Short Communication

Unrestricted sociosexuality predicts preferences for extraverted male faces

Mitch Brown *, Donald F. Sacco

The University of Southern Mississippi, USA

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ABSTRACT

Human facial structures communicate health, thus indicating one's suitability as a potential mating partner. However, facial structures also communicate information about one's personality, which allows for inferences about a target's behavioral intentions. A target's relative level of extraversion can be reliably inferred from facial structural features. Because past research has found an association between extraversion and greater interest in short-term mating, particularly for men, we hypothesized that women with an unrestricted sociosexual orientation, which is geared toward short-term mating, would demonstrate heightened preferences for extraverted faces, particularly male faces. Participants viewed face pairs of various individuals manipulated to be highly extraverted versus highly introverted while indicating their preferences among the pairs; participants also completed the Sociosexual Orientation Inventory-Revised. Independent of sociosexuality, participants preferred extraversion (relative to introversion) in female faces; conversely, participants demonstrated a stronger preference for introverted male faces. However, more sociosexually unrestricted women and men exhibited a greater preference for extraverted male faces. Whereas unrestricted women's preferences may be related to identifying mating opportunities, men's preferences for extraverted male faces may reflect an enhanced sensitivity to detecting same-sex individuals who would represent a heightened intrasexually competitive threat.

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1. Introduction

Although some individuals prefer long-term, monogamous relationships, others desire more pluralistic mating strategies involving multiple short-term partners. These interests constitute the individual difference of sociosexual orientation, or sociosexuality (Simpson & Gangestad, 1991). Those preferring long-term mating have a *restricted* sociosexuality whereas those interested in short-term mating would be considered *unrestricted*. Sociosexuality appears to influence social perception by facilitating unrestricted individuals in identifying high-quality short-term mating opportunities (Sacco, Hugenberg, & Sefcek, 2009). When selecting short-term mates, individuals prioritize good genes and emphasize physical attractiveness (Li & Kenrick, 2006). As such, individuals dispositionally motivated for short-term sexual encounters value physical attractiveness more in potential mates to facilitate selecting mates with better genes for offspring production. Sociosexually unrestricted individuals possess considerable sensitivity toward facial traits communicating fitness, including symmetry (e.g., Quist et al., 2012; Sacco et al., 2009) and sexual dimorphism (Sacco, Jones, DeBruine, & Hugenberg, 2012), which aides in identifying optimum sexual partners.

Along with identifying good genes, sociosexually unrestricted persons might also benefit by identifying the extent of potential mates' receptivity to short-term mating. Indeed, past research in-

dicates sexually unrestricted persons are better at discriminating Duchenne smiles, signs of affiliative interest, from non-Duchenne smiles, which may mask underlying negative affect (Sacco et al., 2009). Nonetheless, if facial cues beyond affect were potentially reliable signals of affiliation or short-term mating interest, it would prove fruitful for unrestricted persons to be more sensitive to, and prefer, faces possessing these features. Importantly, humans demonstrate considerable accuracy in inferring personality based on facial structures, most notably accurately inferring relative levels of extraversion from facial structural information alone (Borkenau, Brecke, Möttig, & Paelecke, 2009; Little & Perrett, 2007). Additionally, past research finds higher levels of extraversion are associated with greater short-term mating interest (Schmitt & Shackelford, 2008). Similar to unrestricted individuals' heightened preferences for fitness indicators, we hypothesize that more unrestricted sociosexuality should predict stronger preferences for faces whose structure indicates greater extraversion. Given extraversion's correlation with short-term mating interest, it would behoove unrestricted persons to prefer those whose faces communicate extraversion. The current research extends findings implicating sociosexuality in detecting facial cues by testing its relation to perceiving extraversion.

1.1. Face perception and sociosexuality

Human facial structures provide valuable information to conspecifics, particularly pertaining to health (Rhodes, 2006). This is a critical facet of short-term mating and indicates that such health identification is of paramount importance to unrestricted individuals. Facial symmetry is one such indicator of genetic quality associated with

health and is an honest signal of pathogen resistance (Thornhill & Gangestad, 2006). Symmetrical individuals are also perceived as healthier, more likable, and more attractive (e.g., Fink, Neave, Manning, & Grammer, 2006). Given short-term strategists' emphasis on good genes, identifying faces connoting greater heritable fitness through symmetry would be adaptive among individuals interested in uncommitted sexual relationships to ensure optimum mating opportunities.

Previous research indicates more unrestricted individuals are indeed more sensitive to heritable fitness cues and indicate greater preference for them. For example, sociosexually unrestricted men exhibit heightened symmetry preferences in female faces and unrestricted women demonstrate a similar preference in male faces (Lustgraaf & Sacco, 2015; Quist et al., 2012; Sacco et al., 2009, 2012). These individuals may have been sensitive to cues connoting fitness for optimum mating opportunities in cross-sex individuals that would be heightened by short-term mating interest. Furthermore, Provost, Kormos, Kosakoski, and Quinsey (2006) found sociosexually unrestricted women preferred masculinized male faces and bodies. Heightened sensitivity also seems most apparent among unpartnered individuals, potentially related to lack of consistent access to mating opportunities (e.g., Lustgraaf & Sacco, 2015; Sacco et al., 2012).

1.2. Extraversion and face preferences

Although structures connoting health signal good genes, such cues may not readily communicate personality, a potential analog to infer targets' behavioral intentions or likely interest in short-term mating. One personality trait individuals may factor in mate selection may be extraversion. Previous research indicates greater-than-chance accuracy in identifying individuals' level of extraversion based on facial structure from composite images of those scoring high and low in the trait (Little & Perrett, 2007). Borkenau et al. (2009) demonstrated this acuity by having participants rate the degree to which targets exemplified Big Five traits following brief exposure to images of people who completed the personality inventory (50–150 ms). Participants accurately identified traits, even at 50 ms, with accuracy being especially high for extraversion.

Extraverted faces should signal affiliative opportunities, including social network access (Pollett, Roberts, & Dunbar, 2011). Beyond ubiquitous affiliative concerns, extraverted individuals are more attractive, thus desirable mates (Lukaszewski & Roney, 2011). In men, extraversion correlates with physical strength, a trait conducive to short-term mating success (Fink, Weege, Pham, & Shackelford, 2016; Lukaszewski & Roney, 2011). Welling, DeBruine, Little, and Jones (2009) also found extraverted women have greater preferences for masculine male faces. Given extraversion's association with sociosexuality (Schmitt & Shackelford, 2008), identifying extraverted individuals through veridical cues of personality in the face would be adaptive in identifying optimum short-term mates. Sociosexually unrestricted women's short-term mating interest should augment sensitivity to male facial cues connoting such opportunities. Their accurate identification of extraversion in male faces could ultimately aid them in finding partners who are similarly interested in short-term mating.

Despite the affiliative benefits of associating with extraverted individuals, one must also consider relational tradeoffs, due to the concurrent interpersonal costs extraverted individuals may invite. For example, extraversion is associated with greater disease transmission and contraction (Nettle, 2005; Schaller & Murray, 2008). Given their greater short-term mating interest (and promiscuity), associating with extraverts may also threaten current relationships. Extraverted men are more likely to have extra-pair relations, implicating them as intra

sexual competition or fidelity threats (Nettle, 2005). Furthermore, extraverted men are more dominant (Cheng, Tracy, & Henrich, 2010). Given these associations, it could be argued that extraverted men's interpersonal costs extend to physical safety. Despite its attractiveness in short-term mating, (Frederick & Haselton, 2007; Gallup, White, & Gallup, 2007), the association between men's strength and dominance could potentially implicate extraverted men as physically riskier mates. This would reduce their desirability among sociosexually restricted women. This sexual dimorphism would further suggest differential costs in extraverted conspecifics such that associating with extraverted men presents greater interpersonal costs over women, given that extraversion in women largely communicates affiliation (benefit) with no associated systematic costs (e.g., physical safety threat).

Nonetheless, despite costs, more sociosexually unrestricted women may be more willing to make tradeoffs by preferring extraverted men for their benefits to short-term mating in spite of any costs. Dominant male behavior presents fewer costs to women in short-term mating than long-term (Gangestad & Simpson, 2000). This could explain unrestricted women's greater preference for fitness cues in men, including muscular bodies (e.g., Provost et al., 2006) and masculinized faces (Sacco et al., 2012), since they would be less likely to commit to men who may be costly beyond a single sexual act. If extraverted male faces communicate traits indicating good genes and short-term mating interest, unrestricted women should exhibit greater interest in extraverted faces over introverted, as extraverted men would potentially provide greater short-term mating opportunities.

Since sociosexually unrestricted individuals are more sensitive to facial cues indicating fitness (e.g., Sacco et al., 2012), they should be more sensitive to cues connoting behavioral intentions for short-term mating. Specifically, this sensitivity should be greater for male faces communicating extraversion, given the cost asymmetry presented by the behavior and traits associated with extraversion in men and women. This sensitivity should thus manifest as preferences for extraverted male faces among sociosexually unrestricted women, because of their interest in good genes and targets' potential receptivity to short-term mating to facilitate their desired strategies. Because of the reduced interpersonal costs posed by extraverted women compared to men, sociosexuality should be less influential in identifying potential mating opportunities for men, as men may not need to consider the tradeoff as intently as would women. Importantly, given humans' accuracy in identifying extraversion through faces (e.g., Little & Perrett, 2007), this preference for male extraversion should occur based solely on facial structures. We hypothesized that sociosexually unrestricted women would demonstrate greater preferences for men's facially communicated extraversion over introversion, a potential analog to women's tradeoffs for uncommitted sexual relationships. We also predicted sociosexuality's role in predicting extraversion sensitivity would only occur in male faces; that is, female extraversion would generally be more associated with affiliation, rather than dominance or infidelity. Thus, men and women should prefer extraverted female relative to male faces, independent of sociosexuality.

2. Method

2.1. Participants

A medium effect-size power analysis for an ANCOVA using G*Power (Faul, Erdfelder, Lang, & Buchner, 2007; $f = 0.25$, $\beta = 0.80$) indicated 128 participants were needed to detect effects. We

deliberately oversampled by recruiting 207 Amazon Mechanical Turk workers (121 women, 86 men; 74.4% White; M_{Age} = 30.63, SD = 6.25) for $0.35 (US); all participation was recorded in a single data collection period prior to data analysis. Participants were instructed that the study was limited to persons between the ages of 18–40 years, given the nature of this study's hypotheses. We excluded 20 participants from analysis (11 women, 9 men; final N = 187) for reporting being over 40, for reporting that they were homosexual (we were primarily interested in opposite-sex perceptions), or those who did not complete all study procedures.

2.2. Materials

2.2.1. Introversion-extraversion faces

We utilized faces generated to communicate extraversion or introversion in a preference task (Brown & Sacco, 2016). Faces included 20 unique male and 20 female identities, all Caucasian and between 18 and 40 years, morphed with extraversion and introversion composite face prototypes originally generated by averaging 10 individuals who scored highest and lowest on extraversion for both sexes (Holtzman, 2011). Unique identities were morphed with matched-sex composite faces communicating extraversion or introversion and blended for 50% appearance of either face (see Fig. 1). This resulted in 40 face pairs for high- and low-extraversion morphs (20 pairs for either sex).

Participants were randomly presented with each pair with one target being the extraversion morph and the other introversion. We randomized presentation of, and counterbalanced, morphs' position (i.e., left-, right-screen position). Participants were instructed to select the face in each pair they preferred by clicking a corresponding button. Much like previous research, participants indicated their preferences in a general sense (i.e., non-sexual), which allowed participants to rate faces of same- and opposite-sex faces in a functionally equivalent capacity (see Sacco et al., 2009, for similar instructions). The task was self-paced and participants viewed each pair until indicating a preference for each trial. To calculate relative preference for extraverted faces (versus introverted), we summed frequency of participants' selection of extraverted targets and divided it by total number of trials, separately for male and female targets, with higher values indicating greater preference for facially communicated extraversion.

2.2.2. Sociosexual orientation

Participants indicated their sociosexuality via the Sociosexual Orientation Inventory-Revised (SOI-R; Penke & Asendorpf, 2008). This 9-item scale assesses individual preferences for committed versus uncommitted sexual relationships along 9-point Likert-type scales. SOI-R's 3 subscales (reliabilities αs > 0.80) assess previous sexual behavior (e.g., "With how many different partners have you had sex within the past 12 months?"), attitudes about uncommitted sex ("Sex without love is OK."), and sexual desire ("How often do you have fantasies about having sex with someone you are not in a committed romantic relationship with?"). We aggregated the three subscales to create one composite score, as is common with sociosexuality (e.g., Kandrik, Jones, & DeBruine, 2015; Lewis, Al-Shawaf, Conroy-Beam, Asao, & Buss, 2012; Sacco et al., 2012). Higher scores indicated more unrestricted sociosexuality.

2.3. Procedure

Interested participants clicked a link through MTurk redirecting them to a consent form. Consenting participants completed the Face Preference Task, followed by SOI-R, and demographics (e.g., age, race, gender). Participants then received debriefing and 6-digit compensation codes.
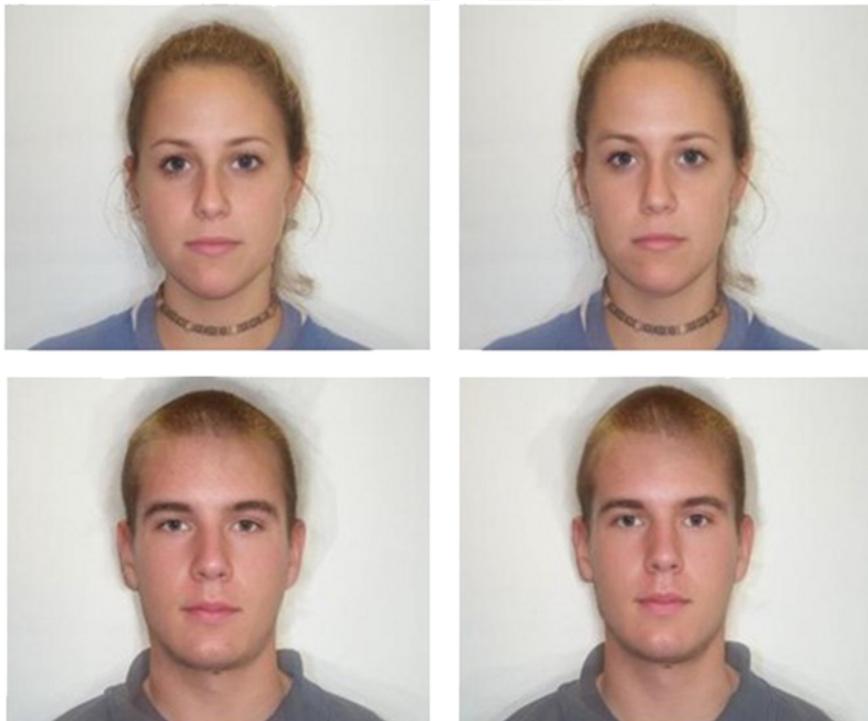

Fig. 1. Faces communicating extraversion (*left*) and introversion (*right*).

3. Results

3.1. Extraversion preferences

To determine sociosexuality's relation to extraverted face preferences, we conducted a 2 (Participant Sex: Male, Female) × 2 (Target Sex: Male, Female) mixed-model custom ANCOVA, with repeated factors over Target Sex and SOI-R as a covariate; this model allowed us to test for main effects and interactions with respect to continuous and categorical variables. Because all 3 SOI-R subscales were strongly correlated with each other ($rs > 0.450$, $ps < 0.001$), suggesting subscales are fundamentally tapping the same process, we analyzed SOI-R as a unitary construct. A significant Target Sex main effect emerged such that participants indicated greater preferences for extraversion in female faces ($M = 0.61$, $SD = 0.14$) than in male ($M = 0.47$, $SD = 0.14$), $F(1, 183) = 30.70$, $p < 0.001$, $\eta_p^2 = 0.144$. Consistent with predictions, one-sample t-tests found above-chance extraversion preferences for female targets, $t(186) = 10.74$, $p < 0.001$, $d = 1.57$; conversely, an above-chance preferences for *introversion* in male faces emerged, $t(186) = -2.72$, $p = 0.007$, $d = 0.40$. Thus, not only is extraversion preferred more in female faces, but introversion (relative to extraversion) is preferred in male faces.

Importantly, a significant SOI-R × Target Sex interaction qualified effects, $F(1, 183) = 6.22$, $p = 0.013$, $\eta_p^2 = 0.033$. We decomposed this interaction by individually correlating SOI-R with extraversion preferences for either Target Sex. SOI-R significantly positively correlated with preferences for extraverted male faces, $r(185) = 0.213$, $p = 0.003$. No association existed for female faces, $r(185) = -0.096$, $p = 0.191$. Surprisingly, no Participant Sex × Target Sex × SOI-R interaction emerged, $F(1, 183) = 0.47$, $p = 0.492$, $\eta_p^2 = 0.003$. This suggests that men and women were responding to male extraversion similarly; we provide a tentative explanation for the null finding with respect to participant sex in the discussion below. Finally, no other main effects or interactions emerged (all $ps > 0.220$).

Because previous research has found preferences for facial cuing in good genes among unrestricted individuals primarily emerges in those who are not currently in a relationship (e.g., Lustgraaf & Sacco, 2015; Sacco et al., 2012), we analyzed the extent to which relationship status might moderate preferences for extraversion. An exploratory 3-way ANCOVA including relationship status in the model found no status effect nor did status interact with study variables (all $ps > 0.100$). Importantly, relationship status did not affect the aforementioned main effect and interaction, $Fs > 4.26$, $ps < 0.050$. This suggests relationship status may not influence extraversion preferences similarly to symmetry or sexual dimorphism.

4. Discussion

Sociosexuality influenced extraversion preferences in male faces. Extraverted men communicate both benefits, specifically greater interest in short-term mating, and costs, such as being a greater threat to physical safety. Sociosexually unrestricted women are thus more willing to make this trade-off such that their preferences for more extraverted men reflects an emphasis on short-term mate value of these targets in spite of potential costs. As expected, sociosexuality did not predict preferences for female extraversion. This could have been due to the reduced costs associated with extraverted women that would primarily be considered for men in short-term mating. Since extraverted women may primarily signal affiliation in the absence of potential threats, including threats to physical safety, an initial pref-

erence for them would seem sensible regardless of sociosexuality. Although extraverted individuals exhibit greater self-reported dominance (Cheng et al., 2010), men's greater size, and perceived formidability (Sell et al., 2009), would implicate them as physical risks whereas women would likely not be perceived in that way. Indeed, in our sample, both men and women, regardless of sociosexuality demonstrated a significant preference for extraverted female faces, but more introverted male faces, suggesting the extraversion in female faces is indeed more clearly associated with affiliation.

Unexpectedly, unrestricted men similarly communicated greater preferences for extraversion in male faces. Previous research has found general preferences for fitness and behavioral intention cues in same-sex conspecifics among unrestricted individuals (Lustgraaf & Sacco, 2015; Sacco et al., 2009). In the context of previous findings, the current results suggest that men's communicated preference for male extraversion could potentially indicate vigilance toward intrasexually competitive men. It would be adaptive for unrestricted men to identify extraverted men who would likely be greater intrasexual competition risks and pose greater threats to such men's mating opportunities. Alternatively, unrestricted men's preference toward male facially communicated extraversion may concern their interest in acquiring coalitional partners who may assist in resource acquisition. Extraverted male conspecifics could provide greater mating opportunities because of the increased contact with extraverts' social network (Pollett et al., 2011), which could include potential mates for those associating with extraverted men. Nonetheless, this association also carries risk of greater potential of mate poaching (e.g., Nettle, 2005), which would make vigilance for intrasexual competition similarly adaptive. Future studies should discern whether unrestricted men select extraverted male faces for the benefits of extended social networks or sensitivity to intrasexual threat. A preference task for men indicating which face appears more intrasexually threatening would clarify results.

These findings contribute to research demonstrating humans' sensitivity to facial features communicating personality, and how such sensitivity is adaptive based on dispositional social motives. For example, considering the affiliative opportunity afforded by extraverts, Brown and Sacco (2017) found individuals with dispositionally higher affiliative motives preferred extraverted faces. Conversely, given extraverted individuals' susceptibility to infectious disease (Nettle, 2005), those with dispositionally higher perceived infectability downregulate preferences for extraverted faces (Brown & Sacco, 2016). We demonstrated another adaptive advantage in accurately identifying extraverted targets in the context of short-term mating. For sociosexually unrestricted individuals, identification would be adaptive to recognize those interested in short-term mating, both as mate and competition.

Given the link between extraversion and dominance (e.g., Cheng et al., 2010), it may have also been possible that participants were also perceiving dominance in extraverted faces. However, it would be unlikely for this covariation to influence this study's findings. A preference for female extraversion would not emerge if extraversion were akin to masculinity across both sexes, since heterosexual attraction, particularly among unrestricted individuals, is contingent on sex-typical facial features (e.g., Sacco et al., 2009). Sexual selection would not have favored such cues in female faces to communicate good genes and reproductive quality (e.g., Rhodes, Hickford, & Jeffery, 2000). However, it would still be necessary to find a potential link between facial extraversion and sex-typicality to determine how much covariance is occurring.

Since male facial extraversion may communicate both good genes and behavioral intentions, it may be possible to activate mating mo

tives beyond dispositional motivation. Maner et al. (2005) temporally activated mating motives in participants and subsequently influenced face perception such that mating-motivated participants found attractive faces to communicate greater sexual receptivity. Perhaps similar activation of mating motives would influence sensitivity to facially communicated extraversion, as individuals would be more sensitive to facial features that may communicate greater proclivity for sexual relationships. Future research would benefit from determining how temporal mating motivations predict face preferences similarly to dispositional.

5. Conclusion

Sociosexuality is adaptive for allowing individuals the opportunity to identify and engage individuals who could satisfy individual mate preferences. Unrestricted individuals would benefit from identifying faces communicating both good genes and receptivity for uncommitted pair-bonding. Our results indicated extraversion is one such facial trait that influences differential mate preferences, albeit among male faces primarily. Nonetheless, human faces continue to demonstrate utility in communicating personality and thus one's social motives.

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