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Original Research Article

The Role of Perceived Health in Preferences for Average Face Shapes

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Abstract

Many studies have reported that faces with less distinctive (i.e., more average or prototypical) shapes are perceived to be more attractive. This preference for faces with less distinctive shapes is often explained in terms of a psychological adaptation in which putative health cues are considered attractive. While evidence that individuals with less distinctive face shapes are actually healthier than those with distinctive face shapes is mixed, there is good evidence that faces with less distinctive shapes are perceived to be healthier. To date, only one study has tested whether preferences for average faces are mediated by health perceptions, finding that health perceptions partially mediated the negative relationship between facial attractiveness and distinctiveness. However, facial distinctiveness was assessed using distinctiveness ratings, which are only modestly correlated with objective measures of shape distinctiveness. Consequently, we tested whether health perceptions mediated the negative relationship between facial attractiveness and shape distinctiveness using a sample of 50 male and 50 female face images for which it has previously been reported that both health and attractiveness ratings were negatively correlated with an objective measure of shape distinctiveness. Mediation analysis showed that ~63% (95% CI [40%, 80%], $p < .001$) of the negative relationship between facial attractiveness and shape distinctiveness could be attributed to the effects of health perceptions. This finding contributes to growing evidence that preferences for face shapes with low distinctiveness occur, at least in part, because less distinctive faces appear to be healthier.

Keywords

attractiveness, faces, distinctiveness, mate preferences, health perceptions, prototypicality

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Introduction

Many studies have reported that faces with less distinctive (i.e., more average or prototypical) shapes are judged to be more attractive (see Rhodes, 2006 for a meta-analytic review). While findings for the attractiveness of other face-shape characteristics, such as symmetry and sexual dimorphism, have been found to depend on the type of study design employed (Jones & Jaeger, 2019; Lee et al., 2021), negative effects of distinctiveness on facial-attractiveness judgments have been reported for a wide range of types of study design. For example, negative effects of distinctiveness on attractiveness judgments have been reported when distinctiveness of face shape was experimentally manipulated using computer graphics methods (e.g., DeBruine et al., 2007; Jones et al., 2007; Perrett et al., 1994; Rhodes et al., 1999, 2001), when natural (i.e., unmanipulated) face images were rated for attractiveness and distinctiveness was assessed using distinctiveness ratings (Rhodes et al., 2001), and when natural (i.e., unmanipulated) face images were rated for attractiveness and distinctiveness was measured using facial metric techniques (Kleisner et al., 2024a; Komori et al., 2009a, 2009b; Lee et al., 2025).

Although it is now well established that less distinctive faces are considered more attractive, the reasons for this negative relationship between facial attractiveness and distinctiveness remains unclear. Many researchers have proposed that preferences for less distinctive faces reflect psychological adaptations for identifying particularly healthy potential mates (Rhodes, 2006; Rhodes et al., 2007; Thornhill & Gangestad, 1999), potentially because contracting infectious illnesses during early development increases both susceptibility to infectious illnesses and facial distinctiveness in adulthood (Rhodes, 2006; Rhodes et al., 2007; Thornhill & Gangestad, 1999). Central to this explanation is the claim that healthier individuals have less distinctive face shapes (Rhodes et al., 2007). However, empirical tests for this putative relationship between distinctiveness and indices of health have been mixed (see Jones et al., 2021 and Obrochta et al., 2025 for reviews). For example, Jones et al. (2018) reported

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that individuals reporting better physical condition on a general health questionnaire had less distinctive face shapes. By contrast, Cai et al. (2019) found no significant correlation between self-reported physical health and distinctiveness.

While most studies exploring health-related explanations of the negative relationship between distinctiveness and attractiveness have focussed on testing for possible associations between facial distinctiveness and measures of actual health, other studies have investigated whether less distinctive faces are perceived to look healthier. Indeed, many studies have reported that less distinctive faces are rated to be healthier (e.g., Rhodes et al., 2001, 2007). Building on this work, Rhodes et al. (2007) tested whether health ratings mediated the negative association between distinctiveness ratings of faces and attractiveness ratings, finding evidence that the negative association between distinctiveness ratings of faces and attractiveness was partially mediated by perceptions of health. However, they demonstrated this pattern of results using partial correlations, rather than a formal mediation analysis. Consequently, the size of the indirect effect of perceived health on the association between facial distinctiveness and attractiveness could not be directly estimated. A formal mediation analysis allows the size of the indirect effect to be quantified and the extent to which perceived health accounts for the association between facial distinctiveness and attractiveness to be determined. A formal mediation analysis can provides an estimate of the size of the mediation effect, expressed as a percentage ranging from 0% (no mediation) to 100% (full mediation).

In the current study, we tested whether Rhodes et al.'s findings replicated when a formal mediation analysis was employed and when face-shape distinctiveness was measured objectively from images using established facial-metric methods. We carried out this test using an open-access image set (DeBruine & Jones, 2022) for which health ratings and measured shape distinctiveness have previously been shown to be negatively and significantly correlated (Leger et al., 2024). We had no a priori prediction regarding whether we would replicate the pattern of results in Rhodes et al. (2007) or regarding the size of mediation effect if we did replicate the pattern of results in Rhodes et al. (2007). The study was not preregistered.

Methods

Ethics

This project was approved by the Department of Psychological Sciences and Health (University of Strathclyde) Ethics Committee (application number: 28.13.11.2023).

Stimuli

Stimuli were face images of 50 white men (mean age = 24.2 years, SD = 3.99 years) and 50 white women (mean age = 24.3 years, SD = 4.01 years) that were obtained from an open-access face-image database (DeBruine & Jones, 2022).

Figure 1. Examples of male (top row) and female (bottom row) face images used in our study.

Individuals posed front-on to the camera, with direct gaze, and with neutral expressions. Images were standardized on pupil position and clothing was masked prior to rating. Example images are shown in Figure 1. Images (and the shape templates used to calculate shape-distinctiveness scores) are publicly available at https://osf.io/a3947/.

Attractiveness Ratings

Attractiveness ratings were taken from the open-access face-image database (DeBruine & Jones, 2022). Two hundred heterosexual men and 200 heterosexual women (mean age = 24.83 years, SD = 5.70 years) were randomly allocated to rate either the 50 male or 50 female face images in an online study using a 7-point scale (1 = much less attractive than average, 7 = much more attractive than average). Trial order was fully randomized. Cronbach's alphas were high for ratings of both male (Cronbach's alpha = .99) and female (Cronbach's alpha = .99) face images. Cronbach's alphas were also high for each combination of face sex and rater sex when calculated separately (all Cronbach's alphas > .97). The mean attractiveness rating for male faces was 2.64 (SD = 1.46) and the mean attractiveness rating for female faces was 2.71 (SD = 1.48).

Attractiveness ratings were collected using the Experimentum data-collection platform (DeBruine et al., 2020) and participants were recruited from adverts on social media sites (e.g., stumbleupon.com). These attractiveness ratings have previously been used in Lee et al. (2025).

Health Ratings

Health ratings were also taken from the same open-access face-image database (DeBruine & Jones, 2022). Two hundred men and 200 women (mean age = 25.15 years, SD = 5.62 years) were randomly allocated to rate either the 50 male face images or the 50 female face images for health using a 1 (much less healthy than average) to 7 (much more healthy than average) scale. Trial order was fully randomized. Ratings were collected using the Experimentum data-collection platform (DeBruine et al., 2020) and participants were recruited from adverts on social media sites (e.g., stumbleupon.com). Inter-rater agreement for health ratings was high for both male and female faces (both Cronbach's alphas > .90). These health ratings have previously been used in Leger et al. (2024), who reported that they were negatively correlated with distinctiveness ratings irrespective of sex of face, sex of rater, or the interaction between sex of face and sex of rater. None of the participants who rated the faces for health had also rated the faces for attractiveness.

Measuring Face-Shape Distinctiveness

Distinctiveness scores were also calculated from each photograph using the facefuns package (Holzleitner & DeBruine, 2021) in R (R Core Team, 2021). This technique has been used to measure face-shape distinctiveness in many previous studies (e.g., Cai et al., 2019; Holzleitner et al., 2019; Lee et al., 2025; Leger et al., 2023, 2024). Shape components were first derived from Principal Component Analysis (PCA) of 132 Procrustes-aligned landmark points (see supplemental materials in Holzleitner et al., 2019 https://osf.io/jurcq/ for diagrams showing these facial landmarks) on each of the 50 male and 50 female face images. These shape principal components were then used to measure the distance each face lies from the mathematical average shape for the sample of faces of the same sex. That is, the average shape values for the same-sex sample were calculated and, for each image, the Euclidean distance from the average was derived. Higher scores indicate that the face lies a further distance away from the average (i.e., had a more distinctive shape). We measured distinctiveness scores for male and female faces separately in light of evidence that faces are primarily processed relative to sex-specific prototypes (e.g., Little et al., 2005; Rhodes et al., 2011). No scores were more than three standard deviations from the mean (i.e., there were no extreme values). Distinctiveness scores were converted to z-scores prior to analyses. These shape distinctiveness scores have previously been used in both Leger et al. (2024) and Lee et al. (2025). Distinctiveness scores for this sample are not significantly correlated with sexual dimorphism (Leger et al., 2024). Previous work has used the method to demonstrate negative relationships between face-shape distinctiveness and both health and attractiveness ratings (e.g., Lee et al., 2025; Leger et al., 2024).

Results

All statistical analyses were carried out using R (R Core Team, 2021), with the packages jtools 2.3.0 (Long, 2022), rstatix 0.7.3 (Kassambara, 2025), and mediation 4.5.1 (Tingley et al., 2014). Data processing and display used cowplot 1.2.0 (Wilke, 2025), kableExtra 1.4.0 (Zhu, 2021), and tidyverse 2.0.0 (Wickham, 2021). All data, full outputs, and analysis code are publicly available on the Open Science Framework (https://osf.io/e3jr9/).

Male and female raters' attractiveness ratings of the faces were highly correlated ($r = .95$, $N = 100$, $p < .001$), as were male and female raters' health ratings of the faces ($r = .89$, $N = 100$, $p < .001$). Consequently, we calculated a single average attractiveness rating and a single average health rating to use in subsequent analyses.

A regression analysis with attractiveness as the outcome variable and shape distinctiveness, sex of face, and the interaction between shape distinctiveness and sex of face as predictors, showed a significant negative effect of distinctiveness (estimate = −0.284, standard error = 0.061, $t = -4.617$, $p < .001$) and no other significant effects (both $p > .16$). The adjusted R squared for this model was .16. A regression analysis with health ratings as the outcome variable and shape distinctiveness, sex of face, and the interaction between shape distinctiveness and sex of face as predictors, also showed a significant negative effect of distinctiveness (estimate = −0.212, standard error = 0.063, $t = -3.359$, $p = .001$) and no other significant effects (both $p > .36$). The adjusted R squared for this model was .08. A final regression analysis with attractiveness as the outcome variable and health ratings, sex of face, and the interaction between health ratings and sex of face as predictors, showed a significant positive effect of health ratings (estimate = 0.908, standard error = 0.047, $t = 19.320$, $p < .001$) and no other significant effects (both $p > .120$). The adjusted R squared for this model was .79. Full results of these analyses are publicly available on the Open Science Framework (https://osf.io/e3jr9/). Collectively these results indicate that attractiveness, health ratings, and shape distinctiveness are intercorrelated and that none of the relationships are qualified by interactions with sex of face. These interrelationships are shown in Figure 2.

Finally, we conducted a mediation analysis to test what proportion of the effect of distinctiveness on attractiveness was mediated by health ratings. This mediation analysis indicated that distinctiveness negatively predicted attractiveness overall (estimate = −0.26, 95% CI [−0.39, −0.16], $p < .001$). Moreover, this effect was partially explained by health ratings: more distinctive faces were rated as less healthy, which

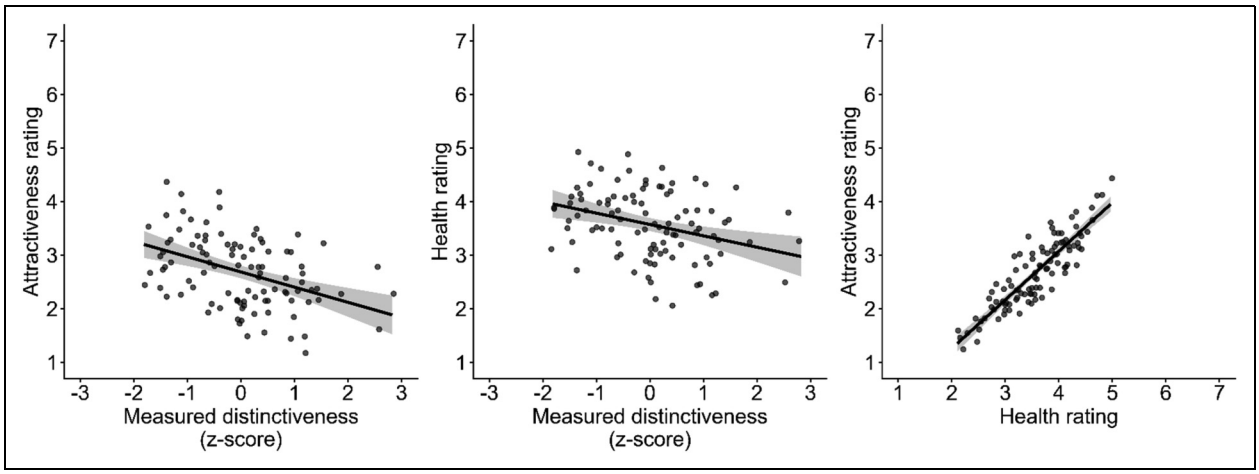

Figure 2. The significant relationships between attractiveness and shape distinctiveness (left panel), health ratings and shape distinctiveness (centre panel), and attractiveness and health ratings (right panel). Dots represent individual faces. The solid black line represents the fitted linear regression line, and the grey shaded band represents the 95% confidence interval around the fitted line.

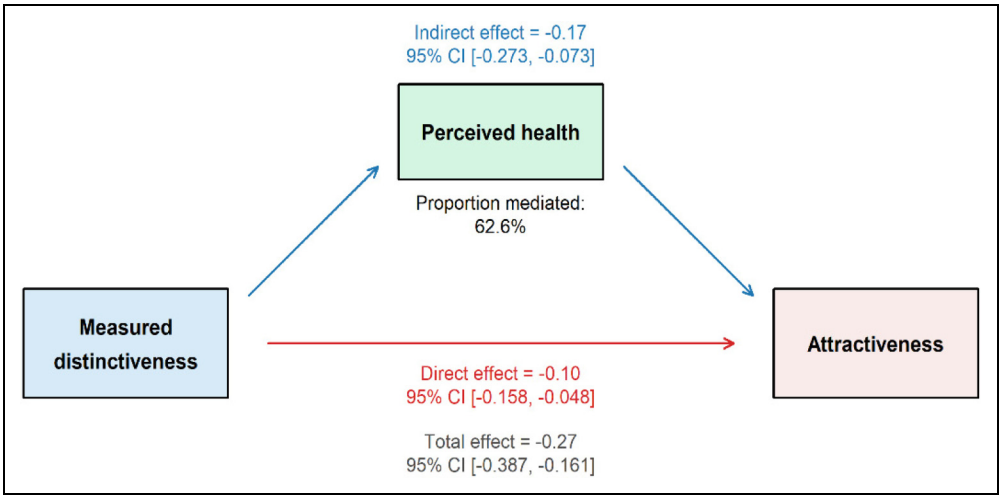

Figure 3. Summary of results of mediation analysis.

in turn predicted lower attractiveness (estimate = −0.16, 95% CI [−0.272, −0.075], $p < .001$). However, distinctiveness remained a significant negative predictor of attractiveness ratings even after accounting for health ratings (estimate = −0.10, CI 95% [−0.16, −0.05], $p < .001$). Health ratings accounted for approximately 63% of the effect of distinctiveness on attractiveness (95% CI [40%, 80%], $p < .001$). Full results of this analysis are publicly available on the Open Science Framework (https://osf.io/e3jr9/). Figure 3 summarizes the results of these analyses.

Discussion

Our initial analyses showed that shape distinctiveness was negatively correlated with both attractiveness and health ratings. These results complement previous analyses published on this image set showing similar patterns of results using linear mixed effects models (Lee et al., 2025; Leger et al., 2024). Our mediation analysis indicated that health ratings partially mediated the attractiveness of average faces, replicating Rhodes et al.'s (2007) results. Whereas Rhodes et al. (2007) showed this partial mediation when averageness was assessed using distinctiveness ratings, here we show this pattern of results also occurs when shape distinctiveness was assessed using a facial-metric method. This is potentially noteworthy, since distinctiveness ratings and shape distinctiveness assessed using facial metrics are only weakly correlated (Kleisner et al., 2024b). The modest correlation between distinctiveness ratings and shape distinctiveness assessed using facial metrics suggests that distinctiveness ratings are influenced by additional information other than shape distinctiveness (e.g., surface information).

We found that the negative relationship between shape distinctiveness and facial attractiveness was mediated by health ratings, which is consistent with the proposal that the attractiveness of average faces is at least partly a consequence of psychological adaptations for identifying healthy individuals (Rhodes, 2006; Thornhill & Gangestad, 1999). However, health ratings partially mediated the effect of averageness on attractiveness, accounting for approximately 63% of the effect. In three samples of faces (one sample of white faces, one sample of Japanese faces, one sample of faces of diverse ethnicities, total number of faces = 881, total number of raters = 200), Rhodes et al. (2007) also found that health ratings only partially mediated the relationship between facial attractiveness and distinctiveness. Although Rhodes et al.'s use of partial correlations, rather than a formal mediation analysis, means that a precise estimate of the magnitude of the mediation effect in their study cannot be derived, both findings suggest that at least part of the negative effect of distinctiveness on facial-attractiveness judgments cannot be explained by health perceptions.

That both our own findings and those reported by Rhodes et al. (2007) suggest that at least part of the negative effect of distinctiveness on facial-attractiveness judgments cannot be explained by health perceptions raises the question of what, other than health, might contribute to the attractiveness of faces exhibiting low distinctiveness? Many researchers have suggested that the attractiveness of average faces (i.e., faces with low distinctiveness) may be partly a low-cost functionless byproduct of the efficiency with which the visual system can process less distinctive faces (see Rhodes, 2006 for a review of this perceptual fluency account). Indeed, several studies have reported that measures of coding efficiency positively predict facial-attractiveness judgments (e.g., Holzleitner et al., 2019; Renoult et al., 2016). Further work is needed to clarify the relative contributions of perceptual fluency and perceived health to the negative relationship between distinctiveness and attractiveness, as well as the role that surface information plays. Relatedly, whereas both our study and Rhodes et al. (2007) investigated the role of health perceptions, rather than measures of actual health, estimating the extent to which measures of actual health mediate the negative relationship between distinctiveness and attractiveness in future studies would also be a useful addition to the literature. It would also be useful for future work to include faces with a wider range of perceived attractiveness and health.

Many researchers have proposed that facial distinctiveness and attractiveness are negatively correlated, at least in part, because facial distinctiveness is a cue of susceptibility to infectious illnesses (Rhodes, 2006; Thornhill & Gangestad, 1999). While evidence that face-shape distinctiveness is correlated with markers of actual health is mixed (see, e.g., Jones et al., 2018 and Cai et al., 2019), many studies have reported that faces with distinctive faces are perceived to be unhealthy (Rhodes et al., 2001, 2007). Here we extend this work by showing that perceived health partially mediates the negative relationship between distinctiveness and facial attractiveness (see also Rhodes et al., 2007), suggesting that more distinctive faces are considered less attractive, at least in part, because they appear to be unhealthy.

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