

Physical Attractiveness and Health: Comment on Weeden and Sabini (2005)

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Evolutionary behavioral biology suggests that certain characteristics of the human face and body are important for mate preferences and are therefore subject to sexual selection. J. Weeden and J. Sabini (2005) identify a number of weaknesses in the association between traits' attractiveness and health. In contrast, the authors argue that (a) studies on preferences for physical characteristics that rely on 1 trait permit only limited interpretation, (b) limitations placed on J. Weeden and J. Sabini's review exclude important associations, (c) there are misconceptions in their treatment of some traits, and (d) their selected literature provides an inaccurate picture regarding effect size. The authors suggest that future research in this field should seek conceptual and methodological constancy in trait selection and in the evaluation of attractiveness- and health-related traits.

Keywords: attractiveness, health, fluctuating asymmetry, human, evolution

The review by Weeden and Sabini (2005) considers (a) the relationship between a number of physical features (body size, shape, symmetry, and hormone markers) and attractiveness and (b) the relationship between attractiveness and health. One problem that arises from such an approach is the separate consideration of the physical features and their relationship with attractiveness. There is overlap between these physical features such that summing effect sizes for n dimensions is a more meaningful approach than simply considering, for example, body mass index (BMI) and attractiveness or symmetry and attractiveness as separate relationships. To clarify, Weeden and Sabini apparently have not considered the theoretical issues related to attractiveness and the internal states of a sender and the decoding of attractiveness by the receiver. Instead they have drawn a monocausal picture of the relations between signal production and perception. Grammer,

Fink, Møller, and Thornhill (2003) described four main sources that add to attractiveness ratings—hormone markers, averageness, symmetry, and skin texture—and in many cases the cues used for attractiveness ratings are interrelated as shown by Thornhill and Grammer (1999). This relation between stimuli can be regarded as an n -dimensional feature space with beauty vectors of different sizes but with an aligned direction (see Grammer, Fink, Jütte, Ronzal, & Thornhill, 2001). If this is the case, evidence for a relation between health, attractiveness, and/or BMI:waist-to-hip ratio (WHR) is a simplification of the whole problem. Indeed, computer simulations of decision making in attractiveness ratings reveal that an “avoiding the worst feature” strategy fits best for men's judgments of women's physical attractiveness. Thus, if the variance of the features is unknown, one cannot meaningfully conclude about the contribution of a single trait to overall attractiveness ratings, nor is a comparison between studies possible. Another theoretical problem, which is apparent in the review, is related to the concept of symmetry. The signal value of symmetry is widely misunderstood by most researchers. There is no one-to-one relation between symmetry and health, nor between symmetry and attractiveness. Symmetry per se has two signal components: First, an organism can be symmetric when there are no environmental perturbations present, and thus, development proceeds without disruptions; and second, symmetry is thought to signal good genes when parasites or environmental disturbances are common and the organism is symmetric despite these stressors. Thus, the relation between attractiveness, symmetry, and health is expected to be a weak one, and the existence of asymmetries is the signal, not the presence of symmetry. This also has considerable effects on the selection of stimuli when conducting such research. If variation in asymmetry is very small, a human observer might use other cues instead.

Editor's Note. The authors of the target article for this comment, “Physical Attractiveness and Health in Western Societies: A Review” (Weeden & Sabini, 2005), were given an opportunity to react to this commentary but chose not to.—HC

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Furthermore, the authors' reliance on the article by Simmons, Rhodes, Peters, and Koehler (2004) for their understanding of fluctuating asymmetry (FA) is questionable. This recent article deals in a fairly controversial way with the tricky problem of what constitutes the kind of asymmetry that indicates developmental instability. Simmons et al. argued that signed asymmetries should be normally distributed (i.e., show "ideal FA") before they may be used as measures of developmental instability. However, in large samples most human right-left differences show small but significant deviations from a normal distribution. Therefore many of the works cited by Weeden and Sabini (2005) report asymmetry and not "ideal FA." Overreliance on this single FA article is not conducive to obtaining a balanced view. With regard to the face, the algorithms used by Grammer et al. (2001) and Grammer and Thornhill (1994) indeed measured FA and not directional asymmetry because they were designed to calculate the deviation from a virtual centerline, and the same holds for follow-up image analysis programs used by these authors. Photographic manipulation of images like flip-flop images are likely manipulations that destroy laterality—and thus are no longer attractive.

Finally, Weeden and Sabini (2005) did not consider the fact that measures of FA only reflect the underlying developmental instability of individuals to a very limited extent. The repeatability of FA is the proportion of the variance in phenotype attributable to individual differences in developmental instability (van Dongen, 1998; Whitlock, 1996). This repeatability of a single trait is only on average .071, which implies that a maximum of 7.1% of underlying individual differences in developmental instability can maximally be reflected by the FA of a single trait (Gangestad & Thornhill, 1999). This has implications for interpretations of mean effect sizes, in particular, those reported by Weeden and Sabini because their effect size estimates are based on FA in one or a few traits. Hence, the effects of underlying developmental instability on attractiveness will generally be several times as large as that reported for asymmetry in a single trait.

Limitations and Oversimplification of the Review

Weeden and Sabini (2005) indicated a number of limitations to their review. It is important that a review be focused on particular questions. However, limitations can be so constructed as to strengthen or weaken the relationships in question. With regard to the possibility of the latter effect we are puzzled as to the following limitations. First, nondeveloped, non-Western societies were not considered. Physical traits that are indicators of environmental stress (most particularly FA) are likely to be robust indicators of attractiveness and health in groups that experience high parasite loads and unpredictable food supplies. It appears that the authors realized this but still excluded studies of traditional societies. In addition, they excluded "within- and between-individual differences in any of the relationships at issue" (Weeden & Sabini, 2005, p. 637). Thus, they have excluded evidence of a link between within-individual physiological homeostasis and FA. For example, Manning and colleagues (Manning, Gage, Diver, & Fraser, 2002; Manning, Scutt, Whitehouse, Leinster, & Walton, 1996) have shown that FA may change in a cyclical manner over women's menstrual cycles or over 24 hr in the case of men. Some participants showed marked change in FA, and others, little change. At least some of these differences depended on fluctuations in hor-

mones related to metabolic rate (thyroxin) and calcium levels (parathyroid hormone). A stable FA and a production of these essential hormones that is not prone to marked fluctuations are likely indicators of good health. Finally, they excluded indicators of fertility such as number of children or age at first child but included measures of sperm viability and probability of conception. This is puzzling because they have indicated that attractiveness-health links are seen in the context of "good-genes" theory. How can one remove measures of fertility from tests of such a theory?

Inadequate Literature Search

The literature search missed several important studies. Weeden and Sabini (2005) claimed they "manually inspected all issues of the journal *Evolution and Human Behavior* for relevant studies back to 1990" (p. 637). A quick inspection revealed obviously relevant articles that were not cited.

FA of the Body and Attractiveness of the Face

Gangestad, Thornhill, and Yeo (1994) have shown in a sample of 72 undergraduate students that body asymmetry, as measured from a composite of seven bilateral traits, is negatively related to attractiveness ratings of the face ($r = -.20, p < .05$). The correlation remained significant after the effects of sex, age, height, and minor physical anomalies were removed ($r = -.25, p < .03$). Separate analyses showed the relationship was stronger for men ($r = -.33, p < .05$) compared with women ($r = -.17, ns$), but these correlations did not reliably differ.

FA and Weight or BMI in Women

There is evidence that female FA is positively related to fat deposition. For example, FA is positively related to BMI in women (Hume & Montgomerie, 2001; Milne et al., 2003). Manning (1994) reported relationships between FA and body size in 70 adults (39 women and 31 men) and 110 children. There were no significant associations in children. In women, both weight ($r = .45, p = .004$) and height ($r = .36, p = .02$) were positively and significantly related to FA. After controlling for the influence of height, Manning found that women's weight remained significantly related to FA ($r = .36, p = .04$). In men, weight ($r = -.53, p = .002$) and height ($r = -.38, p = .04$) were significantly negatively related to FA. The relationships for men have not been replicated, but those for women have.

Manning, Scutt, Whitehouse, and Leinster (1997) have considered breast FA (as measured from mammograms) and its relationship to body size in a sample of 500 women. They found height was only weakly correlated with breast FA ($r = .09, p = .04$) but found stronger positive correlations between breast FA and weight ($r = .24, p = .0001$) and breast FA and breast volume ($r = .36, p = .0001$). Breasts may store considerable amounts of fat. Controlling for tissue density, they found that women with breasts containing high proportions of fat had high breast FA ($r = -.16, p = .0004$). With respect to health, both breast FA and breast volume have been linked with breast cancer (Scutt, Manning, Whitehouse, Leinster, & Massey, 1997).

FA and Health

Also missed were the following three studies. Martin, Manning, and Dowrick (1999) reported on FA and Beck Depression Inventory scores in a sample of 52 men and 50 women. A composite FA score made up of FA from six traits (ears, wrists, and length of each finger from second to fifth) was positively related to Beck Depression Inventory score in men ($p = .04$), where the relationship was strongest for the fourth digit. The relationship was not significant for women ($p = .70$). Baker (1997) has reported that a composite measure of asymmetry (second finger, ear, wrist, and ankle) in 34 men was negatively related to sperm numbers. Manning and Pickup (1998) have reported negative associations between various body asymmetries (particularly ears and nostrils) and running speed in a sample of 50 male middle-distance runners. A consideration of the sites of the asymmetry traits indicates that the correlations probably arise as a result of metabolic efficiency rather than mechanical advantages.

FA

An article by Manning et al. (1997) provides further evidence for an FA health-attractiveness link from a consideration of breast FA in a sample of 500 women. Associations between FA and weight and breast size indicate that breast FA is an important correlate of health-related issues (see Scutt et al., 1997). It was also found that the number of women who were married was decreased in proportion to increasing breast FA from about 90% for those with symmetric breasts to about 50% in those with the most asymmetric breasts (Scutt et al., 1997). This relationship is clearly related to attractiveness and should not be excluded. Other correlates of breast FA include age at first child, which Weeden and Sabini (2005) specifically excluded as a measure of reproductive health. Again, as regards breast FA there appears to be little appreciation of the very marked amount of asymmetry of this trait. On p. 640 the authors appear to criticize Singh (1995) for presenting drawings of breast asymmetry in which one breast sags noticeably. Manning et al. (1997) have shown explicitly that breast FA is often large enough to be obvious, and the drawing used by Singh in his research is therefore fully appropriate. Another uncited article is Grammer et al. (2001). In this article face symmetry correlates with ratings of facial attractiveness ($r = .22$) and with total scores (face, back view, front view; $r = .34$).

BMI and WHR

The review of BMI and WHR is very dependent on the work of Tovee. With regard to these traits Tovee and Singh have long been locked into a vigorous and largely unproductive debate over whether BMI or WHR is the more important predictor of attractiveness. This is unfortunate given that the two traits could be positively correlated and provide complementary information (Evans, Hoffman, Kalkhoff, & Kissebah, 1983). On p. 641 the authors cited Tovee, Mason, Emery, McCluskey, and Cohen-Tovee (1997) with regard to WHR in women with anorexia. That study reported a mean WHR of .76 in a sample that was probably not even fertile. The authors remarked, "Thus, WHR alone would appear to misread the fertility status of very thin women" (Weeden & Sabini, 2005, p. 641). WHR over normal ranges of BMI is a

measure of where women accumulate their fat (in such a population, .76 would be rated as attractive). This in turn is dependent on their ratio of estrogen to testosterone and thus is a correlate of their fertility. Women with almost no body fat have a WHR that is dependent on bone structure, and of course their WHR is not a correlate of fertility in this situation.

The authors concluded that BMI and WHR appear to predict both attractiveness and health but that other variables such as FA do not. In this they largely ignore the relationship between FA and weight or BMI. In women FA is positively related to weight (see above Manning, 1994, body FA; Manning et al., 1997, breast FA) or BMI (Hume & Montgomerie, 2001, face FA; Milne et al., 2003, body FA).

Conclusion

In conclusion, we think it is important to clarify the links between physical traits, attractiveness, and health. The review by Weeden and Sabini (2005) raises valid questions regarding these links. However, we have concerns regarding their treatment of the physical traits as entirely separate stimuli, the puzzling limitations placed on the review, the missing literature, and the misconceptions related to the treatment of FA, BMI, and WHR.

The authors have pointed to weak effect sizes. In general, mean effect sizes in biology are on average 5%–7%. One should not expect much stronger effect sizes in studies of attractiveness. This does not mean that these attractiveness factors are unimportant. It just implies that biological relationships are generally noisy and that even with an experimental approach one cannot expect to find strong average relationships explaining 10% or 25% of the variance. Relating to this last point, it is likely that attractiveness–health links are much stronger in non-Western societies with high loads of contagious diseases, such as many societies in the tropics (Gangestad & Buss, 1993; Guernier, Hochberg, & Guegan, 2004). To understand the associations between physical traits, attractiveness, and health one would best be advised to look to such groups.

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Correction to Cantor et al. (2005)

As a result of an editorial error, the article “Quantitative Reanalysis of Aggregate Data on IQ in Sexual Offenders,” by James M. Cantor, Ray Blanchard, Lori K. Robichaud, and Bruce K. Christensen (*Psychological Bulletin*, 2005, Vol. 131, No. 4, pp. 555–568) listed the link to online supplemental data incorrectly.

The correct URL is as follows:

<http://dx.doi.org/10.1037/0033-2909.131.4.555.supp>