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## **BRIEF REPORT**

# Perceived Negative Emotion in Neutral Faces: Gender-Dependent Effects on Attractiveness and Threat

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Humans automatically form first impressions based on others' appearance, including their perceived emotional state. When others' facial expressions are neutral, or "resting," people nevertheless infer emotion, which they overgeneralize to trait judgments such as attractiveness and threat. I argue that perceived resting negative emotion (PRNE) predicts attractiveness and threat and that these effects are moderated by target gender, such that PRNE more strongly predicts attractiveness for women and threat for men. Analysis of 597 coded faces supports these predictions. Furthermore, moderated mediation analysis suggests that threat partly explains the gender moderation of PRNE's effect on attractiveness, such that threat negatively predicts attractiveness more strongly for women. These findings highlight the moderating role of target gender in emotional-face overgeneralization.

Keywords: face perception, emotion perception, affect, gender stereotypes, overgeneralization

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Most of the people one encounters in daily life are not smiling or frowning; instead, they show a neutral, or "resting," expression. However, some of these women and men still look happy, sad, or angry. These perceived resting emotions not only impact people's first impressions of others (Zebrowitz, 2017) but might also do so differently depending on gender. The insult resting bitch face is typically reserved for women and implies unattractiveness (Deutsch, LeBaron, & Fryer, 1987); on the other hand, facial cues more strongly impact judgments of male threat (Geniole, Denson, Dixson, Carré, & McCormick, 2015). In the present study, I tested whether perceived resting negative emotion (PRNE) predicts both judgments of attractiveness and threat; then, I tested whether PRNE predicts attractiveness more strongly for female targets and threat more strongly for male targets.

## **Judgments of Neutral Faces**

People automatically form first impressions of others by judging their physical appearance (e.g., Willis & Todorov, 2006). However, though these impressions influence how one interacts with others, they are not necessarily accurate (see Todorov, Olivola, Dotsch, & Mende-Siedlecki, 2015). People may make these low-

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accuracy judgments because of overgeneralization, forming impressions based on someone's traits (e.g., "this is an angry person") as well as their physical resemblance to a person who possesses these traits (e.g., "this person looks angry"). Specifically, emotional-face overgeneralization suggests that people infer emotion from neutral faces because of physical characteristics, such as lowered eyebrows (Keating, Mazur, & Segall, 1981), then overgeneralize these inferred emotions to judgments of traits such as dominance and warmth (Zebrowitz, 2017).

Given the ubiquity of neutral facial expressions, people's overgeneralization of perceived resting emotions to trait judgments holds large implications for person perception. In line with prior work (Said, Sebe, & Todorov, 2009), I expected that PRNE operationalized as anger, disgust, fear, sadness, and unhappiness (happiness reverse-coded)—would negatively predict attractiveness and positively predict threat.

## **Moderating Role of Gender**

Though PRNE should predict attractiveness and threat for all targets, exactly who is being judged should moderate the strength of these relations by influencing perceivers' motivation to infer certain traits. One example of this is target race: Perceived happiness in neutral faces predicts likability more strongly for outgroup Korean targets than for ingroup White targets (assumed to be high-likability), and perceived anger in neutral faces predicts competence more strongly for ingroup White targets than for outgroup Black targets (assumed to be low-competence; Zebrowitz, Kikuchi, & Fellous, 2010).

Gender powerfully shapes people's motivations for perceiving attractiveness and threat. For example, people are more motivated to assess attractiveness for women. Sociocultural factors place high value on women's appearance (Fredrickson & Roberts, 1997), such that women are more strongly and frequently evaluated on their looks (Sprecher, Sullivan, & Hatfield, 1994; Swim, Hyers, Cohen, & Ferguson, 2001). Because people are more motivated to assess women's attractiveness, I expected that PRNE would more strongly predict attractiveness for female targets.

People are also more motivated to assess threat for men. Men are responsible for the majority of violent crimes (Frisell, Pawitan, Långström, & Lichtenstein, 2012), which helps explain why people detect anger more quickly in male faces (Becker, Kenrick, Neuberg, Blackwell, & Smith, 2007) and mistakenly shoot unarmed men more often than unarmed women in a shooter task (Plant, Goplen, & Kunstman, 2011). Because people are more motivated to assess men's threat, I expected that PRNE would more strongly predict threat for male targets.

## Mediating Roles of Attractiveness and Threat

Do women high in PRNE seem less attractive because they seem more threatening? Threat may detract from attractiveness more for women than for men (Keating, 1985) because of both social roles (Wood & Eagly, 2002) and sexual selection (Archer, 2009). For this reason, gender differences in PRNE's relation to threat might explain gender differences in PRNE's relation to attractiveness—seeming more threatening may be unattractive for women but not unattractive for men. To examine this possibility, I fit two moderated mediation models testing (a) whether threat explains gender differences in the relation between PRNE and attractiveness and (b) whether attractiveness explains gender differences in the relation between PRNE and threat.

#### The Present Study

I hypothesized that PRNE would negatively predict attractiveness ratings and positively predict threat ratings. Furthermore, I hypothesized that PRNE would more strongly predict attractiveness ratings for female targets and would more strongly predict threat ratings for male targets. Finally, I fit two moderated mediation models to consider (a) whether threat explains target gender differences in the relation between PRNE and attractiveness and (b) whether attractiveness explains target gender differences in the relation between PRNE and threat.

#### Method

## Chicago Face Database Codebook

I analyzed the Chicago Face Database codebook (Ma, Correll, & Wittenbrink, 2015), which includes coder ratings for 597 neutrally posed faces ( $M_{\text{perceived age}} = 28.86$  years, SD = 6.30, range = 17–56; 51% female; 18% Asian, 33% Black, 18% Hispanic, 31% White; see http://bit.ly/2mtLaWZ). Coders were 64% female and 40% non-White and varied considerably in age (M = 26.8, SD = 10.5), though almost all participants were American. Interrater reliability of relevant ratings was very high ( $\alpha$ s > .99¹; see Ma et al., 2015, for full details).

Although the codebook's primary purpose is to inform stimulus selection for experiments, it is also a rich source of data with

considerable race and age diversity. Rated dimensions include perceived anger, disgust, fear, sadness, happiness, and surprise in each neutral face, as well as the perceived attractiveness, threat, trustworthiness, and dominance of each face. Coders used the prompt "Now, consider the person pictured above and rate him/her with respect to other people of the same race and gender" to rate dimensions on a 7-point scale ranging from 1 (*Not at all*) to 7 (*Extremely*). Extensive ratings of neutral faces are unique to the Chicago Face Database; other face databases, such as the Karolinska Directed Emotional Faces (Lundqvist, Flykt, & Öhman, 1998), the Pictures of Facial Affect (Ekman, 1976), and the MR2 (Strohminger et al., 2016), do not include these ratings. By using coded faces instead of coders as the unit of analysis, I substantially reduced concerns about stimulus sampling and generalizability (Judd, Westfall, & Kenny, 2012; Wells & Windschitl, 1999).

## **Index of Perceived Resting Negative Emotion**

Primary analyses do not consider the six emotions separately, instead using a PRNE index.<sup>2</sup> For clearly posed "prototypical" emotion expressions, recognition of specific emotions is decent but not perfect and is highly sensitive to context (Barrett, Mesquita, & Gendron, 2011), such that some scholars have argued that facial expressions are "inherently ambiguous" (Hassin, Aviezer, & Bentin, 2013, p. 60). For neutrally posed expressions, emotion cues are subtle and likely reflect general information about positive-negative valence rather than specific emotions. Because surprise is a valence-ambivalent emotion (Fontaine, Scherer, Roesch, & Ellsworth, 2007), I did not include surprise in the index.

A principal components analysis with direct oblimin rotation supports the decision to form a PRNE index; anger, disgust, fear, sadness, and happiness load onto the first component (55% variance explained, loadings > .70). Surprise loads onto a second component (23% variance explained, loading = .89). Thus, I formed the index of PRNE by centering ratings for anger, disgust, fear, sadness, and happiness; reverse-coding the happiness variable (centered prior to reverse-coding due to the use of a unipolar scale); and averaging together and recentering the variables. The PRNE index demonstrated normal distribution and sufficient variance for analysis (M = .00, Mdn = -.01, SD = .43; see the online supplemental materials for histograms of all variables). However, to address the possibility that influential outliers would drive key effects, I conducted sensitivity analyses with and without influential data points (Cook's distance > .05 for all analyses).

## **Trustworthiness and Dominance**

Trustworthiness and dominance are related to but distinct from attractiveness and threat. Though PRNE likely predicts trustworthiness and dominance, I did not hypothesize gender moderation of these effects. People do not show clear gendered motivations to perceive trustworthiness (e.g., Eastwick & Finkel, 2008) and,

<sup>&</sup>lt;sup>1</sup> These demographics are for Version 1 of the Chicago Face Database (CFD). Version 2 demographics are not available. Also, the authors of the CFD have warned that the reliability ratings are somewhat inflated due to sample size.

<sup>&</sup>lt;sup>2</sup> However, supplementary analyses throughout test the relations between specific emotions and outcomes.

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although people may show gendered motivations to perceive dominance, dominance (unlike threat) is valence-neutral (Said et al., 2009) and less directly related to physical harm, which is primarily initiated by men (Frisell et al., 2012). Nevertheless, complete analyses for trustworthiness and dominance, as well as analyses for attractiveness and threat controlling for trustworthiness and dominance, are available in the online supplemental materials.

#### **Results**

#### Main Effects of PRNE on Attractiveness and Threat

I first tested whether PRNE predicts attractiveness and threat. A regression predicting attractiveness with PRNE and target gender showed a main effect of PRNE (b=-.73), t(594)=-11.50, p<.001,95% confidence interval (CI) [-.85,-.60], as well as a main effect of target gender (b=.46), t(594)=8.42, p<.001,95% CI [.35,.57], such that female targets were rated as more attractive (M=3.46) than were male targets (M=3.00). Two generalized linear models including target race and target age showed no interaction between race and PRNE,  $\chi^2(3, N=597)=4.76$ , p=.19, and no interaction between age and PRNE,  $\chi^2(1, N=597)=.72$ , p=.40. The main effect of PRNE remained significant in these models (ps<.001), suggesting that PRNE predicts judgments of attractiveness across race and age categories.

A regression predicting threat with PRNE and target gender showed a main effect of PRNE (b=.86), t(594)=22.34, p<.001, 95% CI [.78, .93], as well as a main effect of target gender (b=-.34), t(594)=-10.41, p<.001, 95% CI [-.41, -.28], such that male targets were rated as more threatening (M=2.33) than were female targets (M=1.99). Two generalized linear models including target race and target age showed no interaction between race and PRNE,  $\chi^2(3, N=597)=2.24$ , p=.52, and no interaction between age and PRNE,  $\chi^2(1, N=597)=1.65$ , p=.20. The main effect of PRNE remained significant in these models (ps<.001), suggesting that PRNE also predicts judgments of threat across race and age categories.

Regressions testing specific emotions' relation with attractiveness and threat showed significant relationships for every emotion included in the PRNE index (ps < .001; see the Appendix A in online supplemental materials).

## Moderation of PRNE's Effects by Target Gender

I next considered whether target gender moderates the effects of PRNE on judgments of attractiveness and threat by analyzing interactions between PRNE and target gender. The regression predicting attractiveness showed a significant interaction between PRNE and target gender (b=-.32), t(593)=-2.54, p=.011, 95% CI [-.57, -.07], such that PRNE more strongly predicted attractiveness for female targets (b=-.87), t(593)=-10.32, p<.001, 95% CI [-1.04, -.70], than for male targets (b=-.55), t(593)=-5.80, p<.001, 95% CI [-.73, -.36]. Two generalized linear models including target race and target age showed that race did not moderate this interaction,  $\chi^2(3, N=586)=4.51$ , p=.21, nor did age,  $\chi^2(1, N=597)=.41$ , p=.52. The key interaction between PRNE and target gender remained significant with race included in the model,  $\chi^2(1, N=586)=6.39$ , p=.011, and with age included in the model,  $\chi^2(1, N=586)=6.39$ , p=.011, and with age included in the model,  $\chi^2(1, N=586)=6.39$ , p=.011, and with age included in the model,  $\chi^2(1, N=586)=6.39$ ,  $\chi^2(1, N=586)$ 

597) = 5.46, p = .019. These results suggest that target gender moderates the relation between PRNE and attractiveness and that this effect generalizes across race and age.

The regression predicting threat also showed a significant interaction between PRNE and target gender (b=-.28), t(591)=3.69, p<.001, 95% CI [-.43, -.13], such that PRNE more strongly predicted threat for male targets (b=.98), t(591)=17.55, p<.001, 95% CI [.87, 1.09], than for female targets (b=.70), t(591)=13.79, p<.001, 95% CI [.60, .80]. Two generalized linear models including target race and target age showed that race did not moderate this interaction,  $\chi^2(3, N=586)=5.19$ , p=.16, nor did age,  $\chi^2(1, N=595)=2.53$ , p=.11. The key interaction between PRNE and target gender remained significant with race included in the model,  $\chi^2(1, N=586)=14.80$ , p<.001, and with age included in the model,  $\chi^2(1, N=595)=13.72$ , p<.001. These results suggest that target gender also moderates the relation between PRNE and threat and that this effect generalizes across race and age.

To explore gender's interaction with specific emotions, I conducted five additional regression analyses for both attractiveness and threat. Figure 1 illustrates that PRNE, anger, disgust, fear, and sadness predict attractiveness more strongly for female targets than for male targets. Conversely, PRNE, anger, disgust, and happiness predict threat more strongly for male targets than for female targets (see the online supplemental materials, Appendix A, for all regressions).

#### **Moderated Mediation**

PRNE predicted judgments of attractiveness and threat differently for men and women. However, these analyses treated attractiveness and threat as independent outcomes when they are not. Thus, threat may mediate PRNE's relation to attractiveness or vice versa. Furthermore, gender moderated the relation between attractiveness and threat (b = -.44), t(592) = -4.22, p < .001, 95% CI [-.64, -.24], 6 such that threat was more strongly associated with attractiveness for female targets (b = -.69), t(592) = -8.79, p < .001, 95% CI [-.84, -.54], than for male targets (b = -.25), t(592) = -3.65, p < .001, 95% CI [-.39, -.12]. Thus, the moderating role of target gender for PRNE's relation to attractiveness might be explained by threat—PRNE might predict attractiveness more strongly for women *because* PRNE predicts threat, which makes women (but not men) seem unattractive.

 $<sup>^3</sup>$  The inclusion of race (four categories) created substantial issues with influential points. The reported race analyses trim the outer 1% of residuals. For the key PRNE  $\times$  Target Gender effect, sensitivity analyses trimming the outer 2% and outer 3% of residuals (to examine the robustness of effects to different cutoffs) yielded p values of .012 and .002, respectively. Without trimming, this effect is marginal (p=.063).

<sup>&</sup>lt;sup>4</sup> This analysis excluded two influential points with Cook's distances of .082 and .068 (next-highest Cook's distance = .037). The interaction is still significant including these points (b = .23), t(593) = 2.95, p = .003, 95% confidence interval [.08, .38].

<sup>&</sup>lt;sup>5</sup> The reported race analyses trim the outer 1% of residuals. For the key PRNE  $\times$  Target Gender effect, sensitivity analyses trimming the outer 2% and outer 3% of residuals (to examine the robustness of effects to different cutoffs) yielded p values less than .001. Without trimming, this effect was p = 0.01

 $p = .00\dot{1}$ . This analysis excluded one influential point with a Cook's distance of .052 (next-highest Cook's distance = .020). Including these points, b = -.41, t(593) = 3.90, p < .001, 95% confidence interval [.20, .61].

Using the PROCESS macro (Hayes, 2012), I fit two moderated mediation models to test (a) whether threat explains target gender differences in PRNE's effect on attractiveness and (b) whether attractiveness explains target gender differences in PRNE's effect on threat. I included target gender as a moderator for all relations between PRNE, attractiveness, and threat.<sup>7</sup>

With threat included as a mediator (Model A), target gender no longer moderated PRNE's effect on attractiveness (b=-.10), t(588)=-.60, p=.55, 95% CI [-.44, .23], and the magnitude of the indirect effect differed by gender (index of moderated mediation = -.22), 95% CI [-.44, -.01]. Conversely, with attractiveness included as a mediator (Model B), target gender still moderated PRNE's effect on threat (b=-.36), t(588)=4.29, p<.001, 95% CI [-.52, -.19], though the magnitude of the indirect effect marginally differed by gender (index of moderated mediation = .07), 95% CI [-.001, .13]; see Figure 2 and the Appendix B in online supplemental materials, for the full results).

#### **General Discussion**

PRNE negatively predicts attractiveness, especially for female targets, and positively predicts threat, especially for male targets. Furthermore, threat may account for why PRNE predicts attractiveness more strongly for women; female targets with greater PRNE seem more threatening and thus less attractive (for male targets, threat is unrelated to attractiveness). This work extends prior research demonstrating that emotions correlate with trait judgments (Said et al., 2009) using ratings of 597 faces representative of four racial groups and a 40-year age range, substantially boosting the generalizability of results. It is important to note that the present work also elaborates on the little-studied moderating role of target identity on the relation between PRNE and trait

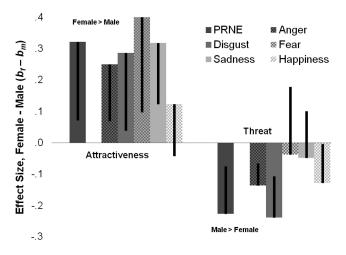


Figure 1. Differences by target gender for the unstandardized effect size of overall perceived resting negative emotion (PRNE), as well as the specific emotions that comprise the PRNE index, on perceived attractiveness and threat. Positive values indicate larger effects for female targets; negative values indicate larger effects for male targets. For perceived attractiveness, PRNE, anger, disgust, fear, and sadness have larger effects for female targets. For perceived threat, PRNE, anger, disgust, and happiness have larger effects for male targets. Bars represent 95% confidence intervals (CIs); effects for which the 95% CIs cross zero are not significant.

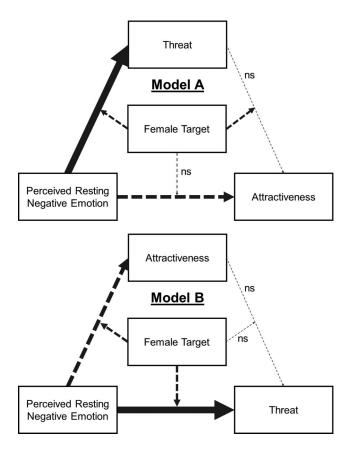


Figure 2. Moderated mediation of the effects of perceived resting negative emotion and target gender on attractiveness through threat (Model A) and threat through attractiveness (Model B). Solid lines indicate positive effects; dashed lines indicate negative effects. Line thickness indicates effect size, with thicker lines representing larger effects. ns = nonsignificant (effects).

judgments (Todorov et al., 2015; Zebrowitz et al., 2010) and considers how target identity moderates relations between traits.

The primary limitation of the present findings is the static nature of the ratings; emotion cues present in the neutral faces were not manipulated but instead measured across many faces, preventing causal inference. Though emotional-face overgeneralization suggests that emotions lead to trait judgments (Zebrowitz, 2017), future work might manipulate PRNE and measure attractiveness and threat as outcomes. Future work might also consider the opposite causal direction (perceived traits impacting perceived emotions; e.g., Maner et al., 2005) and compare the magnitude of these effects to emotional-face overgeneralization effects.

Furthermore, because most coders were American, the present findings are grounded in Western, educated, industrialized, rich, and democratic cognition (Henrich, Heine, & Norenzayan, 2010), limiting generalizability across cultures. This is especially true for the moderating role of gender, which likely hinges on culturally influenced social roles (Wood & Eagly, 2002). Future work might explore

 $<sup>^{7}\,\</sup>mathrm{The}$  moderated mediation models excluded the three previously excluded influential points.

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cross-cultural differences in gender's role in emotional-face overgeneralization.

#### Conclusion

The viral label *resting bitch face* highlights two ideas: neutral faces signal emotions and traits, and people's interpretations of these faces are guided by gendered motivations. The present data back both ideas. Men and women both showed traces of negative emotion in their neutral expressions, but the relation between these emotions and key evaluative traits—attractiveness and threat—differed by gender. When little other information is available, resting emotion and perceived gender might combine to predict whom one asks for directions, talks to at the bar, or simply sits next to on the bus.

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