

THE RELATION BETWEEN INDIVIDUAL DIFFERENCES IN FUNDAMENTAL SOCIAL MOTIVES AND ADAPTIVE FACE PERCEPTION

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ABSTRACT

Human motivational systems are designed to promote organismic reactions that facilitate survival and reproduction. Recent research suggests that there are individual differences in human motivation across evolutionarily salient domains, such as self-protection threat, status, mate-seeking and mate retention, and that these individual differences are distinct from other dimensions of personality (e.g., Big Five) and are related to numerous other life history variables. We hypothesized that individual differences in self-protection, status, mate-seeking, and mate-retention motives would be related to adaptive face preferences with respect to trust and dominance cues in male faces. We asked participants to complete a task that assessed the extent to which they preferred trust, versus dominance, in male faces and then asked them to complete the fundamental social motives inventory. For both men and women, individual differences in mate-seeking and mate-retention goals had the predicted effect on face preferences. Men higher in mate-seeking and mate retention motives demonstrated a greater preference for trustworthy male faces. Women higher in mate-seeking motives demonstrated a greater preference for dominant male faces, while women higher in mate-retention motives demonstrated a stronger preference for trustworthy male faces. No relation was found regarding individual differences in self-protection and status motives and face preferences. Findings provide preliminary evidence for how dispositional motives pertaining to mate acquisition and retention differentially influence preferences for certain facial features.

Key words: Personality, face perception, trust, dominance

INTRODUCTION

Ancestral humans would have contended with numerous environmental constraints posing both survival threats and reproductive opportunities. Such threats would have included predation and disease, whereas opportunities would have included affiliation and acquisition of high-quality mates (e.g., Kenrick, Neuberg, Griskevicius, Becker, & Schaller, 2010). Importantly, it is argued human motivational systems evolved to facilitate adaptive behaviors in individuals' local environments as a way to satisfy salient needs. That is, immediate environmental cues should activate motivational states most functionally relevant to the initiation of adaptive behavior.

Consistent with this framework, research demonstrates that environmental cues activate specific motives, ultimately facilitating adaptive perception and behavior. For example, situational primes of infectious disease (e.g., images of sores) elicit overperception of environmental pathogens (i.e., detecting disease threat in non-pathogenic stimuli; Miller & Maner, 2012) and heightened behavioral avoidance of others (Mortensen, Becker, Ackerman, Neuberg, & Kenrick, 2010), which are adaptive responses to mitigate disease threat. Activating self-protection motives leads men and women to demonstrate greater accuracy when discriminating between trustworthy and untrustworthy faces (Young, Slepian, & Sacco, 2015) and, for women, a greater preference for dominant male faces (Sacco, Lustgraaf, Brown, & Young, 2015). Such perceptual acuity and preferences would help individuals identify safe interaction partners and protective mates respectively, which would be adaptive in a physically threatening environment. Furthermore, men primed with mating motivation demonstrate overperception of sexual arousal when presented with attractive (yet neutrally expressive) female faces, which would likely reduce men's likelihood of missing potential mating opportunities (Maner et al., 2005).

Although such motivations are activated by specific contexts, their activation is also dispositional suggesting manifestation as individual differences in motives related to survival and reproduction. For example, dispositional perceived vulnerability to disease results in overperception of disease cues in others, which serves to facilitate disease avoidance (Miller & Maner, 2012). Unrestricted sociosexuality heightens preferences for targets high in facial symmetry, which facilitates potential acquisition of high-quality mates (Lustgraaf & Sacco, 2015). Expanding upon individual differences in fundamental social motives research, Neel and colleagues (2016) developed an inclusive instrument to assess individual differences in various fundamental social motives. They demonstrated that individuals exhibit a number of variations in motivational aspects, each of which is directly related to survival and reproduction, and also involve differing levels of satisfaction, reminiscent of individual differences seen in Life History Strategy (Figueredo, Vásquez, Brumbach, Sefcek, Kirsner, & Jacobs, 2005). This fundamental social motives inventory assesses individual differences in eleven motivational domains ranging from basic individualistic survival strategies to committal childrearing acts (i.e., self-protection, disease avoidance, affiliation-group, affiliation-exclusion concern, affiliation-independence, status, mate-seeking, mate-retention-

general, mate-retention-break-up, kin-care family, and kin-care children). Neel and colleagues (2016) found these motives to be unique, possess explanatory power beyond other personality measures, and relate to other life history variables.

The current work extends this individual difference framework with fundamental social motives to another key aspect of human sociality; specifically, adaptive face perception. Faces communicate valuable adaptive information, and individual differences in fundamental motives may uniquely predict face preferences. For example, unique facial structures communicate trustworthiness and dominance, two important interpersonal traits when evaluating social targets (Oosterhof & Todorov, 2008). Dominance in male faces may be perceived as a threat cue by men, while simultaneously perceived as a valued reproductive cue by women. Male facial dominance cues are associated with physical strength, which women may find attractive (Fink, Neave, & Seydel, 2007). Men may thus perceive dominant male faces as intrasexual threats, particularly with salient status, mate-seeking, or self-protection goals (e.g., Griskevicius, Tybur, Gangestad, Perea, Shapiro, & Kenrick, 2009). Furthermore, masculinized male faces (a facial cue related to dominance; Fink et al., 2007) are associated with unrestricted sociosexuality and greater sexual promiscuity (Boothroyd, Cross, Gray, Coombes, & Gregson-Curtis, 2011; Kruger, 2006). Thus, both men and women motivated by mate-retention may find trustworthy male faces preferable relative to dominant male faces. For men, more trustworthy male faces would be associated with reduced threat to their relationships because dominant men would be considered an intrasexual competitive threat, whereas for women, trustworthy men would be associated with lower likelihood of extra-pair mating, because they may perceive more dominant men as more promiscuous.

We tested the following hypotheses regarding dispositional self-protection, status, mate-seeking, and mate-retention motives (with other factors in the inventory, we had no specific, a priori hypotheses for their relation to trust-dominance facial preferences):

H1: Women higher in self-protection motivation will display stronger preferences for dominant male faces (Sacco et al., 2015), whereas men higher in self-protection motivation will display stronger preferences for trustworthy male faces (Fink et al., 2007).

H2: Higher status motivation in men will be associated with stronger preferences for trustworthy male faces (Griskevicius et al., 2009).

H3: Higher mate-seeking motivation in men will be associated with stronger preferences for trustworthy male faces due to intrasexual competition concerns. Higher mate-seeking motivation in women will be associated with stronger preferences for dominant male faces, due to a preference for good genes cues (Fink et al., 2007).

H4: Higher mate-retention motivation in men and women will be associated with stronger preferences for trustworthy male faces (Boothroyd et al., 2011).

METHOD

Participants

One hundred ninety-eight undergraduates participated in a laboratory at individual computer stations in exchange for course credit. Thirteen participants were excluded from primary analyses; 8 experienced computer errors; 4 were distracted during the experimental task (e.g., using cell phone); one recognized the face stimuli from a prior study, leaving a final sample of 185 participants (75% female; $M_{\text{age}} = 20.36$ years, $SD = 4.58$ years; 94 African American, 73 Caucasian, 7 Asian, 5 Hispanic; 6 participants did not disclose race). Additionally, 25 men and 65 women reported being single while 21 men and 74 women reported being in relationships.

Materials

Fundamental Social Motives Inventory (FSMI). We utilized the FSMI (Neel, Kenrick, White, & Neuberg, 2016) to assess participants' dispositional social motives which evolved to manage recurrent social threats and opportunities for reproductive fitness. This scale assesses eleven motives: Self-protection ("I worry about dangerous people."), Disease Avoidance ("I avoid people who might have a contagious illness."), Affiliation-Group ("Being part of a group is important to me."), Affiliation-Exclusion Concern ("It would be a big deal to me if a group excluded me."), Affiliation-Independence ("I like to be by myself."), Status ("I want to be in a position of leadership."), Mate-seeking ("I would like to find a new romantic/sexual partner soon."), Mate-retention-General ("It is important to me that my partner is sexually loyal to me."), Mate-retention-Break-up ("I wonder if my partner will leave me for someone else."), Kin-care-Family ("Being close to my family members is extremely important to me."), and Kin-care-Children ("I like to spend time with my children."). Each subscale includes six questions, and participants respond to each question using a 7-point Likert-type scale (1=*strongly disagree*; 7=*strongly agree*). Only participants in relationships were instructed to respond to the Mate-Retention subscales and only those with children were instructed to respond to the Kin-care-Children subscale; participants not in relationships and/or without children were instructed to select "not applicable" for these subscale questions (see Neel et al., 2016 for similar procedures).

Trust-Dominance Preference Task. Stimuli were comprised of computer-generated male faces, which varied on facial features associated with trust and dominance. Oosterhof and Todorov (2008) developed these faces to communicate trust or dominance. On each trial, participants were shown matched pairs of Caucasian male faces: one face manipulated to exhibit high levels of trust while the other exhibited high levels of dominance; target identity was held constant across each trial, and face location was counterbalanced between-participants. Participants were simply asked to indicate which face they preferred. We utilized stimuli at two levels of extremity: 1 standard deviation (SD) away from the mean for both trust and dominance prototypes, as well as 3 SD away from the mean for both prototypes. Thus, decisions on trials using stimuli manipulated to be 3 SD more extreme

than the prototype for trust and dominance represent a more extreme trade-off. Utilizing two levels of stimulus extremity allows for the determination of limitations in regard to the extent to which participants would favor dominant male faces over trustworthy, or vice-versa. Participants completed 16 trials: 8 trials for 1 SD stimuli and 8 trials for 3 SD (pairs were matched stimulus intensity; see Sacco et al., 2015, for similar procedures and examples of stimuli at both intensities).

Procedure

Participants completed all study procedures in a university psychology lab at individual computer stations. After obtaining informed consent, participants completed the study through MediaLab and DirectRT software. Participants first completed the Trust-Dominance Preference Task followed by the FSMI. Finally, participants reported demographics (including age, sex, and race), were thanked for their participation, and were debriefed.

RESULTS

FSMI

We first reverse-scored the appropriate subscale items. Because subscale reliabilities were acceptable (Cronbach's α s ranging .64-.94), we computed subscale averages for each participant where higher scores indicate greater motivational emphasis. Only 12 participants indicated having children; thus, we excluded the Kin-care-Children subscale from analyses.

Relationship between FSMI and Trust-Dominance Preferences

To determine which aspects of FSMI relate to differential preferences for facial trust and dominance, we first computed participants' trust preference at each of the two levels of stimulus intensity. Specifically, we divided the number of times participants selected the more trustworthy face by the total number of trials at each level of stimulus intensity (8 trials for each stimulus intensity level). Thus, higher values indicated more frequent selection of a trustworthy face over a dominant face. We then conducted a series of multivariate ANCOVAs, with trust preferences across both stimulus intensities as the dependent measures, participant sex as a categorical independent variable, and individual participant subscale scores as covariates. Thus, each model allowed us to test for main effects of FSMI personality and participant sex, as well as interactions between the two when addressing trust preferences at each level of stimulus intensity.

Contrary to our prediction, there was not a significant interaction between self-protection disposition and participant sex for trust versus dominance face preferences with respect to either low, $F(1,181)=.149$, $p=.700$, $\eta_p^2=.001$, or high intensity targets, $F(1,181)=.180$, $p=.672$, $\eta_p^2=.001$. Furthermore, correlational analyses revealed that men's and women's self-protection dispositions did not relate significantly to trust/dominance

face preferences at either level of stimulus intensity (all $r_s < .100$, all $p_s > .510$). Thus, women higher in self-protection disposition did not demonstrate a greater preference for dominant male faces, and men higher in self-protection disposition did not demonstrate a greater preference for trustworthy male faces.

Contrary to our prediction, there was not a significant interaction between dispositional status motives and participant sex for trust versus dominance face preferences with respect to either low, $F(1,181)=.781$, $p=.378$, $\eta_p^2=.004$, or high intensity targets, $F(1,181)=.538$, $p=.464$, $\eta_p^2=.003$. Furthermore, men's dispositional status motives were not significantly related to preferences for trustworthy male targets at either low, $r(44)=.188$, $p=.210$, or high stimulus intensity, $r(44)=-.087$, $p=.564$. Collectively these results provide no support for the hypothesis that men higher in dispositional status motives demonstrate a stronger preference for trustworthy male targets.

For Mate-seeking motives, the model yielded main effects for participant sex at both low-intensity, $F(1,181)=3.75$, $p=.054$, $\eta_p^2=.020$, and high-intensity stimuli, $F(1,181)=6.79$, $p=.010$, $\eta_p^2=.036$. Specifically, for low-intensity stimuli, women demonstrated marginally greater preferences for trustworthy male target faces ($M=.78$, $SD=.22$) than did men ($M=.72$, $SD=.24$). For high-intensity stimuli, women also demonstrated a greater, and conventionally significant, preference for trustworthy male target faces ($M=.87$, $SD=.22$) than did men ($M=.84$, $SD=.24$). Importantly, this analysis yielded a significant Participant Sex \times Mate-seeking interaction for high intensity stimuli, $F(1,181)=7.73$, $p=.006$, $\eta_p^2=.041$, and a similar, albeit trending, interaction for low-intensity stimuli, $F(1,181)=2.86$, $p=.093$, $\eta_p^2=.016$. To better understand these interactions, we individually correlated men's and women's mate-seeking scores with trust preferences for high- and low-intensity stimuli. For men, higher mate-seeking scores were associated with a stronger preference for trustworthy male faces at low intensities, $r(44)=.302$, $p=.041$; high-intensity stimuli yielded a similar, marginally significant, pattern, $r(44)=.281$, $p=.059$. Because dominant males would pose greater threats to mating opportunities through intrasexual competition, these results suggest that men higher in dispositional mate-seeking motives show preference for male faces signaling trust, relative to dominance. For women, there was no relationship between mate-seeking motives and trust preferences for low-intensity male targets, $r(137)=-.012$, $p=.890$; however, a significant negative relationship emerged between women's mate-seeking motivation and preferences for trust in high-intensity male target faces, $r(137)=-.180$, $p=.034$; thus, increasing mate-seeking motives in women elicited a preference shift favoring more dominant male faces. Given dominance cues in male faces are associated with good genes cues, it may be adaptive for women higher in dispositional mate-seeking motives to exhibit this stronger preference for dominant males.

For the Mate-retention-General and Mate-retention-Break-up subscales, we only included participants reporting being in a relationship in the analyses, since these would be individuals with a partner to actively retain ($N=95$). However, one male and one female participant failed to complete these subscales, so the analysis included 93 participants (20 men, 73 women). For the Mate-retention-General subscale, there was a marginal main effect

of participant sex for trust preferences with respect to high-intensity faces, $F(1,89)=2.99$, $p=.087$, $\eta_p^2=.033$; women demonstrated a stronger trust preference for male faces ($M=.92$, $SD=.16$) than did men ($M=.80$, $SD=.30$). There was no effect of participant sex for low-intensity faces, $F(1,89)=2.30$, $p=.133$, $\eta_p^2=.025$. Additionally, participants' Mate-retention-General scores were a marginal predictor of trust preferences for high intensity stimuli, $F(1,89)=3.64$, $p=.060$, $\eta_p^2=.039$, such that a stronger general mate-retention score predicted larger preferences for trustworthy, relative to dominant, male faces for both men and women. There was no effect of participants Mate-retention-General scores on trust preferences for low intensity stimuli, $F(1,89)=2.31$, $p=.132$, $\eta_p^2=.025$. Additionally, the model including Mate-Retention-Break-up scores produced neither significant main effects nor an interaction (all $ps>.150$).

Additional models including Disease Avoidance, Affiliation-Group, Affiliation-Exclusion Concern, Affiliation-Independence, and Kin-Care-Family were non-significant (all $ps>.18$).

DISCUSSION

Results from the current study supported two of our four primary hypotheses. Specifically, individual differences in mate-seeking motives differentially predicted men's and women's face preferences (H3). Men higher in mate-seeking motives demonstrated stronger preferences for trustworthy, relative to dominant, male faces, regardless of stimulus intensity. This is consistent with evidence suggesting dominant men are more imposing as intrasexual rivals, and would thus pose greater threat to the reproductive goals of men high in dispositional mate-seeking motives (Boothroyd et al., 2011). Given perceptions of such men as promiscuous, it would be adaptive for men to prefer trustworthy men to mitigate infidelity concerns. Conversely, women higher in mate-seeking motives demonstrated heightened preferences for dominant, over trustworthy, male faces at high levels of stimulus intensity. Because male dominance cues are associated with good genes (Fink et al., 2007), women high in dispositional mate-seeking motives may benefit from a preference for dominant men, as dominance may be a good genes fitness indicator in the context of short-term mating. If women high in dispositional mate-seeking goals are more open to short-term mating experiences, our results would align well with extant findings demonstrating women's preference for men exhibiting good genes and, by extension, dominance in short-term mating capacities (e.g., Frederick & Haselton, 2007; Gangestad, Simpson, Cousins, Garver-Apgar, & Christensen, 2004).

Furthermore, men and women higher in general mate-retention motives demonstrated marginally stronger preferences for trustworthy, relative to dominant, male faces (H4). Because dominant men would be more threatening to men's (mate poaching) and women's (infidelity) relationships, it would be adaptive for an individual, regardless of sex, high in mate-retention motives to prefer trust, over dominance, in male faces, since trustworthy individuals should similarly communicate less proclivity toward extra-pair bonding and mate-poaching. Despite results' consonance with theory (i.e., results were in the predicted

direction), we exercise caution in interpreting findings for two reasons. First, results from this hypothesis did not attain conventional significance. Second, we had a relatively small sample of men in relationships; thus, our analyses were relatively underpowered tests of potential sex similarities (differences) in the relationship between dispositional mate retention goals and adaptive face preferences.

The hypothesis that women high in self-protection motivation would demonstrate stronger preferences for dominance, relative to trust, in male faces, whereas men high in self-protection motives would demonstrate stronger preferences for trustworthy relative to dominant male faces, was not supported (H1). Furthermore, no support emerged for the hypothesis that men high in status motives would demonstrate greater preferences for trustworthy, relative to dominant, male faces (H2). Past research exploring the impact of status and self-protection motives on behavior and perception have largely explored these factors at levels of acute activation, rather than as dispositional tendencies (e.g., Sacco et al., 2015). It is possible that individual differences in these variables do not perfectly track their acute activation.

While past research has articulated the specific domains of individual difference motives as well as their relation to other life history constructs (Neel et al., 2016), the current results indicate that individual differences in fundamental motives are associated with adaptive face preferences for dominance and trust in male faces. Nonetheless, the current results should be considered tentative, and future research should attempt to replicate the current study's findings with a larger and more representative sample of participants to determine the robustness of the reported relationships between individual differences in fundamental motives and face preferences. Additionally, future research would benefit by exploring additional behaviors and preferences associated with individual differences in fundamental motives, such as how individual differences in disease avoidance relate to symmetry preferences (e.g., Young et al., 2011) or how individual differences in affiliation motivation influence sensitivity to cues associated with social approach (e.g., Duchenne versus non-Duchenne smiles; Bernstein, Young, Brown, Sacco, & Claypool, 2008).

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