & Fellous, 2010), gendered emotional

facial expressions may differ in meaning for Black and White faces due to the gendered nature of race (Johnson, Freeman, & Pauker, 2012).

It is empirical fact that White people, on average, perceive Black faces as more masculine than White faces (Johnson et al., 2012; Zebrowitz et al., 2010).[8] Because race is strongly stereotyped in gendered terms, I predict that among Black and White men's faces, smiling (vs. neutral expressions) will exert a larger influence on judgments of Black men's sexual orientation due to the greater contrast with the relative perceived masculinity of Black (vs. White) men's faces. Especially because race is not a known component of the sexual orientation stereotype (Madon, 1997), testing for context-dependent effects of emotional facial expressions in the context of Black and White men's faces will be an important step in generalizing the phenomenon of context-dependent effects of emotional facial expressions on sexual orientation judgments. Experiment 5 addresses this.

Overview of Experiments

My primary hypotheses are (a) that emotional facial expressions will impact sexual orientation judgments to the extent that the emotional facial expressions act as gender atypicality cues and (b) that there will be context-dependent effects of emotional facial expressions on judgments of sexual orientation, and the impact of emotional facial expressions will be greater when the expressions are in more contrast with gendered cues present in the rest of the face. I tested these hypotheses in 5 experiments.

The objective of Experiment 1 was to gain preliminary evidence for both main hypotheses. Participants were presented with faces of self-identified gay and straight men and

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[8] Here, I am referring to *perceived* masculinity. Though it is possible that Black men's faces may contain more masculinity markers than White men's faces, it is not necessary for me to assert this claim, for which evidence is mixed. Importantly, experiments have shown that Black (vs. White) faces are interpreted in more masculine terms even if there is no physical racial difference in masculinity cues (discounting skin tone) (Zebrowitz et al., 2010).

rated each man's sexual orientation using a Likert scale. In this experiment, participants saw two photographs of each man: one in which he was smiling and one in which he had a neutral facial expression. This allowed emotional facial expression to be manipulated within target person, and eliminated any possibility of extraneous personality differences between the people presented in the smiling vs. neutral photos. The key results were whether smiling made men's faces look more gay (compared to perceptions of the same men with neutral facial expressions), and whether the degree to which smiling impacted sexual orientation perceptions would be greater for straight men's (vs. gay men's) faces.

The objective of Experiment 2 was to replicate the basic results of Experiment 1 using a different method (rendering sexual orientation judgments via dichotomous categorizations rather than a Likert scale) and while manipulating facial expression (smiling vs. neutral) between participants to avoid potential contrast effects between expressions. This method also allowed for a test of whether accuracy in a gay–straight judgment task would differ for smiling vs. neutral faces. Specifically, an advantage of the forced-choice categorization task over the Likert scale rating task is that the categorization task allows for computation of a sexual detection accuracy score on a probability scale, which is easily interpretable as a measure of judgment accuracy. Participants were presented with the same smiling or neutral facial photographs of gay and straight men from Experiment 1 and categorized each face as straight or gay. The key results were (1) whether smiling would increase the rate at which gay men's faces were correctly categorized as gay, (2) whether smiling would increase the rate at which straight men's faces were incorrectly categorized as gay, and (3) whether the increase in false alarms (incorrectly categorizing straight men's faces as gay) would outweigh any potential increase in hits (correctly

categorizing gay men's faces as gay), leading smiling (vs. neutral expressions) to decrease overall accuracy of judging men's sexual orientation.

The objective of Experiment 3 was to test whether the impact of emotional facial expressions on perceptions of men's sexual orientation depended on the gendered stereotypes of the emotions. Faces of 14 straight White men were digitally morphed into several different emotional expressions, including smiling, angry, and neutral. Participants judged each face's sexual orientation using a Likert scale. The key result was whether smiling and angry facial expressions, relative to neutral, would have opposite effects on perceptions of men's sexual orientation due to the opposing gender stereotypes of smiling and anger.

The objective of Experiment 4 was to test how emotional facial expressions interact with gender stereotypes to impact perceptions of sexual orientation. The method was identical to that of Experiment 1 except that faces of women (not men) were used. The key result was whether the results would be the opposite of what was obtained for men's faces – i.e., whether smiling (vs. neutral expressions) would make women's faces look more straight (vs. gay), and whether the effect would be greater for gay women's faces due to the greater contrast with the relative masculinity of gay (vs. straight) women's faces.

The objective of Experiment 5 was to test how emotional facial expressions interact with racial stereotypes conveyed by the rest of the face to impact perceptions of sexual orientation. Faces of Black and White straight men were digitally morphed into neutral and smiling poses. Participants judged each face's sexual orientation using a Likert scale. The key result was whether smiling (vs. neutral expressions) would make men's faces look more gay to a greater degree in Black men's faces than in White men's faces due to the greater contrast with the relatively greater perceived masculinity of Black (vs. White) men's faces.

Chapter 2: How does smiling impact perceptions of men's sexual orientation?

Experiment 1

Does a man's face look more gay if it contains a smile, an emotional facial expression that connotes femininity? If so, might the effect of a smile be larger for straight men's faces than for gay men's faces due to the greater contrast with the relative masculinity of straight (vs. gay) men's faces?

Method

Participants. Twenty-six University of Washington students (21 women, 5 men) participated in this experiment in exchange for extra credit in psychology classes. Participants ranged from 18-27 years of age (M = 19.65). The majority of participants were White (n = 9) or Asian/Asian American (n = 14). Previous research on snap judgments of sexual orientation from faces (e.g., Rule et al., 2008; Tabak & Zayas, 2012) has not found effects of participant gender, so I was not concerned by the coincidental, naturally-occurring imbalance in participant gender.

Apparatus. Inquisit Web Edition 3.0.6.0 (Seattle, WA: Millisecond Software, LLC.) was run on Windows XP-based computers equipped with 17-inch CRT or LCD monitors (60 Hz refresh rate; 1024 × 728 resolution).

Facial photograph selection and preparation. Photographs of self-identified straight and gay individuals were obtained from an online dating website (OkCupid.com) by research assistants unaware of the research hypothesis. The stimulus set included 22 neutral gay faces, 30 smiling gay faces, 22 neutral straight faces, and 28 smiling straight faces. These photographs came from 17 unique gay men and 19 unique straight men; each man had at least one smiling facial photograph and at least one neutral facial photograph. This allowed facial expression to be experimentally manipulated within target person, which was important to rule-out any possible

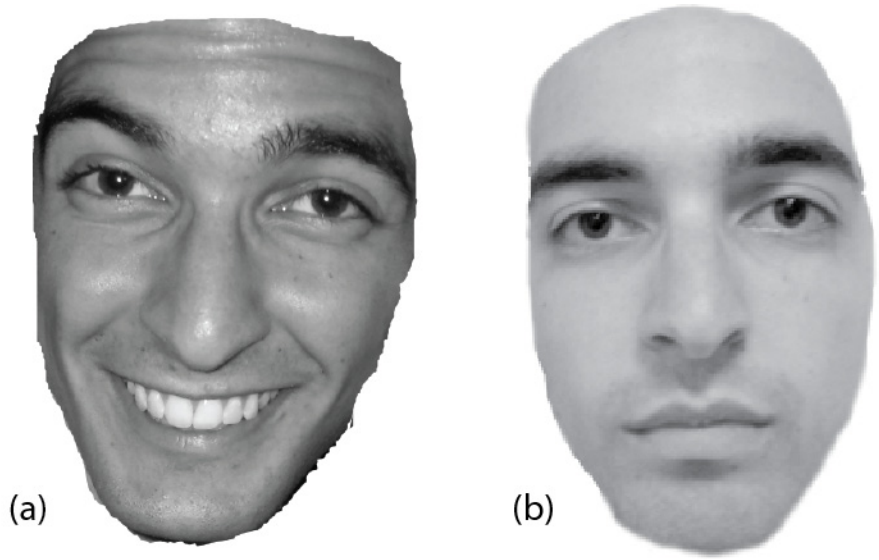
actual differences in personality between target people in the smiling photos and target people in the neutral photos (because, in fact, the smiling and neutral faces were of the same people).

Research assistants were provided with detailed instructions about which photographs could be included in the stimulus set (e.g., no photos of minors, no photos with facial jewelry such as eyewear; full instructions are available upon request). To minimize the prospect that non-face cues would influence judgments, photographs of men with facial alterations or adornments (e.g., scars, eyewear, facial hair, makeup, non-earlobe piercings, etc.) were not included as experimental targets. To maximize consistency across faces, only photographs of White-appearing individuals who self-identified their ages as 18-29 were included.

Using Adobe Photoshop, research assistants removed hair and ears from each head and converted each image to grayscale (8-bit bitmap format), leaving the final "face" stimulus (see Figure 1). When presenting faces to participants, Inquisit standardized each image's height to 200 pixels and adjusted each photograph's width proportionally, resulting in undistorted images of nearly constant size. Given the apparatus (17-inch 4 × 3 aspect-ratio monitors with 1024 × 768 resolution), 200 pixels (the height of face image stimuli) is approximately equal to 26% of the total vertical screen space, or about 2.90 inches.

Figure 1:

Example Face Stimuli (Experiment 1)



Note. Figure 1. Example stimuli from Experiment 1: (a) smiling and (b) neutral men's faces.

Procedure. On each trial, a facial photograph (see Figure 1, above) appeared on the screen along with a horizontal 7-point Likert-type scale (1 = *very gay*; 7 = *very straight*) that has been used in previous research (e.g., Rule et al., 2008).[9] Each participant rated 64 faces, 16 of each type (gay/smiling, gay/neutral, straight/smiling, and straight/neutral), randomly selected for each participant from the larger set of stimuli and presented in random order for each participant. Participants were instructed to use their "gut instinct" to "rate each person's sexual orientation." The wording of these instructions was an attempt to make clear that participants were to rate what they believed to be the true sexual orientation for each face (vs. potential instructions such as, "rate how gay or straight each face appears," which might imply that participants should rate appearance irrespective of what they thought the depicted people's sexual orientation might be). Each facial photograph remained on screen until the participant rendered a judgment by clicking on a number (1-7) using the computer mouse (*Mean* reaction time = 2702 ms). The intertrial interval was 1000 ms.

Data analytic strategy. To account for the nested nature of the sexual orientation judgment data (emotional facial expressions within target people and target people within participants), responses were subjected to a 3-level multilevel regression model (MLM) using HLM® 7.00 (Raudenbush, Bryk, & Congdon, 2010). Using this MLM framework properly accounts for the non-independent nature of responses at each level of the regression – i.e., the MLM accounts for any correlation of judgments from faces with different facial expressions (Level 1) but of the same target person (Level 2), and accounts for any correlation of judgments from faces of the same target person (Level 2) within participant (Level 3). For a primer on

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[9] One-third of participants were randomly assigned to a condition in which all response options were labeled (1 = *very gay*; 2 = *moderately gay*; 3 = *slightly gay*; 4 = *equally gay and straight*; 5 = *slightly straight*; 6 = *moderately straight*; 7 = *very straight*). Responses did not differ depending on whether labels were presented for all response options or only the scale endpoints, so responses were collapsed across this factor.

MLM, see Nezlek (2001, 2008). A preliminary MLM with participant sex entered at Level 3 revealed no statistically significant effects of participant sex, consistent with previous research (e.g., Rule et al., 2008; Tabak & Zayas, 2012), so participant sex was dropped from the final model presented below.

Results

Sexual orientation judgments were reverse-scored so that 1 = *very straight* and 7 = *very gay*. A multilevel regression model (MLM), constructed according to the guidelines provided by Nezlek (2001, 2008), was used to test for the effects of emotional facial expression (SMILE, coded neutral = 0 and smiling = 1) and face sexual orientation (ORIENT, coded straight = 0 and gay = 1) on judgments of sexual orientation. Subscripts indicate face *i*, target person *j*, and participant *k*. As recommended by Nezlek (2001, 2008), the final model only includes random effect terms that were statistically significant:

$$\text{STRGAY}_{ijk} = \pi_{0jk} + \pi_{1jk}*(\text{SMILE}_{ijk}) + e_{ijk} \quad \text{(Level 1)}$$

$$\pi_{0jk} = \beta_{00k} + \beta_{01k}*(\text{ORIENT}_{jk}) + r_{0jk} \quad \text{(Level 2)}$$

$$\pi_{1jk} = \beta_{10k} + \beta_{11k}*(\text{ORIENT}_{jk}) \quad \text{(Level 2)}$$

$$\beta_{00k} = \gamma_{000} + u_{00k} \quad \text{(Level 3)}$$

$$\beta_{01k} = \gamma_{010} \quad \text{(Level 3)}$$

$$\beta_{10k} = \gamma_{100} + u_{10k} \quad \text{(Level 3)}$$

$$\beta_{11k} = \gamma_{110} \quad \text{(Level 3)}$$

$$\text{STRGAY}_{ijk} = \gamma_{000} + \gamma_{010}*(\text{ORIENT}_{jk}) + \gamma_{100}*(\text{SMILE}_{ijk}) + \gamma_{110}*(\text{SMILE}_{ijk}\times\text{ORIENT}_{jk}) + r_{0jk} + u_{00k} + u_{10k}*(\text{SMILE}_{ijk}) + e_{ijk} \quad \text{(Full Mixed Model)}$$

Coefficient γ_{000} can be interpreted as the grand average straight—gayness rating for straight men's faces with neutral expressions; $\gamma_{000} = 2.98$, $SE = 0.09$, $t(25) = 32.16$, $p < .001$.

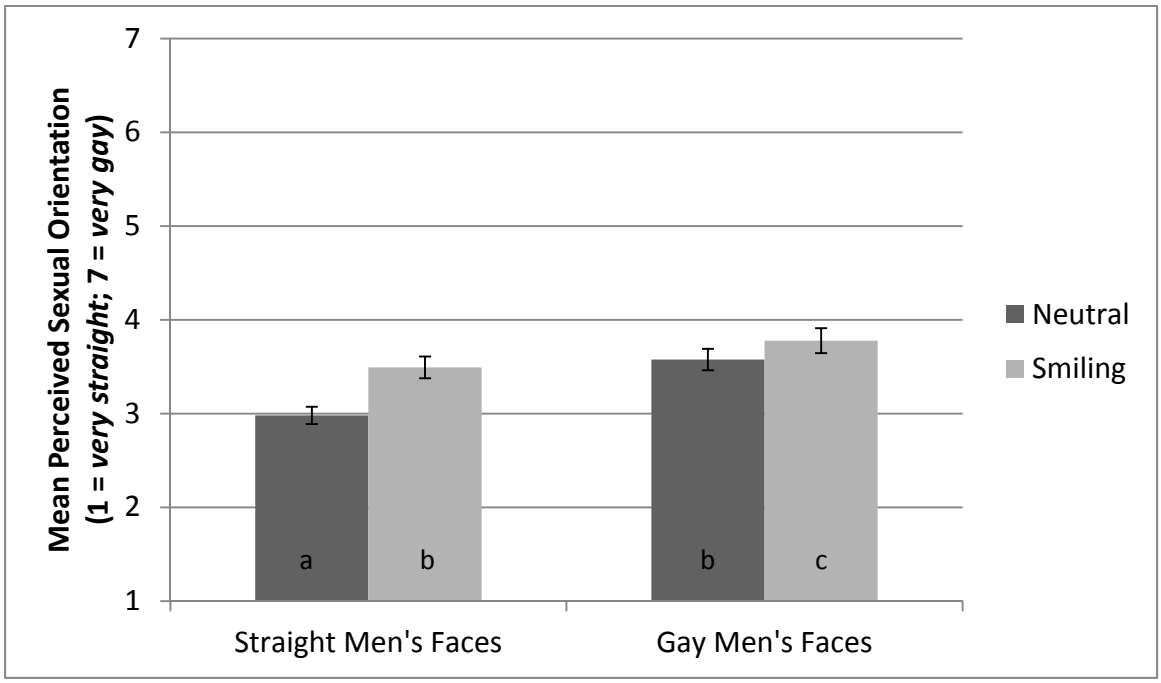
Coefficient γ_{010} can be interpreted as the grand average difference in straight—gayness ratings for gay men's faces with neutral expressions vs. straight men's neutral faces; $\gamma_{010} = 0.60$, $SE = 0.11$, $t(935) = 5.38$, $p < .001$, showing that gay men's faces with neutral facial expressions were perceived as significantly more gay looking than straight men's faces with neutral expressions.

Men were perceived as more gay when smiling (vs. neutral). Coefficient γ_{100} can be interpreted as the grand average difference in straight—gayness ratings for straight men's faces when smiling vs. neutral, $\gamma_{100} = 0.51$, $SE = 0.12$, $t(25) = 4.34$, $p < .001$. Coefficient γ_{110} can be interpreted as the difference in the size of the effect of smiling for gay men's faces vs. straight men's faces. The effect of smiling was significantly smaller for gay men's faces than for straight men's faces, $\gamma_{110} = -0.31$, $SE = 0.14$, $t(1558) = -2.27$, $p = .02$. The total difference in grand average straight—gayness ratings for smiling gay men's faces vs. neutral gay men's faces is equal to $\gamma_{100} + \gamma_{110}$ (approximately = 0.20). Directly testing whether the effect of smiling on gay men's faces (i.e., $\gamma_{100} + \gamma_{110}$) was different from zero required a planned contrast. The contrast involved comparing the Estimate specified by a vector of contrast codes vs. zero. Here, the contrast codes were 0, 0, 1, 1 for coefficients γ_{000}, γ_{010}, γ_{100}, γ_{110}, representing the effect of smiling on average straight—gayness compared to neutral gay men's faces (i.e., $\gamma_{100} + \gamma_{110}$; Estimate = 0.20, $SE = 0.095$). HLM's Hypothesis Testing feature for testing contrasts uses a χ^2 test to compare whether the Estimate is different from zero. Indeed, the Estimate for the effect of $\gamma_{100} + \gamma_{110}$ significantly differed from zero, $\chi^2(1) = 4.45$, $p = .03$. That is, although the effect of smiling was smaller for gay men's faces than for straight men's faces (i.e., $\gamma_{110} = -0.31$), the effect of smiling for gay men's faces ($\gamma_{100} + \gamma_{110} = 0.20$) was significantly above zero. *Mean* perceptions of sexual orientation for each of the four face types (gay/neutral, gay/smiling, straight/neutral, and straight/smiling) are presented in Figure 2.

Figure 2:

Mean Perceptions of Men's Sexual Orientation as a Function of Faces'

Actual Sexual Orientation and Emotional Facial Expression



Note. Figure 2. Mean perceptions of men's sexual orientation as a function of faces' actual sexual orientation and emotional facial expression in Experiment 1. Bars labeled with different letters are significantly different from each other, $p < .05$. Error bars represent ±1 *SEM*.

Discussion

As expected, gay men's faces, overall, were perceived as more gay than were straight men's faces. Consistent with hypotheses, men's faces looked more gay when they were smiling (vs. a neutral expression). Importantly, there was a facial expression × sexual orientation interaction such that smiles (vs. neutral facial expressions) impacted perceived sexual orientation more for straight men's faces than for gay men's faces, though the effect of smiling was still statistically significant for gay men's faces. These results are consistent with the *context-dependence hypothesis*, which states that the impact of an emotional facial expression should be greater when the expression is in greater contrast with the rest of the face. Here, we might postulate that straight men's faces were more masculine than gay men's faces (see Freeman et al., 2010a), making smiles, which are feminine, stand out more.

Interestingly, because the increase in perceived gayness due to smiling was greater for straight men's faces than for gay men's faces, the mean perceived sexual orientation for smiling straight men's faces and neutral gay men's faces was similar (see Figure 2). Indeed, a post-hoc contrast (contrast codes 0, 1, -1, 0 for coefficients γ_{000}, γ_{010}, γ_{100}, γ_{110}) revealed that there was no significant difference in perceived sexual orientation for faces of smiling straight men and of neutral gay men, contrast Estimate = 0.09, $SE = 0.16$, $\chi^2(1) = 0.33$, *ns*. Moreover, the difference in perceived sexual orientation between gay and straight men's faces was smaller for smiling faces than for neutral faces. This raises the intriguing possibility that people may be *worse* at judging men's sexual orientation for smiling faces than for neutral faces – contrary to the lay assumption that it is easier to judge characteristics of people, generally, when they are smiling (e.g., LaFrance, 2011). Experiment 2 will address this possibility.

Experiment 2

In Experiment 2, participants completed a sexual orientation categorization task, which allowed a direct test of sexual orientation detection accuracy for neutral men's faces vs. smiling men's faces, as well as direct tests of the components of judgment accuracy (i.e., hits, or correctly identifying gay faces as gay, and false alarms, or incorrectly identifying straight faces as gay). Experiment 1 provided evidence consistent with the hypotheses that smiling – a feminine emotional facial expression – would make men's faces appear more gay, and that the impact of smiling on perceptions of sexual orientation would be greater for straight men's faces than for gay men's faces, perhaps due to the greater contrast with the greater general gender prototypicality of straight (vs. gay) men's faces. Experiment 2 sought to replicate these findings using a different method – participants in Experiment 2 categorized men's faces as either straight or gay rather than rating sexual orientation on a Likert scale. Additionally, emotional facial expression (smiling vs. neutral) was manipulated between-participants in Experiment 2 to ensure that the effects would replicate without any possible contribution of perceptual contrast effects (between neutral and smiling faces viewed by the same participant). That is, manipulating emotional facial expression between participants allowed for a cleaner test of whether smiling faces were perceived as more gay – when neutral faces were not present for comparison.

Method

Participants. One hundred one University of Washington students (58 women, 43 men) participated in this experiment in exchange for extra credit in psychology classes. Participants ranged from 18-27 years of age (M = 18.77). The majority of participants were White (n = 49) or Asian/Asian American (n = 43).

Apparatus. Same as Experiment 1.

Facial photograph selection and preparation. Same as Experiment 1. See Figure 1.

Procedure. On each trial, a target face stimulus appeared on screen and participants categorized the target face as either "gay" or "straight" "as quickly as possible" according to "gut instinct" by depressing "A" or "L"; assignment of category labels to "A" vs. "L" keys was randomized between participants, had no impact on results, and is not discussed further. Each stimulus remained on screen until the letter "A" or "L" was depressed (i.e., the task was self-paced). The intertrial interval was 1000 ms. Stimulus emotional facial expression (smiling vs. neutral) was randomly manipulated between participants; exposing each participant to either only smiling or only neutral faces ensured that potential perceptual contrast effects between smiling and neutral faces would not contribute to any observed effects. Each participant categorized 32 faces, 16 gay and 16 straight, randomly selected (without replacement) for each participant from all available faces.

Data analytic strategy. Sexual orientation judgment accuracy was measured using A′ (Rae, 1976), a nonparametric measure of signal sensitivity. A′ measures sensitivity to the signal "gay" after correcting for participants' biases to categorize faces as straight or gay.[10] A′ is interpreted on a probability scale, with chance responding indexed by an A′ of .5; accordingly, A′ may be interpreted as a bias-adjusted accuracy score. One A′ score was computed for each participant: A'_n (neutral faces) *or* A'_s (smiling faces). To confirm the findings, all analyses were repeated using d′ (a parametric index of signal detection) as the dependent measure; the results were unchanged. In signal detection analyses (e.g., the computation of A′ or d′), there are two components of accuracy: the hit rate (reported in this study as H_n and H_s), or the proportion of

[10] Declaring "gay" as "signal" and "straight" as "noise" is arbitrary; the signal detection measures of accuracy (A′ or d′) would be exactly identical if "straight" had been considered "signal" and "gay" considered "noise" (Rae, 1976).

gay faces correctly perceived as gay, and the false alarm rate (reported in this study as FA_n and FA_s), or the proportion of straight faces incorrectly perceived as gay.

A preliminary two-way analysis of variance (ANOVA) on accuracy with emotional facial expression as a between-participants factor included participant sex as a between-participants factor; participant sex produced no significant effects or interactions, consistent with previous work (e.g., Rule & Ambady, 2008a; Tabak & Zayas, 2012), and was dropped from analyses. Independent-sample *t*-tests examined whether accuracy (A′) and its components (H and FA) differed as a function of emotional facial expression. One-sample *t*-tests examined whether accuracy of judging sexual orientation from neutral or smiling faces was better than chance.

Results

Sexual orientation detection accuracy was above chance levels for neutral men's faces (*Mean* $A'_n = 0.63$, *SD* = 0.12), $t(52) = 7.98$, $p < .001$, Cohen's (1992) effect size $d = 2.21$, and for smiling men's faces (*Mean* $A'_s = 0.57$, *SD* = 0.12), $t(47) = 3.90$, $p < .001$, $d = 1.14$. As predicted, accuracy of judging men's sexual orientation was significantly lower for smiling (vs. neutral) faces, $t(99) = -2.84$, $p = .006$. The 6 percentage-point decrement in sexual orientation judgment accuracy attributable to smiling was a statistically medium-sized effect, Cohen's $d = -0.57$.

The false alarm rate – the rate at which participants incorrectly categorized straight men's faces as gay – was significant greater for smiling men's faces (*Mean* $FA_s = 0.32$, *SD* = 0.10) than it was for neutral men's faces (*Mean* $FA_n = 0.27$, *SD* = 0.12), $t(99) = -2.11$, $p = .037$, $d = -0.42$. The hit rate – the rate at which participants correctly categorized gay men's faces as gay – did not significantly differ for smiling men's faces (*Mean* $H_s = 0.39$, *SD* = 0.14) and neutral men's faces (*Mean* $H_n = 0.42$, *SD* = 0.13), $t(99) = 1.09$, $p = .28$, $d = 0.22$.

Discussion

Participants in Experiment 2 categorized men's faces as gay more when the faces were smiling than when the faces were neutral. As predicted by the context-dependence hypothesis, this effect of smiling was stronger for straight men's faces than for gay men's faces. That is, the false alarm rate at which straight men's faces were incorrectly categorized as gay significantly increased due to smiling (vs. neutral expressions). In contrast, the hit rate at which gay men's faces were correctly categorized as gay did not significantly differ for smiling vs. neutral faces. Altogether, Experiment 2 largely replicated the results of Experiment 1, but using a different method (forced-choice sexual orientation categorizations rather than Likert scale ratings).

Because the impact of smiling on judgments of men's sexual orientation was context-dependent (i.e., dependent on the face context being a straight man or a gay man), overall sexual orientation judgment accuracy was actually significantly *lower* for smiling men's faces than for neutral men's faces. This is consistent with my hypotheses but possibly surprising in relation to the cultural expectation that it is easier to judge elements of a person's character when the person is smiling compared to when the person has a neutral facial expression (e.g., LaFrance, 2011).

The results of Experiments 1 and 2 support the primary hypotheses: smiling (vs. neutral) men's faces were more likely to be judged as gay, and the impact of smiling on sexual orientation judgments was greater for straight men's faces than for gay men's faces. I have proposed that these results could be due to overlap between gendered connotations of emotional facial expressions (e.g., smiling is feminine) and stereotypes of gay people as gender atypical (e.g., gay men as relatively feminine). In the next section, I will use both experimental manipulations and statistical techniques to provide converging evidence that gendered connotations of facial expressions may be the mechanism underlying the observed effects.

Chapter 3: Do gender stereotypes of emotions explain how emotional facial expressions impact perceptions of men's sexual orientation?

Consistent with my hypotheses, Experiments 1 and 2 showed that men's faces were perceived as more gay when smiling than when neutral and that the effect of smiling was greater for straight men's faces than for gay men's faces. However, comparing judgments only of smiling and neutral faces is not sufficient to support my theory for how emotional facial expressions impact sexual orientation judgments. That is, the results of Experiments 1 and 2 are consistent with my theory but are also consistent with the alternative hypothesis that a man's face would appear more gay if it contained *any* emotional facial expression.

I have proposed that the feminine connotation of smiling is an essential component of the process leading to men's faces being judged as more gay when smiling than when neutral. The alternative explanation that men's faces appear more gay when they contain any emotion would be consistent with stereotypes of gay men as broadly more emotional than straight men (Madon, 1997). In this section, I will attempt to rule-out the aforementioned alternative hypothesis by testing how perceptions of men's sexual orientation differ depending on whether the face is neutral, has a feminine emotional facial expression (i.e., smiling), or a masculine emotional facial expression (i.e., anger). Additionally, I will test several versions of smiles (e.g., smiles with lips closed vs. open) in an attempt to generalize the effect across qualitatively different types of smiles.

Experiment 3

I aimed to address three questions in Experiment 3. First, do all types of smiles yield effects like those observed in Experiments 1 and 2, or do qualitatively different types of smiles (e.g., with or without teeth showing; with or without involvement of muscles around the eyes

characteristic of spontaneous or Duchenne (1862/1990) smiles) yield different effects on perceptions of men's sexual orientation? Second, are gendered connotations of emotional facial expressions a key part of the process by which emotional facial expressions influence how someone's sexual orientation is perceived, or do all emotional facial expressions – even ones that have masculine connotations such as anger (e.g., Hess et al., 2005; Hess et al., 2009; Hess et al., 2004; Hess & Thibault, 2008; LaFrance, 2011; LaFrance et al., 2003) – make men's faces look more gay? Third, if the relationship between faces' masculinity/femininity and perceived sexual orientation is statistically accounted for (i.e., by covariation), do emotional facial expressions retain any unique ability to predict differences in faces' perceived sexual orientation?

Addressing these research questions required having facial photographs of a number of people and having each person posed in a variety of highly standardized facial configurations (e.g., neutral, angry, smiling with lips closed, smiling with lips open, etc.). In order to ensure the stimuli for Experiment 3 were as tightly standardized as possible, I used computerized facial morphing software, FaceGen Modeller (Toronto, ON: Singular Inversions, Inc.), to experimentally manipulate faces into a variety of emotional facial expressions. In brief, this process involved taking neutral facial photographs of real men (provided by the Eberhardt Face Database; Eberhardt, Goff, Purdie, & Davies, 2004), digitally importing them into FaceGen Modeller, and then using FaceGen Modeller's anthropometrically-based tools to pose the digitized faces in various displays (e.g., smiling, angry, etc.); full details are provided in the Method section (also see Figure 3). Using FaceGen Modeller to digitize neutral faces of real men and then precisely manipulate the digitized faces has advantages over using photos of real people asked to pose with various facial displays. For instance, recruiting people willing to pose for such photographs might have yielded undesirable variance in facial expressions due to

extraneous factors, including variation in understanding of facial posing instructions, natural variability in voluntary control of facial musculature, or subtle differences in actions that typically covary with smiling behaviors, such as head tilting.

Method

Participants. One hundred forty-two University of Washington students (99 women, 43 men) participated in this experiment in exchange for extra credit in psychology classes. Participants ranged from 18-29 years of age (M = 19.16). The majority of participants were White (n = 54) or Asian/Asian American (n = 65).

Apparatus. Same as Experiment 1.

Facial photograph selection and preparation. Facial photographs of 15 college-aged straight White males were obtained from the Eberhardt Face Database, a set of facial photographs used in previous research (Eberhardt et al., 2004).[11] All of the facial photographs from the database were highly standardized and all faces contained neutral facial expressions (e.g., Figure 3a). These neutral facial photographs were digitized using the PhotoFit feature of FaceGen Modeller (Toronto, ON: Singular Inversions, Inc.). In brief, PhotoFit involves selecting a computer file of a facial photograph with a neutral facial expression and manually specifying certain points on the face to FaceGen (e.g., pupils, corners of the mouth, etc.), at which point the software faithfully morphs the facial photograph onto a 3D matrix of a human head, and preserves skin tone and texture information (see Figure 3a vs. 3b). Some detail about the mechanisms involved in developing the software are provided by Blanz and Vetter (1999). The 3D digitized version of the face can then be manipulated in over 150 ways; relevantly,

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[11] These target men were recruited using practices standard in social psychological research, so it is reasonable to assume that nearly all of the men are straight. Sexual orientation of the target men is not definitively known. If, by chance, not all targets were straight (e.g., one was gay), that could be considered error in measurement – but would not confound any results or conclusions because the same faces were used across experimental conditions.

specific facial movements (e.g., smiles, squints) and specific emotional facial expressions (e.g., anger, surprise) can be adjusted.

Because facial manipulations in FaceGen cause movements in the 3D matrix underlying the digitized human face, physically equal manipulations of facial expressions were applied to every face. As displayed in Figure 3, seven versions of each face were created: neutral (NT; Figure 3b), smile with lips closed (SC; Figure 3c), smile with lips open (SO; Figure 3d), smile with lips open and eyes squinting (SS, Figure 3e; to approximate a Duchenne (1862/1990) smile), sad (SA, Figure 3f), angry (AN, Figure 3g), and surprised (SU, Figure 3h). The Facial Action Coding System's EMOFACS[12] procedure (Ekman, Friesen, & Hager, 2002, Investigator's Guide) was used to verify the emotional facial expressions; the only expression that was not clearly identifiable as had been intended was sadness, which did not contain any key elements of sad faces (e.g., in terms of FACS' Action Units [AUs], AU4: inner brow raiser; AU6: cheek raiser and lid compressor; AU15: lip corner depressor) except for one (AU4: brow lowerer). Because the "sad" faces (e.g., Figure 3f) were not readily identifiable as actually sad, results based on the sad faces should be interpreted with great caution. The EMOFACS procedure verified the other emotional facial expressions, though it should be noted that the evidence differentiating Duchenne (SS) from non-Duchenne (SO) smiles (i.e., AU6, commonly perceived as eye squinting involving "crow's feet" beside the eyes and bulging of the skin below the lower eye lids) was moderate, but not strong. See Figure 3 for example stimuli. There were a total of 98 face stimuli (14 men × 7 expressions). [13]

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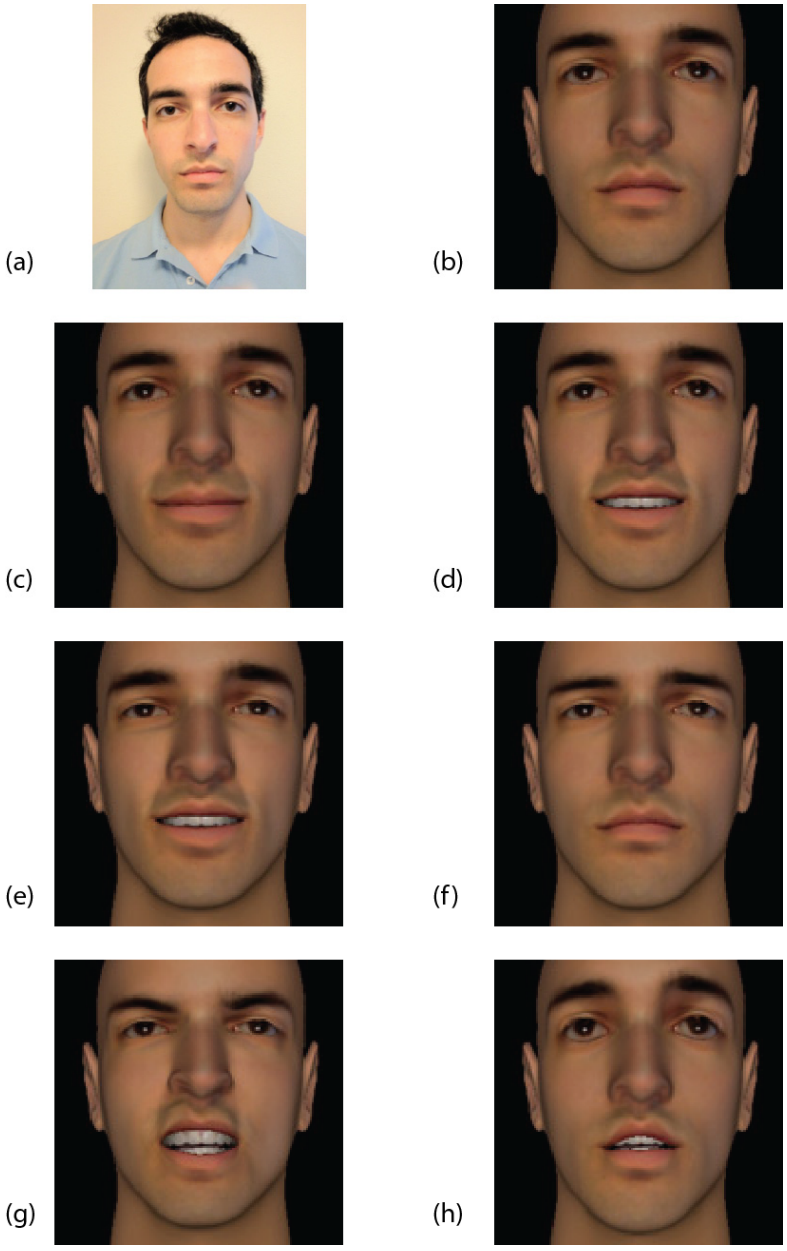
[12] The Facial Action Coding System (FACS) is a system for describing physically possible actions (i.e., movements or configurations) of the human face. Stating the FACS code, alone, merely describes the physical state of a face and does not necessarily implicate presence of any specific emotion. EMOFACS is a procedure for using FACS to identify the most common facial expressions of emotion (i.e., those emotions that have distinct facial displays).

[13] One of the 15 men's faces was accidentally excluded from the facial morphing procedure.

Figure 3:

Example Face Stimuli Created in FaceGen Modeller (Experiment 3)



Note. Figure 3. Example faces used in Experiment 3: (a) neutral man's face before being imported into FaceGen Modeller (never displayed to participants); (b) neutral/NT face; (c) smile with lips closed/SC face; (d) smile with lips open/SO face; (e) smile with lips open and eyes squinting/SS face; (f) sad/SA face; (g) angry/AN face; (h) surprised/SU face.

As previously stated, anger was chosen because it is a masculine emotion predicted to have an effect opposite to that of smiling, and the different types of smiles were selected to test whether the effect of smile would differ depending on the nature of the smile. Sad and surprised faces were included to test for the effects of other feminine-stereotyped emotions (e.g., Hess et al., 2004; LaFrance, 2011; LaFrance et al., 2003).

Procedure. Participants completed three blocks of trials. The procedure for the first block of trials – rating the faces' sexual orientation on a 7-point scale (1 = *very gay*; 7 = *very straight*; reverse-coded prior to analysis) – was identical to that of Experiment 1, except that the stimulus set was different; here, participants completed 98 trials, judging each of the 98 stimulus faces once per block. The other two blocks of trials were identical in structure to the first block except that the task was either to rate the faces' attractiveness on a 7-point scale (1 = *not at all attractive*; 4 = *somewhat attractive*; 7 = *extremely attractive*) or faces' masculinity/femininity (1 = *extremely feminine*; 2 = *moderately feminine*; 3 = *slightly feminine*; 4 = *neither feminine nor masculine*; 5 = *slightly masculine*; 6 = *moderately masculine*; 7 = *extremely masculine*; reverse-coded). The order of face stimuli was randomized for each block of trials for each participant.

In order to ensure that having participants rate faces' attractiveness or masculinity/femininity would not influence participants' perceptions of the faces' sexual orientation (the critical outcome variable), the first block of trials was always the sexual orientation judgment task. The order of the remaining two blocks of trials – attractiveness or masculinity/femininity ratings – was randomized across participants.

Data analytic strategy. As in Experiment 1, to account for the nested nature of the judgment data (emotional facial expressions within target people and target people within participants), responses were subjected to a 3-level multilevel regression model (MLM) using

HLM® 6.08 (Raudenbush, Bryk, & Congdon, 2004). Using this MLM framework properly accounts for the non-independent nature of responses at each level of the regression – i.e., the MLM accounts for any correlation of judgments from faces with different facial expressions (Level 1) but of the same target person (Level 2), and accounts for any correlation of judgments from faces of the same target person (Level 2) within participant (Level 3).

Results

Perceptions of sexual orientation. As in Experiment 1, sexual orientation judgments were reverse-scored into the variable STRGAY such that 1 = *very straight* and 7 = *very gay*. A multilevel regression model (MLM), constructed according to the guidelines provided by Nezlek (2001, 2008), was used to test for the effects of emotional facial expression on judgments of sexual orientation using a Level 1 intercept plus the following Level 1 effect codes (coded 0 = no; 1 = yes): SC (smile, closed lips), SO (smile, open lips), SS (smile with open lips and eye squint), SA (sad), AN (angry), and SU (surprise). As in Experiment 1, subscripts indicate face *i*, target person *j*, and participant *k*. As in Experiment 1 and as recommended by Nezlek (2001, 2008), the final model only includes random effect terms that were statistically significant:

$$\mathrm{STRGAY}_{ijk} = \pi_{0jk} + \pi_{1jk}*(\mathrm{SC}_{ijk}) + \pi_{2jk}*(\mathrm{SO}_{ijk}) + \pi_{3jk}*(\mathrm{SS}_{ijk}) + \pi_{4jk}*(\mathrm{SA}_{ijk}) + \pi_{5jk}*(\mathrm{AN}_{ijk}) + \pi_{6jk}*(\mathrm{SU}_{ijk}) + e_{ijk} \quad \text{(Level 1)}$$

$$\pi_{0jk} = \beta_{00k} + r_{0jk} \quad \text{(Level 2)}$$

$$\pi_{1jk} = \beta_{10k} \quad \text{(Level 2)}$$

$$\pi_{2jk} = \beta_{20k} \quad \text{(Level 2)}$$

$$\pi_{3jk} = \beta_{30k} \quad \text{(Level 2)}$$

$$\pi_{4jk} = \beta_{40k} \quad \text{(Level 2)}$$

$$\pi_{5jk} = \beta_{50k} \quad \text{(Level 2)}$$

$$\pi_{6jk} = \beta_{60k} \quad \text{(Level 2)}$$

$$\beta_{00k} = \gamma_{000} + u_{00k} \quad \text{(Level 3)}$$

$$\beta_{10k} = \gamma_{100} + u_{10k} \quad \text{(Level 3)}$$

$$\beta_{20k} = \gamma_{200} + u_{20k} \quad \text{(Level 3)}$$

$$\beta_{30k} = \gamma_{300} + u_{30k} \quad \text{(Level 3)}$$

$$\beta_{40k} = \gamma_{400} + u_{40k} \quad \text{(Level 3)}$$

$$\beta_{50k} = \gamma_{500} + u_{50k} \quad \text{(Level 3)}$$

$$\beta_{60k} = \gamma_{600} + u_{60k} \quad \text{(Level 3)}$$

$$\begin{aligned} \text{STRGAY}_{ijk} = {} & \gamma_{000} + \gamma_{100}*(\text{SC}_{ijk}) + \gamma_{200}*(\text{SO}_{ijk}) + \gamma_{300}*(\text{SS}_{ijk}) \\ & + \gamma_{400}*(\text{SA}_{ijk}) + \gamma_{500}*(\text{AN}_{ijk}) + \gamma_{600}*(\text{SU}_{ijk}) + r_{0jk} + u_{00k} \\ & + u_{10k}*(\text{SC}_{ijk}) + u_{20k}*(\text{SO}_{ijk}) + u_{30k}*(\text{SS}_{ijk}) + u_{40k}*(\text{SA}_{ijk}) \\ & + u_{50k}*(\text{AN}_{ijk}) + u_{60k}*(\text{SU}_{ijk}) + e_{ijk} \end{aligned} \quad \text{(Full Mixed Model)}$$

A preliminary MLM that included each face's attractiveness rating as a Level 1 covariate yielded the same pattern of significant results as the foregoing (final) model. So, for simplicity, attractiveness ratings were dropped from the model. A model including masculinity/femininity ratings will be presented below.

All estimated coefficients and inferential statistics are included in Table 1. Because effect codes were included at Level 1 to represent each emotional facial expression except neutral, the intercept (γ_{000}) can be interpreted as the grand mean perceived sexual orientation (where 1 = *very straight* and 7 = *very gay*) for men's faces with neutral facial expressions. Estimated coefficients for each of the expression effect codes can be interpreted as the grand mean difference in perceived sexual orientation caused by the effect-coded emotional facial expression (vs. neutral faces).

Table 1:

Multilevel Regression Coefficients Predicting Sexual Orientation Judgments as a Function of Emotional Facial Expression in Men's Faces

Note: Table 1. Effect codes (coded 0 = no; 1 = yes): SC (smile, closed lips), SO (smile, open lips), SS (smile with open lips and eye squint), SA (sad), AN (angry), and SU (surprise); NT (neutral) is presented parenthetically to aid interpretation (though not actually used as an effect code). Coefficients reflect the scale (1 = *very straight* and 7 = *very gay*). Number of Level 1 units = 13916; number of Level 2 units = 1988; number of Level 3 units = 142. Approximate degrees of freedom for each *t*-test = 141. Example stimuli are presented in Figure 3.

Effect	**For Face Type**	**Coefficient**	***SE***	***t*-ratio**	***p*-value**
γ_{000}	(NT)	3.40	0.06	57.55	< .0001
γ_{100}	SC	0.58	0.05	11.39	< .0001
γ_{200}	SO	0.54	0.05	10.45	< .0001
γ_{300}	SS	0.45	0.05	9.39	< .0001
γ_{400}	SA	-0.26	0.04	-6.72	< .0001
γ_{500}	AN	-0.50	0.07	-7.30	< .0001
γ_{600}	SU	0.49	0.05	9.58	< .0001

As shown in Table 1, the results, overall, were consistent with my hypotheses. Straight men's faces were judged as more gay when they were smiling (vs. neutral), regardless of the type of smile (smiling with lips closed, smiling with lips open, or smiling with lips open and squinted eyes; see Figures 3c, 3d, and 3e). Importantly, straight men's faces looked more straight (less gay) when they were angry (vs. neutral) – that is, compared with neutral men's faces, men's faces that contained a masculine emotional facial expression looked more straight (less gay). When men's faces contained a different feminine emotional facial expression – surprise – they also appeared more gay (vs. neutral expression).

The only result counter to expectations was that for sadness expressions. Sadness is generally considered a feminine expression (e.g., Johnson, McKay, & Pollick, 2011), but participants perceived sad faces as less gay in this experiment. As described in the Method section, an analysis of the sad faces using the Facial Action Coding System's EMOFACS procedure (Ekman et al., 2002) revealed that the "sad" faces did not actually contain the key characteristics of sad faces or any other specific emotional facial expression; the only clear difference between the "sad" faces and neutral faces was an increased prominence of the brow ridge. Since prominence of the brow ridge is a masculinity cue (e.g., Thornhill & Gangestad, 1999), the finding that the "sad" faces were perceived as less gay than the neutral men's faces is, ultimately, consistent with my theory.

Planned contrasts tested for differences in the magnitude of the effects for the three types of smiles. There was no statistically significant difference in the effect of closed-lipped vs. open-lipped smiles (contrast codes 0, 1, -1, 0, 0, 0, 0 for coefficients γ_{000}, γ_{100}, γ_{200}, γ_{300}, γ_{400}, γ_{500}, γ_{600}), $\chi^2(1) = 1.07$, $p = .30$. The two types of smiles that did not involve the eyes (i.e., closed-lipped and open-lipped smiles) were more impactful on perceptions of men's sexual orientation

than was the smile that included squinting eyes, which are characteristic of spontaneous or Duchenne smiles (contrast codes 0, .5, .5, -1, 0, 0, 0 for coefficients γ_{000}, γ_{100}, γ_{200}, γ_{300}, γ_{400}, γ_{500}, γ_{600}), $\chi^2(1) = 12.86$, $p = .0006$. There are several plausible reasons for the weaker effect of Duchenne-type smiles, and I will speculate about some possibilities in the Discussion section.

Perceptions of masculinity/femininity. Participants' judgments of faces' masculinity/femininity were reverse-coded into the variable MASCFEM such that 1 = *extremely masculine* … 7 = *extremely feminine* (all 7 scale points were labeled; see Procedure, above). Since perceived masculinity/femininity was hypothesized to be a critical factor in the process by which emotional facial expressions impacted sexual orientation judgments, I predicted that the pattern of results for masculinity/femininity would be identical to the pattern of results for the sexual orientation judgments. The following MLM was used to test for effects of emotional facial expressions on perceptions of men's masculinity/femininity:

$$\text{MASCFEM}_{ijk} = \pi_{0jk} + \pi_{1jk}*(\text{SC}_{ijk}) + \pi_{2jk}*(\text{SO}_{ijk}) + \pi_{3jk}*(\text{SS}_{ijk}) + \pi_{4jk}*(\text{SA}_{ijk}) + \pi_{5jk}*(\text{AN}_{ijk}) + \pi_{6jk}*(\text{SU}_{ijk}) + e_{ijk} \quad \text{(Level 1)}$$

$$\pi_{0jk} = \beta_{00k} + r_{0jk} \quad \text{(Level 2)}$$

$$\pi_{1jk} = \beta_{10k} \quad \text{(Level 2)}$$

$$\pi_{2jk} = \beta_{20k} \quad \text{(Level 2)}$$

$$\pi_{3jk} = \beta_{30k} \quad \text{(Level 2)}$$

$$\pi_{4jk} = \beta_{40k} \quad \text{(Level 2)}$$

$$\pi_{5jk} = \beta_{50k} \quad \text{(Level 2)}$$

$$\pi_{6jk} = \beta_{60k} \quad \text{(Level 2)}$$

$$\beta_{00k} = \gamma_{000} + u_{00k} \quad \text{(Level 3)}$$

$$\beta_{10k} = \gamma_{100} + u_{10k} \quad \text{(Level 3)}$$

$$\beta_{20k} = \gamma_{200} + u_{20k} \quad \text{(Level 3)}$$

$$\beta_{30k} = \gamma_{300} + u_{30k} \quad \text{(Level 3)}$$

$$\beta_{40k} = \gamma_{400} + u_{40k} \quad \text{(Level 3)}$$

$$\beta_{50k} = \gamma_{500} + u_{50k} \quad \text{(Level 3)}$$

$$\beta_{60k} = \gamma_{600} + u_{60k} \quad \text{(Level 3)}$$

$$\begin{aligned} \text{MASCFEM}_{ijk} = {} & \gamma_{000} + \gamma_{100}*(\text{SC}_{ijk}) + \gamma_{200}*(\text{SO}_{ijk}) + \gamma_{300}*(\text{SS}_{ijk}) \\ & + \gamma_{400}*(\text{SA}_{ijk}) + \gamma_{500}*(\text{AN}_{ijk}) + \gamma_{600}*(\text{SU}_{ijk}) + r_{0jk} + u_{00k} \\ & + u_{10k}*(\text{SC}_{ijk}) + u_{20k}*(\text{SO}_{ijk}) + u_{30k}*(\text{SS}_{ijk}) + u_{40k}*(\text{SA}_{ijk}) \\ & + u_{50k}*(\text{AN}_{ijk}) + u_{60k}*(\text{SU}_{ijk}) + e_{ijk} \end{aligned} \quad \text{(Full Mixed Model)}$$

All estimated coefficients and inferential statistics are included in Table 2. Because effect codes were included at Level 1 to represent each emotional facial expression except neutral, the intercept (γ_{000}) can be interpreted as the grand mean perceived masculinity/femininity for men's faces with neutral facial expressions (where 1 = *extremely masculine* … 7 = *extremely feminine*). Estimated coefficients for each of the expression effect codes can be interpreted as the grand mean difference in perceived masculinity/femininity (vs. neutral faces) caused by the effect-coded emotional facial expression.

Table 2:

Multilevel Regression Coefficients Predicting Masculinity/Femininity Judgments as a Function of Emotional Facial Expression in Men's Faces

Note: Table 2. Effect codes (coded 0 = no; 1 = yes): SC (smile, closed lips), SO (smile, open lips), SS (smile with open lips and eye squint), SA (sad), AN (angry), and SU (surprise); NT (neutral) is presented parenthetically to aid interpretation (though not actually used as an effect code). Coefficients reflect the scale (1 = *extremely masculine* … 7 = *extremely feminine*). Number of Level 1 units = 13916; number of Level 2 units = 1988; number of Level 3 units = 142. Approximate degrees of freedom for each *t*-test = 141. Example stimuli are presented in Figure 3.

Effect	**For Face Type**	**Coefficient**	***SE***	***t*-ratio**	***p*-value**
γ_{000}	(NT)	3.36	0.05	61.24	< .0001
γ_{100}	SC	0.47	0.04	11.69	< .0001
γ_{200}	SO	0.39	0.04	9.80	< .0001
γ_{300}	SS	0.26	0.04	5.94	< .0001
γ_{400}	SA	-0.35	0.03	-10.32	< .0001
γ_{500}	AN	-0.95	0.06	-15.35	< .0001
γ_{600}	SU	0.52	0.05	11.42	< .0001

As predicted, participants' perceptions of men's masculinity/femininity closely mirrored their perceptions of those men's sexual orientation – that is, the pattern of the coefficients in Table 2 is virtually identical to the pattern presented in Table 1.

Relationship between perceptions of masculinity/femininity and sexual orientation. To directly assess the relationship between perceptions of faces' masculinity/femininity and sexual orientation, I ran the following MLM:

$$\text{STRGAY\_Z}_{ijk} = \pi_{0jk} + \pi_{1jk}*(\text{MASFEM\_Z}_{ijk}) + e_{ijk} \quad \text{(Level 1)}$$

$$\pi_{0jk} = \beta_{00k} + r_{0jk} \quad \text{(Level 2)}$$

$$\pi_{1jk} = \beta_{10k} \quad \text{(Level 2)}$$

$$\beta_{00k} = \gamma_{000} \quad \text{(Level 3)}$$

$$\beta_{10k} = \gamma_{100} + u_{10k} \quad \text{(Level 3)}$$

$$\text{STRGAY\_Z}_{ijk} = \gamma_{000} + \gamma_{100}*(\text{MASFEM\_Z}_{ijk}) + r_{0jk} + u_{10k}*(\text{MASFEM\_Z}_{ijk}) + e_{ijk} \quad \text{(Full Mixed Model)}$$

Prior to MLM analysis in the HLM program, the variables in this model were manually standardized for each participant as follows (as in all 3-level MLMs presented in this paper, subscripts represent stimulus face *i*, target person *j*, and participant *k*):

$$\text{STRGAY\_Z}_{ijk} = (\text{STRGAY}_{ijk} - M_{\text{STRGAY}_k}) / SD_{\text{STRGAY}_k}$$

$$\text{MASCFEM\_Z}_{ijk} = (\text{MASCFEM}_{ijk} - M_{\text{MASCFEM}_k}) / SD_{\text{MASCFEM}_k}$$

By within-participant Z-standardizing ratings of faces' sexual orientation and masculinity/femininity, the slope for the effect of masculinity/femininity in this model (γ_{100}) can be interpreted as a correlation. By construction, the intercept was zero, $\gamma_{000} = 0.00$, $SE = 0.01$, $t(1987) = 0.00$, $p > .99$. As predicted, there was a moderately strong relationship between perceptions of men's faces' masculinity/femininity and perceptions of those faces' sexual

orientation, $\gamma_{100} = 0.36$, $SE = 0.02$, $t(141) = 26.19$, $p < .0001$. Substantively, this can be interpreted as an average correlation of $r = .36$ between ratings of men's face's masculinity/femininity and ratings of those faces' straight—gayness.

The average strength of the correlation between perceived masculinity/femininity and perceived sexual orientation did not significantly differ as a function of target person (i.e., the Level 2 random effect component for the slope of MASCFEM, r_1, was not significantly different from zero and therefore not included in the final model), which suggests that the moderately strong relationship between a man's face's perceived masculinity/femininity and perceived sexual orientation is fairly consistent across different men's faces. However, the correlation did differ as a function of participant, $u_{10k} = 0.16$, $\chi^2(141) = 550.06$, $p < .0001$. The random effect u_{10} indicates that although the mean correlation between perceived masculinity/femininity and perceived sexual orientation was approximately $\bar{r} = .36$, the size of the correlation significantly differed across participants. The standard deviation of the mean correlation was $SD_{\bar{r}} = 0.16$ (and specifically what u_{10k} tested is whether $SD_{\bar{r}}$ differs from zero, which is does). Accordingly, whereas the mean correlation was medium in size (i.e., $\bar{r} = .36$), for any given participant, the magnitude of the correlation may have ranged from small (e.g., $r = .20$, which is $\bar{r} - 1*SD_{\bar{r}}$) to large (e.g., $r = .52$, which is $\bar{r} + 1*SD_{\bar{r}}$).

Effects of emotional facial expressions on perceptions of sexual orientation controlling for perceptions of masculinity/femininity. Next, I tested whether emotional facial expressions had a detectable influence on perceptions of men's sexual orientation beyond the impact of differences in masculinity/femininity caused by the expression. To statistically control for the effect of masculinity/femininity ratings, I ran the following MLM:

$$\begin{aligned}\text{STRGAY}_{ijk} = {} & \pi_{0jk} + \pi_{1jk}*(\text{SC}_{ijk}) + \pi_{2jk}*(\text{SO}_{ijk}) + \pi_{3jk}*(\text{SS}_{ijk}) \\ & + \pi_{4jk}*(\text{SA}_{ijk}) + \pi_{5jk}*(\text{AN}_{ijk}) + \pi_{6jk}*(\text{SU}_{ijk}) \\ & + \pi_{7jk}*(\text{MASCFEM}_{ijk} \times \text{SC}_{ijk}) + \pi_{8jk}*(\text{MASCFEM}_{ijk} \times \text{SO}_{ijk}) \\ & + \pi_{9jk}*(\text{MASCFEM}_{ijk} \times \text{SS}_{ijk}) + \pi_{10jk}*(\text{MASCFEM}_{ijk} \times \text{SA}_{ijk}) \\ & + \pi_{11jk}*(\text{MASCFEM}_{ijk} \times \text{AN}_{ijk}) + \pi_{12jk}*(\text{MASCFEM}_{ijk} \times \text{SU}_{ijk}) \\ & + \pi_{13jk}*(\text{MASCFEM}_{ijk}) + e_{ijk} \end{aligned} \quad \text{(Level 1)}$$

$$\pi_{0jk} = \beta_{00k} + r_{0jk} \quad \text{(Level 2)}$$

$$\pi_{1jk} = \beta_{10k} \quad \text{(Level 2)}$$

$$\pi_{2jk} = \beta_{20k} \quad \text{(Level 2)}$$

$$\pi_{3jk} = \beta_{30k} \quad \text{(Level 2)}$$

$$\pi_{4jk} = \beta_{40k} \quad \text{(Level 2)}$$

$$\pi_{5jk} = \beta_{50k} \quad \text{(Level 2)}$$

$$\pi_{6jk} = \beta_{60k} \quad \text{(Level 2)}$$

$$\pi_{7jk} = \beta_{70k} \quad \text{(Level 2)}$$

$$\pi_{8jk} = \beta_{80k} \quad \text{(Level 2)}$$

$$\pi_{9jk} = \beta_{90k} \quad \text{(Level 2)}$$

$$\pi_{10jk} = \beta_{100k} \quad \text{(Level 2)}$$

$$\pi_{11jk} = \beta_{110k} \quad \text{(Level 2)}$$

$$\pi_{12jk} = \beta_{120k} \quad \text{(Level 2)}$$

$$\pi_{13jk} = \beta_{130k} \quad \text{(Level 2)}$$

$$\beta_{00k} = \gamma_{000} + u_{00k} \quad \text{(Level 3)}$$

$$\beta_{10k} = \gamma_{100} + u_{10k} \quad \text{(Level 3)}$$

$$\beta_{20k} = \gamma_{200} + u_{20k} \quad \text{(Level 3)}$$

$$\beta_{30k} = \gamma_{300} + u_{30k} \quad \text{(Level 3)}$$

$$\beta_{40k} = \gamma_{400} + u_{40k} \quad \text{(Level 3)}$$

$$\beta_{50k} = \gamma_{500} + u_{50k} \quad \text{(Level 3)}$$

$$\beta_{60k} = \gamma_{600} + u_{60k} \quad \text{(Level 3)}$$

$$\beta_{70k} = \gamma_{700} \quad \text{(Level 3)}$$

$$\beta_{80k} = \gamma_{800} \quad \text{(Level 3)}$$

$$\beta_{90k} = \gamma_{900} \quad \text{(Level 3)}$$

$$\beta_{100k} = \gamma_{1000} \quad \text{(Level 3)}$$

$$\beta_{110k} = \gamma_{1100} \quad \text{(Level 3)}$$

$$\beta_{120k} = \gamma_{1200} \quad \text{(Level 3)}$$

$$\beta_{130k} = \gamma_{1300} \quad \text{(Level 3)}$$

$$\begin{aligned} \text{STRGAY}_{ijk} = {} & \gamma_{000} + \gamma_{100}*(\text{SC}_{ijk}) + \gamma_{200}*(\text{SO}_{ijk}) + \gamma_{300}*(\text{SS}_{ijk}) + \gamma_{400}*(\text{SA}_{ijk}) \\ & + \gamma_{500}*(\text{AN}_{ijk}) + \gamma_{600}*(\text{SU}_{ijk}) + \gamma_{700}*(\text{MASCFEM}_{ijk} \times \text{SC}_{ijk}) \\ & + \gamma_{800}*(\text{MASCFEM}_{ijk} \times \text{SO}_{ijk}) + \gamma_{900}*(\text{MASCFEM}_{ijk} \times \text{SS}_{ijk}) \\ & + \gamma_{1000}*(\text{MASCFEM}_{ijk} \times \text{SA}_{ijk}) + \gamma_{1100}*(\text{MASCFEM}_{ijk} \times \text{AN}_{ijk}) \\ & + \gamma_{1200}*(\text{MASCFEM}_{ijk} \times \text{SU}_{ijk}) + \gamma_{1300}*(\text{MASCFEM}_{ijk}) \\ & + r_{0jk} + u_{00k} + u_{10k}*(\text{SC}_{ijk}) + u_{20k}*(\text{SO}_{ijk}) + u_{30k}*(\text{SS}_{ijk}) \\ & + u_{40k}*(\text{SA}_{ijk}) + u_{50k}*(\text{AN}_{ijk}) + u_{60k}*(\text{SU}_{ijk}) + e_{ijk} \quad \text{(Full Mixed Model)} \end{aligned}$$

All estimated coefficients and inferential statistics are included in Table 3. Because effect codes were included at Level 1 to represent each emotional facial expression except neutral, the intercept (γ_{000}) can be interpreted as the grand mean perceived sexual orientation (where 1 = *very straight* and 7 = *very gay*) for men's faces with neutral facial expressions, controlling for perceived masculinity/femininity (γ_{1300}). Because all MASCFEM × emotional

facial expression interactions were included in the model, estimated coefficients for each of the emotional facial expression effect code variables can be interpreted as the grand mean difference in perceived sexual orientation (vs. neutral faces) caused by the effect-coded emotional facial expression *over-and-above* the impact on sexual orientation judgments caused by the masculinity/femininity of the emotional facial expression.

A Deviance Test revealed that the model presented in Table 3 – predicting men's perceived sexual orientation as a function of each face's emotional facial expression *and* each face's perceived masculinity/femininity – fit the data better than the model presented in Table 1 (i.e., the model that did not include masculinity/femininity), $\chi^2(7) = 446.82$, $p < .001$. The significant Deviance Test indicates that the model presented in Table 3 accounted for the patterns in the data better than the model presented in Table 1 to a greater degree than would have been expected merely because the model in Table 3 contains more predictor variables.

Table 3:

Multilevel Regression Predicting Sexual Orientation Judgments of Men's Faces as a Function of Emotional Facial Expression, Controlling for Masculinity/Femininity

Note: Table 3. Effect codes (coded 0 = no; 1 = yes): SC (smile, closed lips), SO (smile, open lips), SS (smile with open lips and eye squint), SA (sad), AN (angry), and SU (surprise); NT (neutral) is presented parenthetically to aid interpretation (though not actually used as an effect code). Coefficients reflect the scale (1 = *very straight*; 7 = *very gay*). Number of Level 1 units = 13916; number of Level 2 units = 1988; number of Level 3 units = 142. Approximate degrees of freedom for each *t*-test = 141 (γ_{000} to γ_{600}) or 13902 (γ_{700} to γ_{1300}).

Effect	For Face Type	Coefficient	*SE*	*t*-ratio	*p*-value
γ_{000}	(NT)	2.58	0.10	26.52	< .0001
γ_{100}	SC	0.71	0.11	6.72	< .0001
γ_{200}	SO	0.75	0.11	6.57	< .0001
γ_{300}	SS	0.48	0.11	4.41	< .0001
γ_{400}	SA	-0.01	0.09	-0.15	.880
γ_{500}	AN	-0.05	0.11	-0.49	.627
γ_{600}	SU	0.52	0.11	4.69	< .0001
γ_{700}	SC×MASCFEM	-0.06	0.03	-2.45	.015
γ_{800}	SO×MASCFEM	-0.08	0.03	-2.85	.005
γ_{900}	SS×MASCFEM	-0.03	0.03	-0.99	.321
γ_{1000}	SA×MASCFEM	-0.05	0.02	-2.15	.032
γ_{1100}	AN×MASCFEM	-0.09	0.03	-2.77	.006
γ_{1200}	SU×MASCFEM	-0.04	0.03	-1.44	.150
γ_{1300}	(NT×)MASCFEM	0.24	0.02	10.09	< .0001

As displayed in Table 3, once faces' masculinity/femininity was accounted for, sad (γ_{400}) and angry (γ_{500}) expressions did not differ from neutral men's faces in perceived sexual orientation. This result is consistent with the possibility that the impact of sadness and anger facial expressions on perceptions of men's sexual orientation may be wholly driven by differences in perceived masculinity/femininity caused by the expressions.

However, all three types of smiling faces and surprised faces were still rated more gay than neutral men's faces even when the masculinity/femininity of each face was statistically accounted for (i.e., γ_{100}, γ_{200}, γ_{300}, and γ_{600} in Table 3). This result is consistent with the possibility that smiling and surprise emotional facial expressions make men's faces look more gay (vs. neutral expressions) in part due to the masculinity/femininity conveyed by the smiling or surprise expressions, but also in part for other reasons (e.g., gendered stereotypes of emotions that go beyond the actual gendered appearance of those emotions). Indeed, casually comparing the *t*-ratios for γ_{100}, γ_{200}, γ_{300}, and γ_{600} in Table 1 vs. Table 3 reveals that the effects of smiling and surprise on perceptions of men's sexual orientation were reduced as a result of covarying faces' masculinity/femininity.[14] That is, smiling and surprise emotional facial expressions had less unique ability to predict judgments of men's sexual orientation once the masculinity/femininity of each specific stimulus face was statistically controlled (i.e., covaried).

Mediation analysis. In the foregoing paragraph, I suggested that emotional facial expressions retained diminished unique ability to predict perceptions of sexual orientation when statistically controlling for faces' perceived masculinity/femininity (i.e., comparing *t*-ratios from

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[14] To compare the magnitude of effects across the models presented in Tables 1 and 3, *t*-ratios should be used as the estimate of effect size because *t*-ratios account for *SEM*. That is, if one looked only at the coefficients presented in Tables 1 and 3, it might actually appear that some effects became stronger in the latter model (the *opposite* of what I argue). However, because *SEM* also increased substantially for the coefficient estimates in the latter model, the effects are actually weaker in the latter model (as I argue and is conveyed by the *t*-ratios, which are adjusted for *SE*).

Tables 1 and 3). To directly test whether the indirect effects of emotional expression → masculinity/femininity → perceived sexual orientation were statistically reliable, I computed Sobel Z statistics for each emotional facial expression (Baron & Kenny, 1986; Preacher & Hayes, 2008) using a software application provided by Preacher and Leonardelli (2012). The tests of mediation were statistically significant for each emotional facial expression, Z's > 5.12, p's < .000001. This can be interpreted as evidence that the reductions in the t-statistics representing the effects of emotional facial expressions predicting perceptions of sexual orientation when faces' perceived masculinity/femininity was (Table 3) vs. was not (Table 1) covaried were caused, at least in part, by indirect effects from emotional expression → masculinity/femininity → perceived sexual orientation.

Discussion

Experiment 3 generalized the effects of smiling from Experiments 1 and 2, eliminated an important alternative hypothesis, and supported the process I propose underlies the effects.

The effect of smiling making men's faces look more gay (vs. neutral expressions) was replicated in this experiment using three distinct types of smiles: a smile with closed lips, a smile with open lips, and a smile with open lips and eyes squinting (see Figures 3c, 3d, and 3e). These three types of smiles were chosen so that a range of common types of smiles could be tested. The results demonstrated that the impact of smiling on perceptions of men's sexual orientation may be broadly invoked by various styles of smiling.

Results showed that the effect of smiling was slightly but significantly weaker for Duchenne smiles (involving eye squint) than for non-Duchenne smiles. There are several reasons that this might be the case. For instance, Duchenne smiles, best known as the *spontaneous* display associated with *genuine* happiness or enjoyment (e.g., Ekman, Davidson, &

Friesen, 1990), might be interpreted as conveying less about a person's personality beyond the emotion (i.e., happiness) in part because Duchenne smiles convey more about "true" or difficult-to-mask emotion than do non-Duchenne smiles. That is, Duchenne smiles' uniquely strong association with genuine emotion (vs. non-Duchenne smiles) might reduce misattribution of the smile to stable person characteristics (e.g., sexual orientation; masculinity/femininity). Another possibility is that Duchenne smiles, due to involvement of the eye area, might draw attention to the brow ridge more than other smiles do, and the facial masculinity cued by the brow ridge (Thornhill & Gangestad, 1999) might counteract the femininity of other components of the smile. However, these two (of many possible) post-hoc explanations are entirely speculative. In general, the finding that Duchenne smiles had less impact on men's perceived sexual orientation than did non-Duchenne smiles should be interpreted with caution until future research replicates the effect and tests a mechanism. The principal conclusion is that all three types of smiles (lips closed; lips open; lips open with eyes squinting) had relatively similar effects in making men's faces appear more gay.

Importantly, men's faces with anger expressions – a masculine display – were perceived as less gay (more straight) than neutral men's faces. This was a key finding (a) generally because it eliminates the alternative hypothesis that *any* emotional facial expression would make a man's face look more gay, e.g., due to stereotypes of gay men as broadly more emotional than straight men, and (b) specifically because it is consistent with my theory that emotional facial expressions impact perceptions of sexual orientation due to the gendered connotations of those emotional facial expressions.

The finding that men's apparent sexual orientation was modulated by emotional facial expressions in the direction that would be expected based on the gendered connotations of each

emotional facial expression (i.e., smiling and surprise – feminine expressions – made men's faces look more gay; anger – a masculine expression – made men's faces look more straight) lends credence to my proposed process for the effects. Further support for my proposed process comes from the MLM presented in Table 3. Specifically, when the masculinity/femininity of each face was covaried, emotional facial expressions had smaller impacts on perceptions of sexual orientation than when masculinity/femininity was not covaried (cf. Table 1). Of note, there was significant variability in stereotype strength – strength of the correlation between masculinity/femininity perceptions and sexual orientation perceptions – across participants. I will build on this in Experiment 4 by testing whether participants' stereotype strength relates to the accuracy of their sexual orientation perceptions.

Together, Experiments 1-3 support my theory that perceptions of sexual orientation will vary depending upon a face's emotional facial expression due to the gendered connotations of the emotional facial expressions. The next section will provide further support for this hypothesis by examining how emotional facial expressions intersect with target gender and target ethnicity to influence sexual orientation perceptions, and will provide additional tests of my theory about context-dependent effects of emotional facial expressions.

Chapter 4: How does smiling interact with gender and racial stereotypes to impact sexual orientation judgments?

Experiments 1-3 have provided a solid foundation on which to build my theory about how emotional facial expressions impact perceptions of people's sexual orientation. In Experiments 4 and 5, I will extend my theory by testing how emotional facial expressions impact sexual orientation judgments in different facial contexts: the context of gay vs. straight women's faces (Experiment 4), and the context of White vs. Black straight men's faces (Experiment 5).

Experiment 4

Does a woman's face look *less* gay if it contains a smile, an emotional facial expression that connotes femininity? If so, might the effect of a smile be larger for *gay* women's faces than for straight women's faces due to the greater contrast with the relative masculinity of gay (vs. straight) women's faces? Also, Experiment 3 found that there was significant variation in participants' stereotype strength (i.e., participants' correlation between masculinity/femininity and straight—gayness ratings). Does accuracy of sexual orientation perceptions differ depending on participants' stereotype strength?

Method

Participants. One hundred five University of Washington students (71 women, 34 men) participated in this experiment in exchange for extra credit in psychology classes. Participants ranged from 18-23 years of age (M = 19.14). The majority of participants were White (n = 27) or Asian/Asian American (n = 64).

Apparatus. Same as Experiment 1.

Facial photograph selection and preparation. Photographs of self-identified straight and gay women were obtained from an online dating website (OkCupid.com) by research

assistants unaware of the research hypothesis. The stimulus set included 15 neutral gay women's faces, 15 smiling gay women's faces, 15 neutral straight women's faces, and 15 smiling straight women's faces. These photographs came from 15 unique gay women and 15 unique straight women; each woman had one smiling facial photograph and one neutral facial photograph. The facial photograph selection and preparation methods were the same as those reported in the Method section of Experiment 1. Faces used in this experiment were conceptually identical to those used in Experiment 1 (see Figure 1), except they were faces of women instead of men.

Procedure. On each trial, a facial photograph appeared on the screen along with a horizontal 7-point Likert-type scale (1 = *very gay*; 7 = *very straight*) used in previous research (e.g., Rule et al., 2008) and Experiments 1 and 3. Each participant rated 60 faces, 15 of each type (gay/neutral, gay/smiling, straight/neutral, and straight/smiling), presented in random order for each participant. Participants were instructed to use their "gut instinct" to "rate each person's sexual orientation." As in Experiments 1 and 3, each facial photograph remained on screen until the participant rendered a judgment by clicking on a number (1-7) using the computer mouse (*Mean* reaction time = 2369 ms). The intertrial interval was 1000 ms.

As in Experiment 3, there were two other blocks of trials that were identical in structure to the first block of trials except that the task was either to rate the faces' attractiveness on a 7-point scale (1 = *not at all attractive*; 4 = *somewhat attractive*; 7 = *extremely attractive*) or to rate faces' masculinity/femininity (1 = *extremely feminine*; 2 = *moderately feminine*; 3 = *slightly feminine*; 4 = *neither feminine nor masculine*; 5 = *slightly masculine*; 6 = *moderately masculine*; 7 = *extremely masculine*; *not* reverse-coded). The order of face stimuli was randomized for each block of trials for each participant. As in Experiment 3, in order to ensure that having participants rate faces' attractiveness or masculinity/femininity would not influence participants'

perceptions of the faces' sexual orientation (the critical dependent measure), the first block of trials was always the sexual orientation judgment task. The order of the remaining two blocks of trials – attractiveness or masculinity/femininity ratings – was randomized across participants.

Data analytic strategy. MLMs were run in HLM® 6.08 (Raudenbush et al., 2004). Otherwise, data analytic strategy for Experiment 4 was identical to that of Experiment 1. Note that in this experiment, masculinity/femininity was not reverse-coded, so higher scores indicate greater masculinity.

Results

How smiling impacts perceptions of women's sexual orientation. Sexual orientation judgments were reverse-scored so that 1 = *very straight* and 7 = *very gay*. A multilevel regression model (MLM), constructed according to the guidelines provided by Nezlek (2001, 2008), was used to test for the effects of emotional facial expression (SMILE, coded neutral = 0 and smiling = 1) and face sexual orientation (ORIENT, coded straight = 0 and gay = 1) on judgments of women's sexual orientation (subscripts indicate face *i*, target person *j*, and participant *k*). As recommended by Nezlek (2001, 2008), the final model only includes random effect terms that were statistically significant:

$$\text{STRGAY}_{ijk} = \pi_{0jk} + \pi_{1jk}*(\text{SMILE}_{ijk}) + e_{ijk} \quad \text{(Level 1)}$$

$$\pi_{0jk} = \beta_{00k} + \beta_{01k}*(\text{ORIENT}_{jk}) + r_{0jk} \quad \text{(Level 2)}$$

$$\pi_{1jk} = \beta_{10k} + \beta_{11k}*(\text{ORIENT}_{jk}) \quad \text{(Level 2)}$$

$$\beta_{00k} = \gamma_{000} + u_{00k} \quad \text{(Level 3)}$$

$$\beta_{01k} = \gamma_{010} + u_{01k} \quad \text{(Level 3)}$$

$$\beta_{10k} = \gamma_{100} + u_{10k} \quad \text{(Level 3)}$$

$$\beta_{11k} = \gamma_{110} \quad \text{(Level 3)}$$

$$STRGAY_{ijk} = \gamma_{000} + \gamma_{010}*(ORIENT_{jk}) + \gamma_{100}*(SMILE_{ijk}) + \gamma_{110}*(SMILE_{ijk}\times ORIENT_{jk}) + r_{0jk} + u_{00k} + u_{01k}*(ORIENT_{jk}) + u_{10k}*(SMILE_{ijk}) + e_{ijk} \quad \text{(Full Mixed Model)}$$

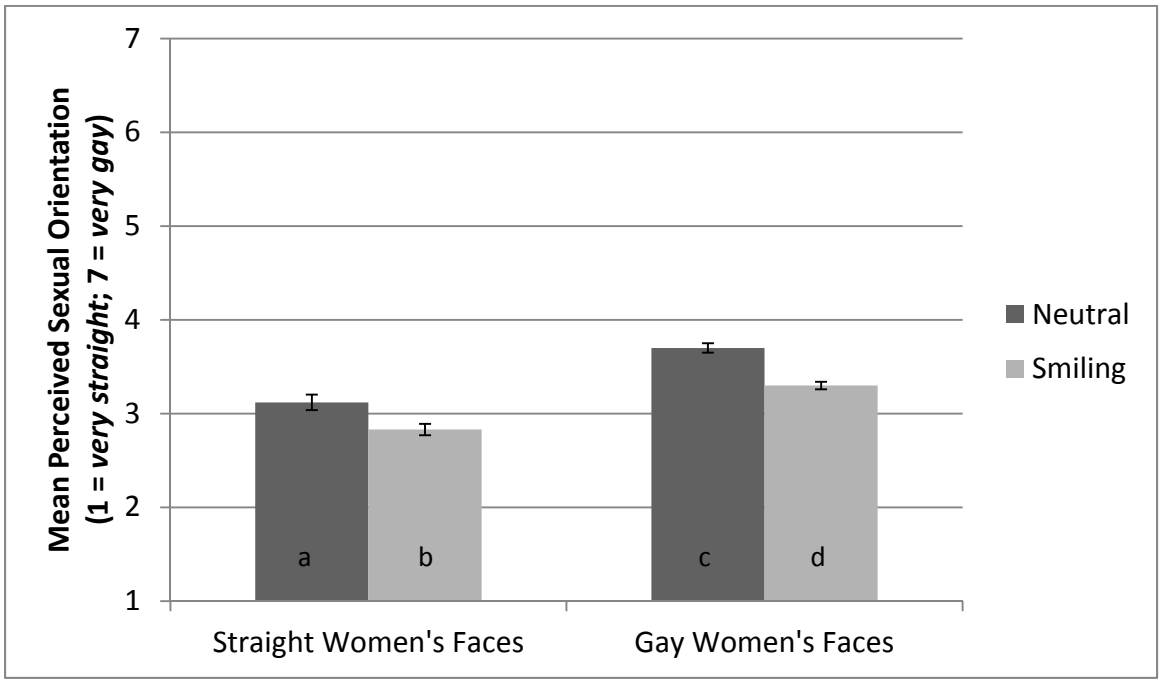
Coefficient γ_{000} can be interpreted as the grand average straight—gayness rating for straight women's faces with neutral expressions; $\gamma_{000} = 3.12$, $SE = 0.08$, $t(104) = 37.20$, $p < .0001$. Coefficient γ_{010} can be interpreted as the grand average difference in straight—gayness ratings for gay women's faces with neutral expressions vs. straight women's neutral faces; $\gamma_{010} = 0.58$, $SE = 0.05$, $t(104) = 11.04$, $p < .0001$, showing that gay women's faces with neutral facial expressions were perceived as significantly more gay looking than straight women's faces with neutral expressions.

Women were perceived as more gay when neutral (vs. smiling). Coefficient γ_{100} can be interpreted as the grand average difference in straight—gayness ratings for straight women's faces when smiling vs. neutral, $\gamma_{100} = -0.29$, $SE = 0.06$, $t(104) = -5.22$, $p < .0001$. Coefficient γ_{110} can be interpreted as the difference in the size of the effect of smiling for gay women's faces vs. straight women's faces. The effect of women's faces being judged *less* gay when smiling than when neutral was significantly *greater* in magnitude for gay women's faces than for straight women's faces, $\gamma_{110} = -0.11$, $SE = 0.04$, $t(6296) = -2.50$, $p = .01$. The total effect of smiling on gay women's faces = $\gamma_{100} + \gamma_{110}$ (approximately -0.40). *Mean* perceptions of sexual orientation for women's faces (gay/neutral, gay/smiling, straight/neutral, and straight/smiling) are presented in Figure 4.

Figure 4:

Mean Perceptions of Women's Sexual Orientation as a Function of Faces'

Actual Sexual Orientation and Emotional Facial Expression



Note. Figure 4. Mean perceptions of women's sexual orientation as a function of faces' actual sexual orientation and emotional facial expression in Experiment 4. Bars labeled with different letters are significantly different from each other, $p < .05$. Error bars represent ±1 *SEM*.

How sexual orientation judgment accuracy differs depending on participants' stereotype strength. Here, stereotype strength was defined as each participant's correlation between masculinity/femininity perceptions and sexual orientation perceptions. Positive correlations indicated greater stereotype strength – that is, positive correlations indicated greater correspondence between perceiving women's faces as masculine and perceiving women's faces as gay. For each participant, the correlation coefficient was computed as ST_STRENGTH_r. Across participants, the *Mean* of ST_STRENGTH_r was $\bar{r} = .39$ and $SD_{\bar{r}} = .24$.[15] (This correlation did not significantly differ as a function of target person's sexual orientation or emotional facial expression, so the correlation was computed for all faces, collapsing across these factors.) To aid with interpretation of the final model, each participant's ST_STRENGTH_r was Z-transformed:

$$\text{ST\_STRENGTH\_rZ}_k = (\text{ST\_STRENGTH\_r}_k - \bar{r}) / SD_{\bar{r}}$$

As a result of this transformation, ST_STRENGTH_rZ represents each participant's stereotype strength as the number of standard deviation units above or below the mean stereotype strength correlation. In essence, ST_STRENGTH_r was grand-mean standardized into the variable ST_STRENGTH_rZ. Sexual orientation perceptions were also grand-mean standardized into the variable STRGAY_Z prior to analysis to aid with interpretation.

The impact of stereotype strength on accuracy of perceiving women's sexual orientation was tested using the following model:

$$\text{STRGAY\_Z}_{ijk} = \pi_{0jk} + e_{ijk} \quad \text{(Level 1)}$$

$$\pi_{0jk} = \beta_{00k} + \beta_{01k}*(\text{ORIENT}_{jk}) + r_{0jk} \quad \text{(Level 2)}$$

$$\beta_{00k} = \gamma_{000} + u_{00k} \quad \text{(Level 3)}$$

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[15] The "stereotype strength" construct appears to be a reliable measure of individual differences; split-half reliability of stereotype strength was $r(102) = .68$, $p < .0001$.

$$\beta_{01k} = \gamma_{010} + \gamma_{011}*(\text{ST\_STRENGTH\_rZ}_k) \quad \text{(Level 3)}$$

$$\text{STRGAY\_Z}_{ijk} = \gamma_{000} + \gamma_{010}*(\text{ORIENT}_{jk}) + \gamma_{011}*(\text{ORIENT}_{jk}\times\text{ST\_STRENGTH\_rZ}_k) + r_{0jk} + u_{00k} + e_{ijk} \quad \text{(Full Mixed Model)}$$

The intercept, which can be interpreted as the average *Z*-scored straight—gayness rating of straight women's faces for participants with average stereotype strength, was γ_{000} = -0.17, *SE* = 0.05, $t(104) = -3.29$, $p = .002$, indicating that all else constant, straight women's faces were judged significantly more "straight" than the grand average straight—gayness rating of all faces. Coefficient γ_{010}, which can be interpreted as the average difference in *Z*-scored straight-gayness rating for gay women's faces compared to straight women's faces (the intercept, γ_{000}) for participants with average stereotype strength, was $\gamma_{010} = 0.34$, *SE* = 0.02, $t(3148) = 14.30$, $p < .0001$. In the context of this model, sexual orientation perception accuracy is equivalent to the difference between straight—gayness perceptions of straight and gay women's faces; i.e., for a participant with average stereotype strength, accuracy of differentiating straight and gay women's faces is $\gamma_{010} = 0.34$ standard deviation units of perceived straight—gayness. However, when a participant's stereotype strength differs from average, then accuracy is $\gamma_{010} + \gamma_{011}$ – that is, coefficient γ_{011} represents the difference in accuracy attributable to stereotype strength. The model showed that $\gamma_{011} = 0.14$, *SE* = 0.02, $t(3148) = 6.07$, $p < .0001$. This revealed that participants with greater stereotype strength (i.e., higher correlation between femininity—masculinity and straight—gayness for women's faces) had higher sexual orientation judgment accuracy (i.e., γ_{011} was positive and significantly different from zero, showing that the point-biserial correlation between faces perceived and actual correlation, γ_{010}, a measure of accuracy (see Rule et al., 2008) increased with stereotype strength). For instance, participants with

stereotype strength 1 *SD* above the mean stereotype strength would have, on average, rated straight vs. gay women's faces as 0.48 standard deviation units apart in straight—gayness. In contrast, participants with stereotype strength 1 *SD* below the mean stereotype strength would have, on average, rated straight vs. gay women's faces as only 0.20 standard deviation units apart in straight—gayness.

Discussion

As expected, gay women's faces, overall, were perceived as more gay than were straight women's faces. Women's faces looked less gay when they were smiling (vs. a neutral expression). Importantly, there was a facial expression × sexual orientation interaction such that smiles (vs. neutral facial expressions) impacted perceived sexual orientation more for gay women's faces than for straight women's faces, though the effect of smiling was still statistically significant for straight women's faces. These results – a mirror image of the effects of smiling in gay and straight men's faces in Experiment 1 – are consistent with the *context-dependence hypothesis*, which states that the impact of an emotional facial expression should be greater when it is in greater contrast with the rest of the face. Gay women's faces were perceived as more masculine than straight women's faces, and I propose that this is what made smiles, which connote femininity, have a greater effect for straight (vs. gay) women's faces.

Whereas the effects of smiling on perceptions of gay and straight women's sexual orientation were the exact opposite of the effects of smiling on perceptions of gay and straight men's sexual orientation (cf. Experiment 1), the explanation for the effects of smiling on perceptions of sexual orientation is the same for both cases (i.e., smiles acted as femininity cues). The empirical fact that smiling made women's faces appear *less* gay eliminates the potential

alternative explanation that a semantic link between smiling/happy and homosexual (i.e., both being acceptable definitions of "gay") could be driving these effects.

Interestingly, stereotype strength was related to accuracy of perceiving women's sexual orientation. Participants who had tighter connections between their ratings of women's femininity—masculinity and straight—gayness were more accurate in distinguishing women's sexual orientation. This is tangential to my primary hypotheses, but hints at the intriguing possibility that the use of stereotypes, in some circumstances, may increase accuracy of sexual orientation judgments (cf. Freeman et al., 2010a). Moreover, to my knowledge, this is the first experiment to discover a reliable individual-difference predictor of sexual orientation judgment accuracy. I will revisit this in the General Discussion.

Thus far, I have provided evidence for the hypothesis of context-dependent effects of emotional facial expressions by manipulating the sexual orientation context (i.e., straight vs. gay) in which the emotional facial expressions have occurred (Experiments 1, 2, and 4). Though the results of Experiments 1, 2, and 4 all supported my hypothesis, it is possible that the context-dependent effects occurred at least in part because the "context" (faces' actual sexual orientation) was tightly connected to the dependent variable (the faces' perceived sexual orientation). Theoretically, it is important to demonstrate context-dependent effects of emotional facial expressions on sexual orientation judgments when the manipulated facial context factor is not closely associated with sexual orientation. Face ethnicity (i.e., Black vs. White) is an effective manipulation of masculinity and is not directly connected to sexual orientation (e.g., Johnson et al., 2012). I manipulated face ethnicity (Black vs. White) and tested how emotional facial expressions impacted perceptions of men's sexual orientation in Experiment 5.

Experiment 5

Experiments 1-3 showed that men's faces look more gay if they contain a smile, an emotional facial expression that connotes femininity. Might the effect of a smile be larger for Black men's faces than for White men's faces due to the greater contrast with the relative masculinity of Black (vs. White) men's faces (cf. Ito & Urland, 2003; Zebrowitz et al., 2010)?

Method

Participants. Seventy University of Washington students (39 women, 31 men) participated in exchange for extra credit in psychology classes. Participants ranged from 18-26 years of age (M = 19.16). All participants self-identified as White. Perceptions of faces of different ethnicities differ as a function of perceiver ethnicity for a variety of reasons (see, e.g., Bernstein, Young, & Hugenberg, 2007; Ma & Correll, 2011; Shriver, Young, Hugenberg, Bernstein, & Lanter, 2008), so non-White participants were excluded from this experiment.

Apparatus. Same as Experiment 1.

Facial photograph selection and preparation. Same as Experiment 3 except as follows: Fifteen straight White men's faces and 15 straight Black men's neutral faces were provided by the Eberhardt Face Database (Eberhardt et al., 2004).[16] The faces were digitized using FaceGen Modeller and each face was posed in a neutral facial expression and in a smiling emotional facial expression (smile with closed lips; code SC from Experiment 3; see Figures 3b and 3c for example stimuli). There were a total of 60 face stimuli (15 White men × 2 expressions + 15 Black men × 2 expressions).[17]

Procedure. Same as Experiment 3.

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[16] See footnote 10.

[17] Faces of Asian/Asian American men were originally included in addition to the faces of Black and White men, but the digitized Asian/Asian American faces appeared ambiguous in ethnicity and were therefore dropped from analysis and are not discussed further.

Data analytic strategy. Same as Experiments1 and 4.

Results

Predicting sexual orientation judgments as a function of emotional facial expression and face ethnicity. Sexual orientation judgments were reverse-scored so that 1 = *very straight* and 7 = *very gay*. A multilevel regression model (MLM), constructed according to the guidelines provided by Nezlek (2001, 2008), was used to test for the effects of emotional facial expression (SMILE, coded neutral = 0 and smiling = 1) and face ethnicity (ETHNICITY, coded White = 0 and Black = 1) on judgments of men's sexual orientation (subscripts indicate face *i*, target person *j*, and participant *k*). As recommended by Nezlek (2001, 2008), the final model only includes random effect terms that were statistically significant:

$$\text{STRGAY}_{ijk} = \pi_{0jk} + \pi_{1jk}*(\text{SMILE}_{ijk}) + e_{ijk} \quad \text{(Level 1)}$$

$$\pi_{0jk} = \beta_{00k} + \beta_{01k}*(\text{ETHNICITY}_{jk}) + r_{0jk} \quad \text{(Level 2)}$$

$$\pi_{1jk} = \beta_{10k} + \beta_{11k}*(\text{ETHNICITY}_{jk}) \quad \text{(Level 2)}$$

$$\beta_{00k} = \gamma_{000} + u_{00k} \quad \text{(Level 3)}$$

$$\beta_{01k} = \gamma_{010} + u_{01k} \quad \text{(Level 3)}$$

$$\beta_{10k} = \gamma_{100} + u_{10k} \quad \text{(Level 3)}$$

$$\beta_{11k} = \gamma_{110} \quad \text{(Level 3)}$$

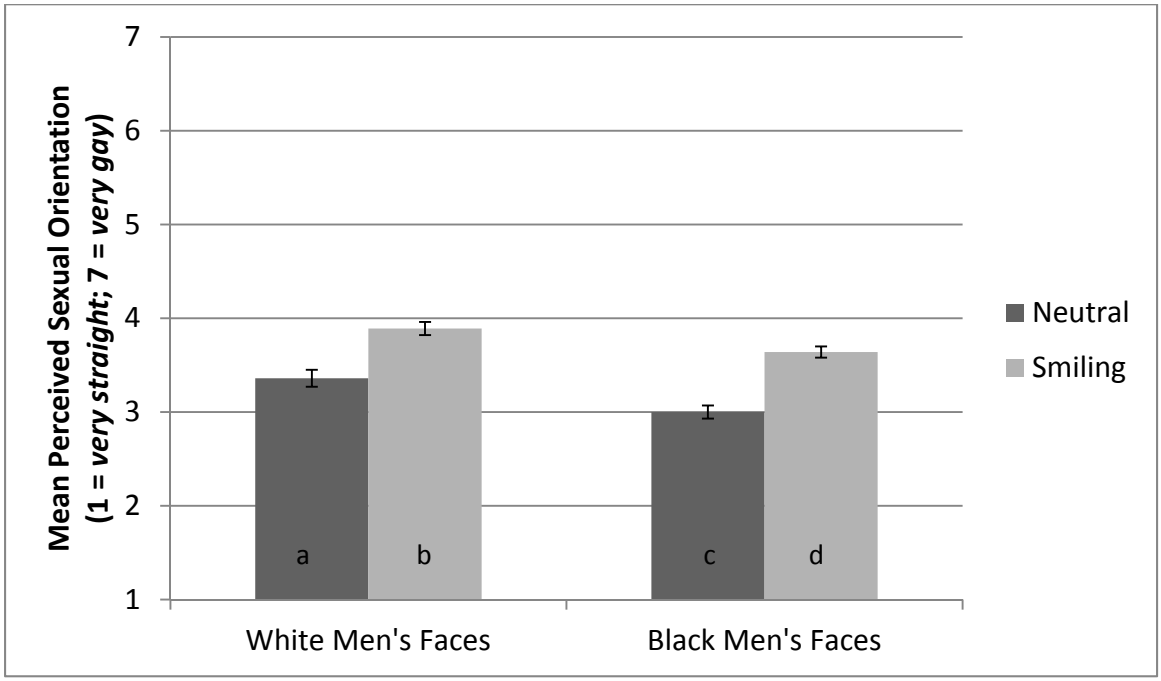
$$\begin{aligned}\text{STRGAY}_{ijk} = {} & \gamma_{000} + \gamma_{010}*(\text{ETHNICITY}_{jk}) + \gamma_{100}*(\text{SMILE}_{ijk}) \\ & + \gamma_{110}*(\text{SMILE}_{ijk}\times\text{ETHNICITY}_{jk}) + r_{0jk} + u_{00k} \\ & + u_{01k}*(\text{ETHNICITY}_{jk}) + u_{10k}*(\text{SMILE}_{ijk}) + e_{ijk}\end{aligned} \quad \text{(Full Mixed Model)}$$

The intercept, which can be interpreted as the grand average straight—gayness rating for White men's faces with neutral expressions, was $\gamma_{000} = 3.36$, $SE = 0.09$, $t(69) = 37.21$, $p < .0001$. On average, Black men's faces with neutral expressions were perceived as significantly less gay

looking than White men's neutral faces, γ_{010} = -0.36, *SE* = 0.07, *t*(69) = -5.19, *p* < .0001. This is consistent with the idea that, at least for White participants, Black men's faces are perceived as more masculine than White men's faces (e.g., Zebrowitz et al., 2010).

Men's faces were perceived as more gay when smiling (vs. neutral). White men's faces were judged as significantly more gay when smiling (vs. neutral), γ_{100} = 0.53, *SE* = 0.07, *t*(69) = 8.07, *p* < .0001. Black men's faces were also judged more gay when smiling than when neutral, and the size of the effect of smiling was significantly *greater* for Black men's faces than for White men's faces, γ_{110} = 0.11, *SE* = 0.06, *t*(4196) = 1.92, *p* = .05. (Note that the total effect of smiling for Black men's faces is $\gamma_{100} + \gamma_{110}$.) *Mean* perceptions of sexual orientation for men's faces (Black, White, neutral, smiling) are presented in Figure 5.

Figure 5: Mean Perceptions of Men's Sexual Orientation as a Function of Faces' Ethnicity and Emotional Facial Expression



Note. Figure 5. Mean perceptions of men's sexual orientation as a function of faces' actual ethnicity and emotional facial expression in Experiment 5. Bars labeled with different letters are significantly different from each other, $p < .05$. Error bars represent ±1 *SEM*. All participants in this experiment self-identified as White. [18]

[18] Seven Black participants participated in this experiment, so the data from Black participants could be reliably analyzed (separately) due to the highly-repeated-measures experimental design. Black participants rated White men's faces as more masculine and more straight than Black men's faces, and although Black participants did see smiling as making faces appear more feminine and more gay, the effect of smiling was greater for White men's faces than for Black men's faces for Black participants. This is precisely the opposite pattern of the data from White participants (shown in Figure 5, above). It is intriguing to speculate that perhaps different types of "White masculinity" and "Black masculinity" are perceived by Black vs. White participants, potentially accounting for Black participants' opposite results – but, ultimately, no known theory can account for the pattern of data obtained from Black participants in this experiment.

Predicting sexual orientation judgments as a function of emotional facial expression and face ethnicity, controlling for faces' perceived masculinity/femininity. In Experiment 3, I tested whether masculinity/femininity perceptions would explain the effects that different emotions had on judgments of sexual orientation. Here, I tested whether differences in masculinity/femininity would explain why the same emotional facial expression (smiling) would have different degrees of impact in different types of faces (i.e., Black vs. White men). To explore whether accounting for differences in perceived masculinity/femininity as a function of face ethnicity would account for the context-dependent effects of smiling in the foregoing model, I ran the following MLM (note: MASCFEM was grand-mean centered to facilitate model interpretation):

$$\text{STRGAY}_{ijk} = \pi_{0jk} + \pi_{1jk}*(\text{SMILE}_{ijk}) + \pi_{2jk}*(\text{MASCFEM}_{ijk}) + e_{ijk} \quad \text{(Level 1)}$$

$$\pi_{0jk} = \beta_{00k} + \beta_{01k}*(\text{ETHNICITY}_{jk}) + r_{0jk} \quad \text{(Level 2)}$$

$$\pi_{1jk} = \beta_{10k} + \beta_{11k}*(\text{ETHNICITY}_{jk}) \quad \text{(Level 2)}$$

$$\pi_{2jk} = \beta_{20k} + \beta_{21k}*(\text{ETHNICITY}_{jk}) \quad \text{(Level 2)}$$

$$\beta_{00k} = \gamma_{000} + u_{00k} \quad \text{(Level 3)}$$

$$\beta_{01k} = \gamma_{010} + u_{01k} \quad \text{(Level 3)}$$

$$\beta_{10k} = \gamma_{100} + u_{10k} \quad \text{(Level 3)}$$

$$\beta_{11k} = \gamma_{110} \quad \text{(Level 3)}$$

$$\beta_{20k} = \gamma_{200} + u_{20k} \quad \text{(Level 3)}$$

$$\beta_{21k} = \gamma_{210} + u_{21k} \quad \text{(Level 3)}$$

$$\begin{aligned}\text{STRGAY}_{ijk} = {} & \gamma_{000} + \gamma_{010}*(\text{ETHNICITY}_{jk}) + \gamma_{100}*(\text{SMILE}_{ijk}) \\ & + \gamma_{110}*(\text{SMILE}_{ijk}\times\text{ETHNICITY}_{jk}) + \gamma_{200}*(\text{MASCFEM}_{ijk}) \\ & + \gamma_{210}*(\text{ETHNICITY}_{jk}\times\text{MASCFEM}_{ijk}) + r_{0jk} + u_{00k}\end{aligned}$$

$$+ u_{01k}*(\text{ETHNICITY}_{jk}) + u_{10k}*(\text{SMILE}_{ijk}) + u_{20k}*(\text{MASCFEM}_{ijk})$$

$$+ u_{21k}*(\text{ETHNICITY}_{jk}\times\text{MASCFEM}_{ijk}) + e_{ijk} \qquad \text{(Full Mixed Model)}$$

Masculinity/femininity was a significant predictor of perceived sexual orientation, γ_{200} = 0.30, SE = 0.03, $t(69) = 11.13$, $p < .0001$. The relationship between masculinity/femininity and perceived sexual orientation did not significantly differ for Black (vs. White) faces, γ_{210} = 0.04, SE = 0.03, $t(69) = 1.36$, $p = .18$.

When statistically controlling for (i.e., covarying) each face's masculinity/femininity, the intercept, which can be interpreted as the grand average straight—gayness rating for White men's faces with neutral expressions and average masculinity/femininity, was γ_{000} = 3.38, SE = 0.08, $t(69) = 41.77$, $p < .0001$. On average, when controlling for faces' masculinity/femininity, Black men's faces were perceived as significantly less gay than were White men's faces with neutral expressions, γ_{010} = -0.24, SE = 0.06, $t(69) = -3.74$, $p = .001$.

Men's faces were perceived as more gay when smiling (vs. neutral), even when controlling for faces' perceived masculinity/femininity. White men's faces were judged as significantly more gay when smiling (vs. neutral), γ_{100} = 0.41, SE = 0.06, $t(4192) = 7.02$, $p <$ .0001. Unlike the previous model that did not include faces' masculinity/femininity as a covariate, here, when controlling for faces' perceived masculinity/femininity, the size of the effect of smiling did not differ for Black (vs. White) men's faces, γ_{110} = 0.03, SE = 0.06, $t(69) =$ 0.44, $p = .67$. This result is consistent with the possibility that smiles were more impactful on perceptions of Black vs. White men's sexual orientation due to the greater perceived masculinity of Black men's faces. (So when the difference in perceived masculinity/femininity between Black and White men's faces was statistically controlled, the contrast effect – the emotional facial expression × race interaction – was no longer statistically significant.)

Discussion

As expected, Black men's faces, overall, were perceived as less gay than were White men's faces. Men's faces looked more gay when they were smiling (vs. a neutral expression). Importantly, there was a facial expression × face ethnicity interaction such that smiles (vs. neutral facial expressions) impacted perceived sexual orientation more for Black men's faces than for White men's faces, though the effect of smiling was still statistically significant for White men's faces. Moreover, the facial expression × face ethnicity interaction was no longer statistically significant when controlling for faces' perceived masculinity/femininity. These results, again, are consistent with the *context-dependence hypothesis*, which states that the impact of an emotional facial expression should be greater when it is in greater contrast with the rest of the face. Here, Black men's faces were perceived as more masculine than White men's faces, potentially making feminine-stereotyped smiles stand out more. This shows that the impact of emotional facial expressions on perceptions of sexual orientation can depend on the facial context even when the facial context factor is unrelated to sexual orientation (e.g., ethnicity).

Chapter 5: General Discussion

Could something as impermanent as an emotional facial expression influence perceptions of a person's sexual orientation? In five experiments, I showed that emotional facial expressions impacted sexual orientation judgments consistent with the gendered connotations of the emotional displays (e.g., smiling is feminine; anger is masculine). Moreover, several studies provided evidence for *context-dependent* effects of emotional facial expressions – evidence that the impact of emotional facial expressions on perceptions of sexual orientation was largest when the gendered emotional facial expression was in contrast to the "context" of the faces' overall masculinity/femininity (e.g., smiles were more impactful in straight men's than gay men's faces).

The statistical analyses performed across the five experiments yielded a broad array of findings. First, I will explain the most novel theoretical advances of this work and recapitulate the principal conclusions of the experiments. Then, I will integrate the current work within the broader research context and discuss how this research may relate to everyday experience.

What is Novel about this Research?

Previous research has shown that after briefly viewing facial photographs of unknown men and women, people are able to judge their sexual orientation with above-chance accuracy (e.g., Rule & Ambady, 2008a; Rule et al., 2008; Rule et al., 2009; Tabak & Zayas, 2012). Research has also shown that gender atypicality cues – that is, cues to femininity among men or masculinity among women – reliably predict a person being perceived as gay (e.g., Dunkle & Francis, 1990; Freeman et al., 2010a; Johnson & Ghavami, 2011; Johnson et al., 2007).

However, prior research has focused on stable, trait-like masculinity/femininity cues, such as skin tone or facial structure (Freeman et al., 2010a). This is the first research to test whether emotional facial expressions – facial cues that carry gendered connotations but are

contemporaneous or state-like instead of stable or trait-like – could influence perceptions of sexual orientation. This is also the first work to test whether contextual factors would modulate the strength with which emotional facial expressions impact perceived identities. Here, I tested two primary hypotheses: (1) that emotional facial expressions would impact sexual orientation judgments when the emotional facial expressions act as gender atypicality cues and (2) that there would be context-dependent effects of emotional facial expressions on judgments of sexual orientation, such that the impact of emotional facial expressions would be greater when the expressions were in more contrast with gendered cues present in the rest of the face (i.e., the gendered cues provided by the rest of the face would act as "context" in which the emotional facial expression would be interpreted). Below, I review results that support each hypothesis.

Gendered connotations of emotional facial expressions impact perceptions of sexual orientation. Smiling is an emotional facial expression that connotes femininity (e.g., Hess et al., 2005; Hess et al., 2009; Hess et al., 2004; LaFrance, 2011; LaFrance et al., 2003). Based on previous research showing that stereotypes of gender atypicality, at least in part, underlie sexual orientation judgments (Freeman et al., 2010a; Johnson et al., 2007), I predicted that men's faces would look more gay when smiling than when neutral. The data concurred. On average, men were judged as more gay when their faces contained a smile (vs. a neutral expression). This finding replicated using two different judgment methods: Likert-scale ratings of sexual orientation (Experiments 1, 3, and 5) and dichotomous forced-choice sexual orientation categorizations (Experiment 2). The result replicated using real men's faces (Experiments 1 and 2) as well as computer-generated men's faces (Experiments 3 and 5). Moreover, the result replicated both with emotional facial expression manipulated within-participant (Experiments 1, 3 and 5) or between-participants (Experiment 2) – that is, the result occurred even when potential

perceptual contrast effects between smiling and neutral faces were methodologically circumvented because each participant saw only smiling or neutral faces (Experiment 2).

Theoretically, I proposed that the effects of smiling were not due to a direct link between smiling and gayness perceptions (e.g., smile = gay), but were caused by the feminine connotation carried by smiling. Supporting this hypothesis, Experiment 4 showed that smiles made women's faces appear *less* gay – consistent with the idea that adding femininity (i.e., a smile, vs. neutral) to a woman's face decreases gender atypicality, and therefore decreases perceived gayness, and inconsistent with the alternative that smiling globally invokes the concept "gay".

My theory extends to other emotional facial expressions that carry gendered connotations. To test whether the theory generalizes beyond smiling, I examined whether other gendered emotional facial expressions, such as anger, which is masculine, and surprise, which is feminine (e.g., Hess et al., 2005; Hess et al., 2009; Hess et al., 2004), would impact perceptions of sexual orientation consistent with the connoted masculinity/femininity of the expressions. As expected, Experiment 3 replicated the effect of smiling on judgments of men's sexual orientation and also showed that men's faces appeared less gay when angry (vs. neutral) and more gay when surprised (vs. neutral). Additionally, Experiment 3 used statistical techniques to show that the effects of emotional facial expressions on sexual orientation perceptions were driven at least in part by the fact that the emotional facial expressions caused differences in perceived masculinity/femininity of the faces (see Table 3, above).

Together, these experiments demonstrated that emotional facial expressions act as masculinity/femininity cues consistent with the gendered connotations of the emotions they represent, and therefore emotional facial expressions make faces appear more or less gay by increasing or decreasing the gender atypicality of the faces. Importantly, in all experiments,

facial expression was manipulated within target-person (i.e., the same people were smiling, neutral, etc.), so there could not have been any actual differences in personality or identity between the faces that differed in expression. Moreover, the results replicated with natural smiles that could have qualitatively differed across target people (Experiments 1, 2, and 4) and with computer-generated smiles that were identical for all target faces (Experiments 3 and 5). This is the first research to demonstrate that emotional facial expressions modulate perceptions of people's sexual identity.

The impact of smiling on perceptions of sexual orientation depends on facial context. The first major hypothesis advanced in this research was that emotional facial expressions would impact perceptions of sexual orientation due to the gendered connotations of the emotional facial expressions. In the foregoing section, I reviewed the most important findings in support of that hypothesis. The second major hypothesis advanced in this research is that emotional facial expressions would exert *context-dependent effects* on perceptions of sexual orientation. I predicted that the impact of an emotional facial expression would be greater when the masculinity/femininity of the expression was in greater contrast with the context provided by the masculinity/femininity of the rest of the face.

For instance, in the case of smiling, which is a feminine emotional facial expression, I predicted that the impact of smiling would be greater in the context of masculine faces than in the context of feminine faces.[19] That is what the data revealed. Specifically, although the effect of smiling on perceived gayness of men's faces was significant for both gay and straight men's faces, it was significantly stronger for straight men's faces than gay men's faces (which are presumed to be more and less relatively masculine, respectively; Freeman et al., 2010a). The

[19] I am referring to relative masculinity/femininity within gender. No experiment in this paper included both men's and women's faces, so a direct comparison of the effect size of smiles for men's vs. women's faces was not possible.

significant smiling × face sexual orientation interaction emerged for men's faces in Experiment 1, using Likert-scale ratings of sexual orientation, as well as in Experiment 2, using dichotomous, forced-choice sexual orientation categorizations.

Moreover, the reverse context-dependent effect of smiling was found among women's faces (as expected). Thus, it is not the case that the effect of smiling is always greater among straight people's faces. In Experiment 4, smiling made women's faces appear *less* gay and although the effect was significant both for straight and gay women's faces, the effect of smiling was actually stronger for gay women's faces than for straight women's faces. Additionally, each face's masculinity/femininity was measured in Experiment 4. In Experiment 4, gay women's faces were perceived as more masculine (less feminine) than straight women's faces (i.e., it was not necessary to merely presume that gay and straight women's faces differed in perceived masculinity/femininity). This supports my argument that the effect of smiling, a femininity cue, was strengthened by the greater contrast with the masculinity/femininity facial context.

Experiment 5 examined the effect of smiling among men who differed in a cue – ethnicity (Black or White) – that is tied to masculinity/femininity but not to sexual orientation or to smiling (cf. Johnson et al., 2012; Johnson & Ghavami, 2011) and provided further evidence for the context-dependence hypothesis. Because Black men's faces are perceived as more masculine than White men's faces (e.g., Johnson et al., 2012; Zebrowitz et al., 2010), I predicted that while smiles would, overall, make Black and White men's faces appear more gay (vs. neutral faces), the effect of smiling would be greater for Black men's faces than for White men's faces due to the greater contrast with the higher perceived masculinity of Black men's faces.[20]

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[20] See footnote 8.

The data were consistent with predictions. Black and White men's faces were perceived as more gay when smiling (vs. neutral), but the effect of smiling was larger for Black men's faces than for White men's faces. Again, each face's masculinity/femininity was rated, and Black men's faces were perceived as more masculine than White men's faces, which is consistent with the proposition that the effect of smiling was greater for Black (vs. White) men's faces due to the relatively greater perceived masculinity of Black men's faces. Moreover, when statistically controlling for each face's masculinity/femininity, the main effect of smiling on sexual orientation judgments remained statistically significant, but the smiling × target face ethnicity interaction was no longer statistically significant. Statistically equating Black and White men's faces on masculinity/femininity (via covariation) was a methodological technique for eliminating the hypothesized contrast between the femininity conveyed by the smiles and the masculinity/femininity of the rest of the face. When the faces' masculinity/femininity was controlled in this way, the effect of smiling no longer differed in magnitude between the more masculine (i.e., Black) and less masculine (i.e., White) men's faces. That is what would be expected according to my theory that the greater effect of smiling (a femininity cue) was caused by greater contrast with masculinity context of the rest of the face. This was perhaps the most direct test of the context-dependence hypothesis.

Together, Experiments 1, 2, 4, and 5 demonstrated that the face acts as a "context" in which its own facial features or expressions are interpreted (Experiment 3 did not test this hypothesis). When faces were judged, overall, as relatively more masculine (e.g., gay women's faces [Experiment 4] or Black men's faces [Experiment 5]), a smile (a feminine emotional facial expression) impacted perceptions of sexual orientation more than when faces were judged relatively as less masculine (e.g., straight women's faces [Experiment 4] or White men's faces

[Experiment 5]). The observed effects are, more generally, consistent with recently-proposed dynamic theories of personal construal, which assert that person information is continuously aggregated and, accordingly, is integrated into person perceptions in a continuous manner (see Freeman & Ambady, 2011). That is, the result that a face can act as context for the interpretation of its own features fits with the idea that different sources of information from the same face are processed in parallel and can dynamically interact with each other to impact person perceptions.

Emotional facial expressions impact sexual orientation judgment accuracy due to their context-dependent effects. Though the primary focus of this research has not been sexual orientation judgment accuracy, statistically significant levels of sexual orientation judgment accuracy were observed in each of the studies that involved the use of actual gay and straight people's faces. In Experiments 1, 2, and 4, on average, gay people's faces were rated as significantly more gay than straight people's faces. Experiment 2 directly tested whether accuracy in a sexual orientation categorization task was greater for neutral men's faces than for smiling men's faces (it was). Conceptually similar effects can be found in Experiments 1 and 4, wherein sexual orientation judgment accuracy (i.e., the perceived difference between gay and straight faces measured by Likert-scale ratings) was reduced (but still statistically significant) for smiling (vs. neutral) men's (Experiment 1) and women's (Experiment 4) faces.

As predicted, the reduced accuracy for judging sexual orientation of smiling (vs. neutral) faces was a consequence of the context-dependent effects of the emotional facial expressions. If smiling had made all men's faces appear more gay to the same degree, then any increase in the proportion of gay men's faces correctly identified as gay would have been offset by an approximately equal increase in the proportion of straight men's faces incorrectly identified as gay, resulting in approximately a net zero change in accuracy as a function of smiling. But

smiling did not impact all faces similarly. Smiling reliably exerted a greater effect on sexual orientation perceptions when it was in greater contrast with the perceived masculinity/femininity of the rest of the face. Accordingly, as discussed, smiling impacted perceptions of straight men's faces more than it impacted perceptions of gay men's faces. So, as shown directly in Experiment 2 and conceptually replicated in Experiments 1 and 4 (with men's and women's faces, respectively), the increase in the proportion of straight men's faces incorrectly identified as gay outweighed any change in the proportion of gay faces correctly identified as gay, resulting in an overall decrease in sexual orientation judgment accuracy for smiling (vs. neutral) faces. (For women's faces, in Experiment 4, accuracy decreased for the same theoretical reason but the opposite numerical reason; the decrease in the proportion of gay women's faces correctly seen as gay outweighed the decrease in the proportion of straight women's faces incorrectly seen as gay, resulting in reduced overall accuracy for smiling vs. neutral women's faces.)

Sexual orientation stereotype strength moderated accuracy of judging sexual orientation. In Experiment 4, I showed that sexual orientation stereotype strength – defined as each participant's correlation between straight/gayness and masculinity/femininity perceptions and interpreted as an index of how strongly a participant conceptualized non-heterosexual orientation as gender atypicality – moderated accuracy of differentiating straight and gay women's faces. Participants with greater stereotype strength were significantly more accurate at discerning straight vs. gay women's faces than were participants with average or below average stereotype strength (i.e., accuracy levels for those with +1 or -1 *SD* of stereotype strength both differed in accuracy from participants with average stereotype strength). To my knowledge, this is the first discovery of a reliable individual difference predictor of accuracy in a sexual

orientation judgment task. And, indeed, entire projects have been devoted to trying to discover individual difference predictors of sexual orientation judgment accuracy (e.g., Tabak, 2009).

Though Experiment 4 demonstrated that stereotype strength (a participant's correlation between gay/straight and masculinity/femininity judgments) positively predicted the ability to differentiate gay and straight women's faces, it is difficult to interpret this finding broadly. The present research was not designed to determine *why* individual differences in stereotype strength emerged, so providing an understanding of why people who differed in stereotype strength differed in judgment accuracy is beyond the scope of the present experiments. One could speculate that individual differences in stereotype strength are driven simply by individual differences in comfort with applying stereotypes (e.g., restricted ranges). A different possibility is that individual differences in stereotype strength reflect differences in sensitivity to facial cues. Given that there are no other known individual difference predictors of sexual orientation judgment accuracy, it would be prudent for future research to explore this result more fully.

The relationship between stereotypes of gender atypicality and perceptions of sexual orientation. The present research has provided strong evidence that stereotypes of gender atypicality – femininity among men and masculinity among women – drive sexual orientation judgments. Previous work (e.g., Freeman et al., 2010a; Johnson et al., 2007) has come to the same conclusion. It is crucial to keep in mind that despite repeated discoveries of the ways in which stereotypes drive judgments and may even increase judgment accuracy (e.g., Experiment 4), it is highly unlikely that stereotypes of gender atypicality are the only predictor of sexual orientation judgments. Even from a purely mathematical position, it is clear that while gender atypicality may be a significant predictor of perceived sexual orientation, there is still a large

amount of variance in perceptions of sexual orientation that is not accounted for by gender atypicality.

Given that there is substantial variability in perceptions of sexual orientation that gender atypicality does not explain, why might it be that research on sexual orientation judgments has centered on gender atypicality cues as predictors? Perhaps research has focused on stereotypes as predictors of snap judgments because the link is intuitive – i.e., researchers may be driven, in part, by confirmation bias (even if unintentionally). That is, ironically, the very existence of stereotypes might actually be biasing researchers, including me, towards performing experiments that "discover" (or confirm) the significant predictive ability of the stereotypes. The existence of stereotypes may restrict researchers' thinking and inhibit the development of theories regarding sexual orientation judgment predictors besides stereotypes. Alternatively, it may be that sexual orientation judgments are relatively unreliable beyond the variance accounted for by stereotypes. Still another possibility is that current research techniques may not be adequate for detecting whatever other factors are driving sexual orientation judgments due to lack of precision when searching for more subtle predictors of person perceptions. The possible explanations are many. The important point is that stereotypes of gender atypicality are not the *only* factor driving sexual orientation judgments, despite the strong evidence linking stereotypes and judgments.

How Does this Research Fit with Extant Work?

I have emphasized the novel aspects of this research, but these advances dovetail nicely with existing research. Overall, the present work highlights the value of investigating intersectionality in person perception research (e.g., Freeman, Pauker, Apfelbaum, & Ambady, 2010b; Johnson et al., 2012). Intersectionality research stresses the importance of testing how person perceptions differ when two person attributes – e.g., concomitant identities – are both

manipulated within an experiment. In general, intersectionality work has focused on the intersections of two identities to show how impressions of one identity (e.g., gender) differ as a function of the other manipulated identity (e.g., race) (see Johnson et al., 2012). The present work – specifically, support for the context-dependent effects of emotional facial expressions – extends the intersectionality framework by showing that impression formation may differ not only at the intersection of stable person attributes (e.g., race and gender), but also at the intersection of stable and transient person attributes (e.g., race and emotional facial expression; gender and emotional facial expression; sexual orientation and emotional facial expression). Beyond broadly supporting and advancing work on intersectionality in person perception, the present findings have direct implications for a variety of domains, including gaydar research, research on other snap judgments, and impression formation research methods.

Integrating with existing gaydar research. The most obvious implication for gaydar research – that is, research on snap judgments of sexual orientation from faces (e.g., Rule & Ambady, 2008a; Rule et al., 2008; Rule et al., 2009; Tabak & Zayas, 2012) – stems from Experiment 2. Experiment 2 replicated the sexual orientation categorization task most frequently used in previous research on snap judgments of men's sexual orientation (e.g., Rule & Ambady, 2008a; Tabak & Zayas, 2012), but introduced a between-participants manipulation of emotional facial expression (smiling vs. neutral). Sexual orientation judgment accuracy was above chance levels for smiling faces (about 57% accuracy), but was significantly greater for neutral faces (about 63% accuracy). Given the sources of stimuli used in previous gaydar experiments (i.e., online social networking websites and online dating websites), it is highly likely that the vast majority of faces used in previous gaydar research were of smiling people as a result of the fact that the vast majority of photos available from such sources are of smiling faces (LaFrance,

2011). So, previous gaydar experiments may have actually *underestimated* average sexual orientation judgment accuracy.

(However, if sexual orientation judgments are typically based on smiling faces in everyday life, it could be that the lower accuracy estimates obtained from smiling faces are more representative of everyday accuracy. Whether the higher or lower estimate of average judgment accuracy is more "correct" is unknown. The principal conclusion is that sexual orientation judgment accuracy can differ due to faces' emotional expressions. Indeed, the impact of smiling on judgments of sexual orientation influences perceptions *in vivo* – when a plethora of other cues such as clothing and body language are present and may distract from the face – can only be tested in future research.)

Because the effect of smiling on perceptions of sexual orientation differs for straight vs. gay men and for straight vs. gay women, future gaydar research may need to take extra precautions when attempting to control for variation in emotional facial expressions across faces of each sexual orientation. For instance, Tabak & Zayas (2012) "controlled" for emotional facial expression in their experiments by ensuring that the proportion of smiling vs. neutral faces did not differ for straight vs. gay target people. Such an effort to "control" for emotional facial expression would generally be considered adequate and appropriate. However, in light of the present research, that method of controlling for emotional facial expression may not be optimal. That is, even if the same percentage of gay and straight men's faces were smiling in Tabak and Zayas' experiments, the effect of emotional facial expression was likely larger for the straight men's faces than for the gay men's faces – whether the differential effect of smiling represents (a) error in measurement or (b) might actually be a feature of the research (potentially enhancing generalizability) depends largely on the specific research question that is being addressed. It will

be essential for future face perception research to interpret findings in light of the emotional facial expressions of the faces, especially when multiple identities are compared.

Integrating with non-gaydar snap judgment research. Here, I proposed that emotional facial expressions interacted with facial context (the relative masculinity/femininity "context" of faces that differed in sexual orientation, gender, or ethnicity) to impact sexual orientation judgments due to the overlap between implications of the emotional facial expression (i.e., masculinity/femininity connotations), cues provided by the facial context (i.e., masculinity/femininity), and cues utilized in the process of judging sexual orientation (again, masculinity/femininity). There may be many other person characteristics for which snap judgments could be impacted by emotional facial expressions through a similar mechanism.

For example, anger connotes dominance, men (vs. women) are stereotyped as dominant, and judgments of leadership potential are related to dominance (e.g., Rule & Ambady, 2008b, 2009; Todorov, Mandisodza, Goren, & Hall, 2005). Could judgments of leadership ability be impacted by emotional facial expressions such as anger differently for men's and women's faces? It is an empirical question (and one with mixed evidence; see Brescoll & Uhlmann, 2008; Livingston, Rosette, & Washington, 2012), but the theory I advance in this paper would predict an affirmative answer – and a counterintuitive affirmative at that. That is, anger is generally considered less acceptable for women (vs. men) to display (Hess et al., 2005), but it could be that anger makes faces look more like leaders (Tiedens, 2001; Trichas & Schyns, 2012), and perhaps more so for women than for men due to greater contrast of anger in women's (vs. men's) faces. So even though anger is usually frowned upon in women, expressing it might enhance women's chances of being perceived as leaders.

Integrating with research methods. The illustration in the foregoing paragraph is one of an infinite number of combinations of emotional facial expressions, traits or identities, and judgments in which emotional facial expressions might not only impact impressions (i.e., "main effect") but also exhibit context-dependent effects (i.e., "expression × face identity/trait interaction"). Current research methods typically involve using faces primarily or exclusively with one facial expression (e.g., smiling or neutral). Utilizing faces that do not appreciably differ in emotional facial expression may be an appropriate technique for controlling for effects of emotional facial expressions. However, the present research suggests that it may *not* be appropriate to generalize results obtained using only one facial expression beyond judgments made from faces containing that emotional facial expression.

What Does this Research Mean for Everyday Life?

The five experiments presented here were all performed in a controlled lab setting. The extent to which the results generalize to everyday life can only be determined by future research (e.g., experiments involving live interaction between a participant and a confederate of the researcher whose facial emotive behavior is experimentally manipulated). Additionally, faces are frequently perceived in combination with other aspects of physical appearance (such as clothing or gesticulations), and little is known about how these various sources of physical appearance combine to affect sexual orientation judgments. Nonetheless, the results of the present research are relevant to a number of everyday social psychological phenomena. Here, I will speculate about how the present research may be interpreted in light of everyday experiences in which emotional facial expressions relate to discrimination and strategic use of emotional displays, as well as romantic flirting behavior.

Relation to discrimination and strategic emotion. I use the term strategic emotion to refer to selective, goal-directed expression or suppression of emotional displays; the process may occur consciously and deliberately or automatically and entirely outside of conscious awareness (e.g., see Gross, Richards, & John, 2006). As discussed in the Introduction chapter, there are strong gender differences in smiling behavior. A meta-analysis of over 400 studies including over 100,000 participants showed that women outsmile men by a considerable margin (LaFrance et al., 2003). Additionally, it is likely that gender differences in expressivity are driven not by evolved tendencies, but by social-cognitive factors (Zayas et al., 2009). Given that smiling makes men's faces appear more gay (vs. neutral faces) – and this effect is actually more pronounced for straight men's faces than for gay men's faces – could men be using emotion strategically to avoid bias?

Since gay men (or generally feminine men, even if not gay) are discriminated against, it is plausible that men may be strategically underexpressing smiles in order to avoid bias and discrimination (again, this could be conscious or nonconscious strategy). Similarly, women could be overexpressing smiles in order to avoid the stigma associated with gay (or relatively masculine, even if not gay) women. Future research could test these possibilities. Admittedly, gender differences in smiling behavior could be explained by gender norms alone – but the idea that gender differences in smiling may be caused in part by gender norms and in part due to fear of being misclassified as a sexual minority is theoretically viable (cf. "misclassification threat," Bosson, Prewitt-Freilino, & Taylor, 2005). In turn, this raises the intriguing possibility that nondiscrimination protection for sexual minorities might not only alleviate stress among sexual minority people but also among sexual majority people faced with misclassification threat.

Sexual majority members' attempting to avoid the stigma dealt to sexual minorities may not be the only strategic use of emotion related to discrimination. Sexual minorities might also strategically use emotion to conform to social norms and avoid being subjected to bias (Bosson, Weaver, & Prewitt-Freilino, 2011). Consider the case in which a gay man is interviewing for a leadership position. Given that gay (or feminine) men are stereotyped as weak (Madon, 1997) and the average gay man's face may already be slightly more feminine than the average straight man's face, it may feel crucial for the gay man to suppress any feminine emotional facial expressions, such as smiles, during the interview.

Perhaps the most perplexing smiling situations fall upon ethnic minorities. Experiment 5 revealed that the effect of smiling making men's faces appear more gay was stronger for Black men's faces than for White men's faces due to the relative perceived masculinity of Black men's faces. Volumes of research have shown that stereotypes of Black men as dominant and threatening are pervasive and related to racial discrimination (e.g., Hugenberg & Bodenhausen, 2003). One way to combat being perceived as dominant or threatening is to smile (Hess et al., 2005; Tidd & Lockard, 1978). But the present results imply that smiling behavior among Black men may also put them at increased risk of discrimination (if perceived as gay or effeminate). Future research should explore the puzzling intersection of race and emotion within domains related to dominance (e.g., perceived leadership, perceived criminality).

The preceding discussion presented discrimination (or fear thereof) as a cause of strategic emotion – that is, a cause of using emotion to conform to norms or expectations, consciously or otherwise. Strategic use of emotion and adherence to norms likely also reinforces the very display rules driving biases. For instance, if hiring managers believe they need to hire unfeminine men for leadership positions and men are aware of this and therefore generally act

unfeminine (e.g., un-smiley) during interviews for leadership positions, then hiring managers' stereotypes of unfeminine (and un-smiley) people as ideal candidates would be regularly validated (cf. van Kleef, De Dreu, & Manstead, 2004a, 2004b). When discrimination processes are iterative – such as display rules motivating behavior and behavior, in turn, perpetuating display rules (or stereotypes) – it may be especially difficult to change display rules; few people want to wager the potential accomplishment of defying stereotypes against the risk of being excluded from major life opportunities (e.g., jobs).

Relation to romantic flirting and the smiling paradox. Romantic flirting presents a bit of a paradox with respect to smiling. Cultural norms and display rules predict that smiling behavior detracts from men's success in a domain (e.g., smiling or otherwise acting feminine leading to men's exclusion from managerial roles) (LaFrance, 2011). This pattern does not hold in the domain of romantic flirting. Both for men and women, and possibly throughout many parts of the world, smiling is an integral, if tacit, behavioral component of expressing romantic interest (e.g., Cunningham, Druen, & Barbee, 1997; Hazan & Diamond, 2000; LaFrance, 2011; Tidd & Lockard, 1978). As demonstrated in this and previous research, smiling makes men's faces appear more feminine. But women, on average, prefer masculine men as romantic and sexual partners (Buss & Schmitt, 1993; Hazan & Diamond, 2000).

How can we reconcile the findings that women prefer masculine men, smiling is feminine, and yet men generally must exhibit smiles to flirt and attract women as romantic or sexual partners? Perhaps the domain of romantic relationships presents a scenario in which a man's being perceived as slightly stereotypically gay – e.g., warm, caring, and affiliative – could be a competitive advantage. The idea that there might be situations in which a straight man could gain by taking on specific aspects of a typically stigmatized identity (i.e., gay man) seems

slightly perverse. Yet this proposition is consistent with research indicating that straight men who are most successful in attracting female dates and mates are not *only* masculine, but rather have a mix of masculine characteristics and some stereotypically gay male (or feminine) characteristics including warmth (Cunningham et al., 1997; Hazan & Diamond, 2000), which, in particular, smiles convey (Hess et al., 2005; LaFrance et al., 2003; Naumann et al., 2009).

Dissecting the relationship between smiling and flirting indicates that there is at least one domain in which smiling – displaying a stereotypically feminine cue – could be advantageous for men. Future research should explore whether there may be opportunities for combating gender norms by examining the specific factors that allow gender atypical emotional expressions (e.g., smiling among men) to be acceptable in certain situations (e.g., flirting) and testing whether those factors can be successfully introduced into situations where gender atypical emotional expressions are typically less acceptable.

Conclusion

Emotional facial expressions – facial expressions such as smiles or frowns that are typically associated with emotions – convey more than just sentiment. Many emotional facial expressions are stereotyped as masculine or feminine. Perceived masculinity/femininity predicts a variety of trait (e.g., dominance) and identity (e.g., ethnicity) impressions; in particular, judgments of others' sexual orientation seem to be driven by perceived masculinity or femininity. Here, I demonstrated that gendered connotations of emotional facial expressions explain how emotional facial expressions modulate our perceptions of others' sexual orientation. I found that feminine emotional facial expressions (e.g., smiles) make men's faces look more gay (Experiments 1, 2, 3, and 5), feminine emotional facial expressions (e.g., smiles) make women's faces look more straight (Experiment 4), and masculine emotional facial expressions (e.g., anger)

make men's faces appear more straight (Experiment 3). Moreover, the effects of emotional facial expression were not the same for all faces, they were *context-dependent* – the effects depended on the masculinity/femininity context provided by the rest of the face. For instance, straight and gay men's faces looked more gay when smiling (vs. neutral), but the effect was greater in the context of straight men's faces than in the context of gay men's faces. Similarly, smiling made men's faces appear more gay, but the effect was greater in the context of Black men's faces than White men's faces due to the greater perceived masculinity of Black faces.

Can something as impermanent as a smile influence perceptions of something as important and personal as sexual orientation? Yes. Can the face act as its own context, with the magnitude of effects of emotional facial expressions differing depending upon information conveyed by the rest of the face – the context in which the emotional facial expression resides? Yes. Further, the data indicate that stereotypes of gender atypicality may substantially drive how another's sexual orientation is judged.

Indeed, the data are clear: At least in the eye of the beholder, *you are what you emote*.

References

"Gay." (2012). Merriam-Webster's Online Dictionary. Retrieved April 14, 2012, from: http://www.merriam-webster.com/dictionary/gay

Ambady, N., Hallahan, M., & Conner, B. (1999). Accuracy of judgments of sexual orientation from thin slices of behavior. *Journal of Personality and Social Psychology, 77*, 538-547. doi: 10.1037/0022-3514.77.3.538

Bar, M., Neta, M., & Linz, H. (2006). Very first impressions. *Emotion, 6*, 269-278. doi: 10.1037/1528-3542.6.2.269

Baron, R. M., & Kenny, D. A. (1986). The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology, 51*, 1173-1182. doi: 10.1037/0022-3514.51.6.1173

Bernstein, M. J., Young, S. G., & Hugenberg, K. (2007). The cross-category effect: Mere social categorization is sufficient to elicit an own-group bias in face recognition. *Psychological Science, 18*, 706-712. doi: 10.1111/j.1467-9280.2007.01964.x

Blanz, V., & Vetter, T. (1999). *A morphable model for the synthesis of 3d faces*. Paper presented at the Proceedings of the 26th annual conference on Computer graphics and interactive techniques. doi: 10.1145/311535.311556

Borkenau, P., & Liebler, A. (1992). Trait inferences: Sources of validity at zero acquaintance. *Journal of Personality and Social Psychology, 62*, 645-657. doi: 10.1037/0022-3514.62.4.645

Bosson, J. K., Prewitt-Freilino, J. L., & Taylor, J. N. (2005). Role rigidity: A problem of identity misclassification? *Journal of Personality and Social Psychology, 89*, 552-565. doi: 10.1037/0022-3514.89.4.552

Bosson, J. K., Weaver, J. R., & Prewitt-Freilino, J. L. (2011). Concealing to belong, revealing to be known: Classification expectations and self-threats among persons with concealable stigmas. *Self and Identity, 11*, 114-135. doi: 10.1080/15298868.2010.513508

Brescoll, V. L., & Uhlmann, E. L. (2008). Can an angry woman get ahead? *Psychological Science, 19*, 268-275. doi: 10.1111/j.1467-9280.2008.02079.x

Buss, D. M., & Schmitt, D. P. (1993). Sexual strategies theory: An evolutionary perspective on human mating. *Psychological Review, 100*, 204-232. doi: 10.1037/0033-295x.100.2.204

Cohen, J. (1992). A power primer. *Psychological Bulletin, 112*, 155-159. doi: 10.1037/0033-2909.112.1.155

Copi, I. M., & Cohen, C. (1998). *Introduction to logic*. Upper Saddle River, NJ: Prentice Hall.

Cunningham, M. R., Druen, P. B., & Barbee, A. P. (1997). Angels, mentors, and friends: Trade-offs among evolutionary, social, and individual variables in physical appearance. In J. A. S. D. T. Kenrick (Ed.), *Evolutionary social psychology* (pp. 109-140). Hillsdale, NJ, England: Lawrence Erlbaum Associates, Inc.

Draine, S. C. (2009). Inquisit (Version 3.0.3.2) [Computer software]. Seattle, WA: Millisecond Software, LLC.

Duchenne, G.-B. (1862/1990). *The mechanism of human facial expression* (R. A. Cuthbertson, Trans.). New York: Cambridge University Press.

Dunkle, J. H., & Francis, P. L. (1990). The role of facial masculinity/femininity in the attribution of homosexuality. *Sex Roles, 23*, 157-167. doi: 10.1007/bf00289863

Eberhardt, J. L., Goff, P. A., Purdie, V. J., & Davies, P. G. (2004). Seeing black: Race, crime, and visual processing. *Journal of Personality and Social Psychology, 87*, 876-893. doi: 10.1037/0022-3514.87.6.876

Ekman, P., Davidson, R. J., & Friesen, W. V. (1990). The duchenne smile: Emotional expression and brain physiology: Ii. *Journal of Personality and Social Psychology, 58*, 342-353. doi: 10.1037/0022-3514.58.2.342

Ekman, P., Friesen, W. V., & Hager, J. C. (2002). *Facial action coding sytem*. Salt Lake City, Utah: A Human Face.

FaceGen. (2011). Facegen modeller (Version 3.5.3) [Computer software]. Toronto, Ontario, Canada: Singular Inversions Inc.

Freeman, J. B., & Ambady, N. (2011). A dynamic interactive theory of person construal. *Psychological Review, 118*, 247-279. doi: 10.1037/a0022327

Freeman, J. B., Johnson, K. L., Ambady, N., & Rule, N. O. (2010a). Sexual orientation perception involves gendered facial cues. *Personality and Social Psychology Bulletin, 36*, 1318-1331. doi: 10.1177/0146167210378755

Freeman, J. B., Pauker, K., Apfelbaum, E. P., & Ambady, N. (2010b). Continuous dynamics in the real-time perception of race. *Journal of Experimental Social Psychology, 46*, 179-185. doi: 10.1016/j.jesp.2009.10.002

Gross, J. J., Richards, J. M., & John, O. P. (2006). Emotion regulation in everyday life. In D. K. Snyder, J. Simpson & J. N. Hughes (Eds.), *Emotion regulation in couples and families: Pathways to dysfunction and health* (pp. 13-35). Washington, D.C.: American Psychological Association.

Hall, J. A., & Halberstadt, A. G. (1986). Smiling and gazing. In J. S. Hyde & M. C. Linn (Eds.), *The psychology of gender: Advances through meta-analysis*. Baltimore, MD: Johns Hopkins University Press.

Hazan, C., & Diamond, L. M. (2000). The place of attachment in human mating. *Review of General Psychology, 4*, 186-204. doi: 10.1037/1089-2680.4.2.186

Heider, F. (1958). *The psychology of interpersonal relations*. New York: Wiley.

Hess, U., Adams Jr, R. B., & Kleck, R. E. (2005). Who may frown and who should smile? Dominance, affiliation, and the display of happiness and anger. *Cognition & Emotion, 19*, 515-536. doi: 10.1080/02699930441000364

Hess, U., Adams, R. B., Grammer, K., & Kleck, R. E. (2009). Face gender and emotion expression: Are angry women more like men? *Journal of Vision, 9*. doi: 10.1167/9.12.19

Hess, U., Adams, R. B., Jr., & Kleck, R. E. (2004). Facial appearance, gender, and emotion expression. *Emotion, 4*, 378-388. doi: 10.1037/1528-3542.4.4.378

Hess, U., & Thibault, P. (2008). Faces and emotions: Why the same expression may not mean the same when shown on different faces or seen by different people. In J. H. Tao & T. N. Tan (Eds.), *Affective information processing* (pp. 145-158). Heidelberg, Germany: Springer.

Hugenberg, K., & Bodenhausen, G. V. (2003). Facing prejudice: Implicit prejudice and the perception of facial threat. *Psychological Science, 14*, 640-643. doi: 10.1046/j.0956-7976.2003.psci_1478.x

Hugenberg, K., & Bodenhausen, G. V. (2004). Ambiguity in social categorization: The role of prejudice and facial affect in race categorization. *Psychological Science, 15*, 342-345. doi: 10.1111/j.0956-7976.2004.00680.x

Hugenberg, K., & Sczesny, S. (2006). On wonderful women and seeing smiles: Social categorization moderates the happy face response latency advantage. *Social Cognition, 24*, 516-539. doi: 10.1521/soco.2006.24.5.516

Ito, T. A., & Urland, G. R. (2003). Race and gender on the brain: Electrocortical measures of attention to the race and gender of multiply categorizable individuals. *Journal of Personality and Social Psychology, 85*, 616-626. doi: 10.1037/0022-3514.85.4.616

Johnson, K. L., Freeman, J. B., & Pauker, K. (2012). Race is gendered: How covarying phenotypes and stereotypes bias sex categorization. *Journal of Personality and Social Psychology, 102*, 116-131. doi: 10.1037/a0025335

Johnson, K. L., & Ghavami, N. (2011). At the crossroads of conspicuous and concealable: What race categories communicate about sexual orientation. *PLoS ONE, 6*, e18025. doi: 10.1371/journal.pone.0018025

Johnson, K. L., Gill, S., Reichman, V., & Tassinary, L. G. (2007). Swagger, sway, and sexuality: Judging sexual orientation from body motion and morphology. *Journal of Personality and Social Psychology, 93*, 321-334. doi: 10.1037/0022-3514.93.3.321

Johnson, K. L., McKay, L. S., & Pollick, F. E. (2011). He throws like a girl (but only when he's sad): Emotion affects sex-decoding of biological motion displays. *Cognition, 119*, 265-280. doi: 10.1016/j.cognition.2011.01.016

Johnson, K. L., & Tassinary, L. G. (2005). Perceiving sex directly and indirectly: Meaning in motion and morphology. *Psychological Science, 16*, 890-897. doi: 10.1111/j.1467-9280.2005.01633.x

Kawamura, S., Komori, M., & Miyamoto, Y. (2008). Smiling reduces masculinity: Principal component analysis applied to facial images. *Perception, 37*, 1637-1648. doi: 10.1068/p5811

Knutson, B. (1996). Facial expressions of emotion influence interpersonal trait inferences. [Article]. *Journal of Nonverbal Behavior, 20*, 165-182.

Kozlowski, L. T., & Cutting, J. E. (1977). Recognizing the sex of a walker from a dynamic point-light display. *Perception & Psychophysics Perception & Psychophysics, 21*, 575-580. doi: 10.3758/BF03198740

Kubota, J. T., & Ito, T. A. (2007). Multiple cues in social perception: The time course of processing race and facial expression. *Journal of Experimental Social Psychology, 43*, 738-752. doi: 10.1016/j.jesp.2006.10.023

LaFrance, M. (2011). *Lip service : Smiles in life, death, trust, lies, work, memory, sex, and politics*. New York: W.W. Norton & Co.

LaFrance, M., Hecht, M. A., & Paluck, E. L. (2003). The contingent smile: A meta-analysis of sex differences in smiling. *Psychological Bulletin, 129*, 305-334. doi: 10.1037/0033-2909.129.2.305

Livingston, R. W., Rosette, A. S., & Washington, E. F. (2012). Can an agentic black woman get ahead? The impact of race and interpersonal dominance on perceptions of female leaders. *Psychological Science*. doi: 10.1177/0956797611428079

Ma, D. S., & Correll, J. (2011). Target prototypicality moderates racial bias in the decision to shoot. *Journal of Experimental Social Psychology, 47*, 391-396. doi: 10.1016/j.jesp.2010.11.002

Madon, S. (1997). What do people believe about gay males? A study of stereotype content and strength. *Sex Roles, 37*, 663-685. doi: 10.1007/bf02936334

Nagy, E., Nemeth, E., & Molnar, P. (2000). From unidentified to 'misidentified' newborn: Male bias in recognition of sex. *Perceptual and Motor Skills, 90*, 102-104. doi: 10.2466/pms.2000.90.1.102

Naumann, L. P., Vazire, S., Rentfrow, P. J., & Gosling, S. D. (2009). Personality judgments based on physical appearance. *Personality and Social Psychology Bulletin, 35*, 1661-1671. doi: 10.1177/0146167209346309

Nezlek, J. B. (2001). Multilevel random coefficient analyses of event- and interval-contingent data in social and personality psychology research. *Personality and Social Psychology Bulletin, 27*, 771-785. doi: 10.1177/0146167201277001

Nezlek, J. B. (2008). An introduction to multilevel modeling for social and personality psychology. *Social and Personality Psychology Compass, 2*, 842-860. doi: 10.1111/j.1751-9004.2007.00059.x

Oosterhof, N. N., & Todorov, A. (2009). Shared perceptual basis of emotional expressions and trustworthiness impressions from faces. *Emotion, 9*, 128-133. doi: 10.1037/a0014520

Petty, R. E., & Cacioppo, J. T. (1996). *Attitudes and persuasion: Classic and contemporary approaches*. Boulder, Colo: Westview Press.

Preacher, K. J., & Hayes, A. F. (2008). Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behavior Research Methods, 40*, 879-891. doi: 10.3758/brm.40.3.879

Preacher, K. J., & Leonardelli, G. J. (2012). Calculation for the sobel test: An interactive calculation tool for mediation tests [web-application]. Retrieved from http://quantpsy.org/sobel/sobel.htm

Rae, G. (1976). Table of *a'*. *Perceptual and Motor Skills, 42*, 98. doi: 10.2466/pms.1976.42.1.98

Raudenbush, S. W., Bryk, A. S., & Congdon, R. (2004). Hlm 6 for windows. Lincolnwood, IL: Scientific Software International, Inc. Retrieved from http://www.ssicentral.com/hlm/index.html

Raudenbush, S. W., Bryk, A. S., & Congdon, R. (2010). Hlm 7 for windows. Lincolnwood, IL: Scientific Software International, Inc. Retrieved from http://www.ssicentral.com/hlm/index.html

Rieger, G., Linsenmeier, J. A. W., Gygax, L., Garcia, S., & Bailey, J. M. (2010). Dissecting "gaydar": Accuracy and the role of masculinity–femininity. *Archives of Sexual Behavior, 39*, 124-140. doi: 10.1007/s10508-008-9405-2

Ross, L. (1977). The intuitive psychologist and his shortcomings: Distortions in the attribution process. In L. Berkowitz (Ed.), *Advances in experimental social psychology* (Vol. 10). New York: Academic Press.

Rule, N. O. (2011). The influence of target and perceiver race in the categorisation of male sexual orientation. *Perception, 40*, 830-839. doi: 10.1068/p7001

Rule, N. O., & Ambady, N. (2008a). Brief exposures: Male sexual orientation is accurately perceived at 50 ms. *Journal of Experimental Social Psychology, 44*, 1100-1105. doi: 10.1016/j.jesp.2007.12.001

Rule, N. O., & Ambady, N. (2008b). The face of success: Inferences from chief executive officers' appearance predict company profits. *Psychological Science, 19*, 109-111.

Rule, N. O., & Ambady, N. (2009). She's got the look: Inferences from female chief executive officers' faces predict their success. *Sex Roles, 61*, 644-652. doi: 10.1007/s11199-009-9658-9

Rule, N. O., Ambady, N., Adams Jr, R. B., & Macrae, C. N. (2008). Accuracy and awareness in the perception and categorization of male sexual orientation. *Journal of Personality and Social Psychology, 95*, 1019-1028. doi: 10.1037/a0013194

Rule, N. O., Ambady, N., & Hallett, K. C. (2009). Female sexual orientation is perceived accurately, rapidly, and automatically from the face and its features. *Journal of Experimental Social Psychology, 45*, 1245-1251. doi: 10.1016/j.jesp.2009.07.010

Savin-Williams, R. C. (2006). Who's gay? Does it matter? *Current Directions in Psychological Science, 15*, 40-44. doi: 10.1111/j.0963-7214.2006.00403.x

Shakin, M., Shakin, D., & Sternglanz, S. H. (1985). Infant clothing: Sex labeling for strangers. *Sex Roles, 12*, 955-964. doi: 10.1007/bf00288097

Shriver, E. R., Young, S. G., Hugenberg, K., Bernstein, M. J., & Lanter, J. R. (2008). Class, race, and the face: Social context modulates the cross-race effect in face recognition. *Personality and Social Psychology Bulletin, 34*, 260-274. doi: 10.1177/0146167207310455

Tabak, J. A. (2009). *The gaydar effect: Automatic perception of sexual orientation from faces presented upright and upside-down.* Undergraduate honors thesis, Cornell University, Ithaca, NY.

Tabak, J. A., & Zayas, V. (2012). The roles of featural and configural face processing in snap judgments of sexual orientation. *PLoS ONE, 7*, e36671. doi: 10.1371/journal.pone.0036671

Thornhill, R., & Gangestad, S. W. (1999). Facial attractiveness. *Trends in Cognitive Sciences, 3*, 452-460. doi: 10.1016/s1364-6613(99)01403-5

Tickle, N. R. (2003). *You can read a face like a book : How reading faces helps you succeed in business and relationships*. Mountain View, CA: Daniel's Pub.

Tidd, K. L., & Lockard, J. S. (1978). Monetary significance of the affiliative smile: A case for reciprocal altruism. *Bulletin of the Psychonomic Society, 11*, 344-346.

Tiedens, L. Z. (2001). Anger and advancement versus sadness and subjugation: The effect of negative emotion expressions on social status conferral. *Journal of Personality and Social Psychology, 80*, 86-94. doi: 10.1037/0022-3514.80.1.86

Todorov, A., Mandisodza, A. N., Goren, A., & Hall, C. C. (2005). Inferences of competence from faces predict election outcomes. *Science, 308*, 1623-1626.

Trichas, S., & Schyns, B. (2012). The face of leadership: Perceiving leaders from facial expression. *The Leadership Quarterly, 23*, 545-566. doi: 10.1016/j.leaqua.2011.12.007

van Kleef, G. A., De Dreu, C. K. W., & Manstead, A. S. R. (2004a). The interpersonal effects of anger and happiness in negotiations. *Journal of Personality and Social Psychology, 86*, 57-76. doi: 10.1037/0022-3514.86.1.57

Van Kleef, G. A., De Dreu, C. K. W., & Manstead, A. S. R. (2004b). The interpersonal effects of emotions in negotiations: A motivated information processing approach. *Journal of Personality and Social Psychology, 87*, 510-528. doi: 10.1037/0022-3514.87.4.510

Wilkins, C. L., Kaiser, C. R., & Rieck, H. (2010). Detecting racial identification: The role of phenotypic prototypicality. *Journal of Experimental Social Psychology, 46*, 1029-1034. doi: 10.1016/j.jesp.2010.05.017

Willis, J., & Todorov, A. (2006). First impressions: Making up your mind after a 100-ms exposure to a face. *Psychological Science, 17*, 592-598. doi: 10.1111/j.1467-9280.2006.01750.x

Zayas, V., Tabak, J. A., Günaydýn, G., & Robertson, J. M. (2009). A social-cognitive model of human behavior offers a more parsimonious account of emotional expressivity. [Commentary]. *Behavioral and Brain Sciences, 32*, 407-408. doi: 10.1017/S0140525X09990094

Zebrowitz, L. A. (1997). *Reading faces : Window to the soul?* Boulder, Colo.: Westview Press.

Zebrowitz, L. A., & Collins, M. A. (1997). Accurate social perception at zero acquaintance: The affordances of a gibsonian approach. *Personality and Social Psychology Review, 1*, 204-223. doi: 10.1207/s15327957pspr0103_2

Zebrowitz, L. A., Kikuchi, M., & Fellous, J.-M. (2010). Facial resemblance to emotions: Group differences, impression effects, and race stereotypes. *Journal of Personality and Social Psychology, 98*, 175-189. doi: 10.1037/a0017990

VITA

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