ELSEVIER

Evolution and Human Behavior 27 (2006) 131–144

Evolution and Human Behavior

Facial sexual dimorphism, developmental stability, and susceptibility to disease in men and women

Randy Thornhill[a,*], Steven W. Gangestad[b]

[a]*Department of Biology, The University of New Mexico, Albuquerque, NM 87131, USA*
[b]*Department of Psychology, The University of New Mexico, Albuquerque, NM 87131, USA*

Initial receipt 23 March 2005; final revision received 13 June 2005

Abstract

We investigated aspects of self-reported health history–the number and duration of respiratory and stomach or intestinal infections and the number of uses of antibiotics over the last 3 years–in relation to measured facial masculinity, developmental instability [facial asymmetry and body fluctuating asymmetry (FA)] and facial attractiveness in a sample of 203 men and 203 women. As predicted from the hypothesis that the degree of facial masculinity is an honest signal of individual quality, men's facial masculinity correlated negatively and women's positively with respiratory disease number and duration. Stomach illness, however, was not associated significantly with facial masculinity and antibiotic use correlated significantly (negatively) only with men's facial masculinity. For both facial asymmetry and body FA, significant, positive associations were seen with the number of respiratory infections. In addition, facial asymmetry was associated positively with the number of days infected and marginally, in the same direction, with antibiotic use. Facial attractiveness showed no significant relationships with any of our health-history measures. This study provides some evidence that facial masculinity in both sexes may signal disease resistance and that developmental stability covaries positively with disease resistance. The validity of our health measures is discussed.

Keywords: Developmental instability; Facial masculinity; Health; Immunocompetence; Physical attractiveness; Sexual selection

* Corresponding author.
E-mail address: rthorn@unm.edu (R. Thornhill).

1090-5138/06/$ – see front matter © 2006 Elsevier Inc. All rights reserved.
doi:10.1016/j.evolhumbehav.2005.06.001

1. Introduction

On average, many of men's and women's facial structures differ. Men have broader and longer chins, deeper and narrower eyes due to brow ridge development, and thinner lips. Sexual dimorphism is facilitated ontogenetically by the ratio of testosterone to estrogen during adolescence (Bardin & Catterall, 1981; Enlow, 1990; see also references in Swaddle & Reierson, 2002). In men, a high ratio influences facial growth until the early 20s (Enlow, 1990). Possibly, estrogen caps the growth of the facial bones, as it does for some other bones, but enhances lip fullness, whereas testosterone, in combination with growth hormones, promotes facial bone growth (for further discussion, see Thornhill & Gangestad, 1993; Thornhill & Grammer, 1999). Sexually dimorphic facial structure hereafter is referred to as "facial masculinity."

Facial masculinity has been a focus of studies of sexual selection in humans. Men with masculine faces may tend to be socially dominant (Mazur & Booth, 1998; Mueller & Mazur, 1997; Swaddle & Reierson, 2002), and hence, men's facial masculinity may play a role in male intrasexual selection. It also affects female choice. The face that normally ovulating women (not using hormone-based contraception) who are at the fertile phase of their ovulatory cycle find most attractive is more masculine than the face found most attractive by women during other phases of the cycle (Johnston, Hagel, Franklin, Fink, & Grammer, 2001; Penton-Voak & Perrett, 2000; Penton-Voak et al., 1999). One report found this to be especially true when these women are pair-bonded and rating faces for short-term sexual relationships (Penton-Voak et al., 1999). Female preference for men's facial masculinity primarily at peak fertility in the ovulatory cycle, the absence of the preference in women not ovulating due to hormonal contraception, and an enhanced preference in pair-bonded women seeking short-term sexual relationships suggest that the preference is an adaptation that functions to obtain for the offspring a sire of superior genetic quality (Johnston et al., 2001; Penton-Voak & Perrett, 2000; Penton-Voak et al., 1999).

That men's facial masculinity may be involved in intrasexual competition and intersexual selection suggests that facial masculinity honestly signals individual phenotypic and related genetic quality (Grammer & Thornhill, 1994; Mueller & Mazur, 1997; Thornhill & Gangestad, 1993). Honest signaling here might work through an immunocompetence handicap mechanism (Folstad & Karter, 1992): Testosterone compromises the immune system's ability to combat disease; hence, only men with superior immune systems can afford high testosterone levels and associated masculinization. Alternatively, high masculinity may signal quality because testosterone allocates energy to functions involved in male–male competition (e.g., muscle growth) that men lacking key competitive abilities do not benefit from to the same extent (McDade, 2005; Thornhill & Gangestad, 1999a, 1999b). In any case, honest signaling through facial masculinization may be partly mediated socially through ongoing male–male competitive testing of quality. (See Roberts, Buchanan, & Evans, 2004, for a review of alternative honest-signal hypotheses and Zahavi & Zahavi, 1997, for further discussion of honest signal evolution).

Fitness is an individual's design for reproductive success, not merely reproductive success (Williams, 1966). Reproductive success arises, in part, through stochastic processes rather