Facial Attractiveness: Preferences and Possible Evolutionary Mechanisms

FACIAL ATTRACTIVENESS: PREFERENCES AND POSSIBLE EVOLUTIONARY MECHANISMS

Gillian RHODES[1] and Jamin HALBERSTADT[2]

[1] *University of Western Australia, Australia*   [2] *University of Otago, New Zealand*

Abstract

What makes a face beautiful and where do our preferences come from? Variation in ideals of beauty across societies and historical periods has led to a long-held view that standards of beauty are the products of cultural convention. However, recent evidence of cross-cultural agreement in standards of facial beauty and early emergence of preferences in development, challenge this view. In this talk we will consider two candidates for biologically based preferences: preferences for symmetric and average faces. We will present evidence that both traits are attractive in faces, and consider how these preferences might have evolved. One hypothesis is that they evolved to facilitate the identification of high quality mates. On this view, symmetry and averageness signal aspects of mate quality and preferences for these traits are limited to stimuli that are relevant to reproductive fitness. An alternative hypothesis is that these preferences reflect the operation of more general perceptual mechanisms that did not evolve in the context of mate choice. We will present the results of recent studies that test these hypotheses about the evolution of preferences for facial symmetry and averageness.

Facial Attractiveness: Preferences and Possible Evolutionary Mechanisms

If beauty is in the eye of the beholder, as the saying goes, then perceptions of attractiveness will vary idiosyncratically from person to person. But standards of beauty are widely shared, even by people from very different cultures (Cunningham, Roberts, Wu, Barbee & Druen 1995; Zebrowitz, Montepare & Lee 1993) and by young infants (Kramer, Zebrowitz, San Giovanni & Sherak 1995; Langlois et al. 1987; Rubenstein, Kalankis & Langlois 1999). These findings suggest that some of our preferences are biologically based, reflecting our evolutionary rather than our cultural heritage, and that we all share the same eye for beauty.

How might our preferences have evolved? One possibility is that they are adaptations to the problem of choosing a good mate, i.e., an individual who has good genes and/or is a good provider (Miller & Todd 1998; Thornhill & Gangestad 1993, 1999). On this "mate choice" view, the preferred traits signal aspects of mate quality, such as health, and the preferences enhance reproductive success (Andersson 1994; Hamilton & Zuk 1982; Møller & Swaddle 1997). Another possibility is that our preferences are by-products or side-effects

of more general perceptual systems, such as those used to detect and recognize objects (Endler & Basolo 1998; Enquist & Arak 1994; Enquist & Johnstone 1997; Johnstone 1994). On this "perceptual by-product" view, preferences did not evolve as adaptations for identifying good mates, and attractive traits need not advertise mate quality. Consistent with this proposal, modeling studies show that preferences can evolve in the absence of any link between the preferred trait and mate quality (Johnstone 1994). Yet another possibility is that preferences evolve because attractive individuals have attractive offspring, who are themselves preferred as mates (Fisher 1915). On this "good taste" view, preferences enhance long-term reproductive success without the preferred traits signalling mate quality (see Cronin 1991 for further discussion of these mechanisms). We note that these mechanisms need not be mutually exclusive. More than one could contribute to our preferences.

In this paper, we consider two candidates for evolved preferences: preferences for symmetric faces and preferences for average faces. First we review the evidence that symmetry and averageness are attractive in faces and then we consider how these preferences might have evolved.

Are Facial Symmetry and Averageness Attractive?

Individuals with more symmetric faces are generally rated as more attractive than those with less symmetric faces (Grammer & Thornhill 1994; Mealy, Bridgestock & Townsend 1999; Zebrowitz, Voinescu & Collins 1996). Individual faces can also be made more (or less) attractive by increasing (or decreasing) their symmetry using morphing procedures, so long as the manipulation used to increase symmetry does not also introduce structural abnormalities (Rhodes, Proffitt, Grady & Sumich 1998; Perrett et al. 1999; Rhodes, Roberts & Simmons 1999a). For example, perfectly symmetric faces created by blending the original face with its mirror image are more attractive than the original faces, whereas symmetric chimeras created by reflecting one half of the face about the vertical midline, which tend to introduce structural abnormalities, are not (Rhodes et al. 1999a). The appeal of symmetry is not limited to Western faces. A recent study found that Japanese raters also prefer perfectly symmetric versions of Japanese faces to the original, slightly asymmetric versions of those faces (Rhodes, Yoshikawa, Clark, Lee, McKay & Akamatsu 2001).

Average faces are also attractive.[1] Computer-averaged composite faces are typically rated as more attractive than almost all the faces that compose them (Langlois & Roggman 1990; Rhodes, Sumich & Byatt 1999b), and individual faces can be made more (or less) attractive by moving their configurations closer to (or further from) an average same-sex configuration (Rhodes & Tremewan 1996; Rhodes et al. 1999b). Typical faces, which resemble the population average, are also more attractive than less typical (more distinctive) faces (Light, Hollander & Kayra-Stuart 1981; Rhodes & Tremewan 1996; Rhodes et al. 1999b). A preference for average faces is also found in Japanese and Chinese cultures

(Rhodes, Harwood, Yoshikawa, Nishitani & McLean 2001; Rhodes, Yoshikawa et al. 2001), and has been reported in a remote Paraguyan Indian culture (Jones & Hill 1993).

Interestingly, although more average faces are generally more symmetric than less average ones, symmetry and averageness appear to make independent contributions to attractiveness (Rhodes et al. 1999b). The fact that these preferences are found across cultures makes them plausible candidates for biologically based preferences. So too, does preliminary evidence that the appeal of average faces emerges early in development (Rubenstein et al. 1999). A more convincing case could be made, however, if we could determine how such traits might have evolved. We address this question in the next section.

How Might Preferences for Symmetric and Average Faces Have Evolved?

In this section we consider two mechanisms that might have contributed to the evolution of these preferences: the mate choice mechanism and the perceptual by-product mechanism.

The Mate Choice Mechanism

Several theorists have conjectured that attractive traits signal mate quality, and that preferences for these traits enhance reproductive success (e.g., Miller & Todd 1998; Thornhill & Gangestad 1999). Such preferences are said to be sexually selected and are adaptations designed to identify good mates. Here we consider whether such a mechanism is likely to have played a role in the evolution of preferences for symmetric and average faces. In particular, we consider whether facial symmetry and averageness are signs of mate quality.

The conjecture that facial symmetry and averageness are signs of mate quality gains plausibility from evidence that symmetry and averageness of body traits advertise mate quality in many species, including humans. Both are associated with developmental stability, i.e., the ability to maintain a stable course of development (for a review, see Møller & Swaddle 1997). Both fluctuating asymmetries (FAs) (small random deviations from perfect bilateral symmetry) and deviations from average body morphology increase with developmental stresses, such as parasites, pollutants, extreme environmental conditions, marginal habitats, inbreeding, and chromosomal abnormalities (Parsons 1990; Møller & Swaddle 1997; Thornhill & Møller 1997). More symmetric and average individuals either encounter fewer stressors or are better able to withstand the stressors they do experience, or both. They are, therefore, likely to make better mates, either because they have better genes, or because they are better providers than their less robust counterparts. Consistent with the idea that symmetric and average individuals are good potential mates, body FA in human is negatively associated with both health (Livshits & Kobyliansky 1991; Scutt, Manning, Whitehouse, Leinster & Massey 1997; Thornhill & Møller 1997; Waynforth 1998) and fecundity (Manning, Scutt, Whitehouse & Leinster 1997; Møller, Soler & Thornhill 1995;

Waynforth 1998).

But what about facial traits? Does the face also provide cues to mate quality? The evidence that facial attractiveness signals health is actually quite weak. A recent meta-analysis reported a modest link between attractiveness and health in humans (Langlois et al. 2000). However, the authors note that the effect was based on very few studies and some of the health measures were of dubious validity. Furthermore, one very comprehensive study using longitudinal health data from detailed medical records failed to find any association between adolescent facial attractiveness and either current or future health in a large sample (Kalick, Zebrowitz, Langlois & Johnson 1998).

It is unlikely, however, that all attractive facial traits signal mate quality. Those traits that we learn to like because of our social and cultural histories are unlikely to signal mate value, whereas traits that are attractive across cultures, like averageness and symmetry, might more plausibly signal aspects of mate quality, such as health (for discussion of the many factors that contribute to attractiveness, see Zebrowitz & Rhodes 2001). The fact that facial asymmetries and deviations from averageness are elevated in a variety of serious disorders suggests that symmetry and averageness in the face may well advertise health (Hoyme 1994; Thornhill & Møller 1997).

We used the same sample as Kalick et al. (1998) to determine whether facial symmetry and averageness at seventeen years, a prime age for mate choice, are signs of health in a normal human population (Rhodes, Zebrowitz, Clark, Kalick, Hightower & McKay 2001). We examined whether these traits were associated with prior health (during childhood and adolescence), as would be expected if they reflect developmental stability, as well as whether they signalled present and future health.

Black and white photographs of the faces of 316 (161F, 155M) individuals, aged seventeen, were obtained from the Intergenerational Studies archive (Clausen 1993) held at the University of California, Berkeley, Institute of Human Development (IHD). The participants were from working and middle-class Caucasian families living in Berkeley and Oakland, California. Their photographs were rated on seven-point scales of distinctiveness (reverse-scored to give a measure of averageness) and symmetry. Each trait was rated by a different group of 24 raters (12M, 12F).

Health ratings (on a five-point scale) were available for these individuals, during childhood, adolescence, and into adulthood. The ratings were made by physicians, using detailed medical records. Because the participants were born between 1920 and 1929 and grew up before vaccinations and antibiotics were widespread, their health scores could plausibly reflect heritable resistance to pathogens and parasites. Facial traits that predict these scores may, therefore, be valid signals of mate quality.

Figure 1 shows partial correlations (controlling the effects of averageness and SES) between facial symmetry at seventeen and four measures of health: childhood health, adolescent health, current health (at age seventeen), and adult health. Figure 2 shows the same

partial correlations (this time controlling for symmetry and SES) for facial averageness at seventeen. As can be seen, facial symmetry was not associated with any measure of health. In contrast, facial averageness was clearly associated with health. For males, it correlated significantly with childhood health and for females it correlated with both current health and adolescent health, although the latter was marginally significant. These results suggest that facial averageness may be a better signal of health than facial symmetry.

Rated Symmetry at 17 and Health
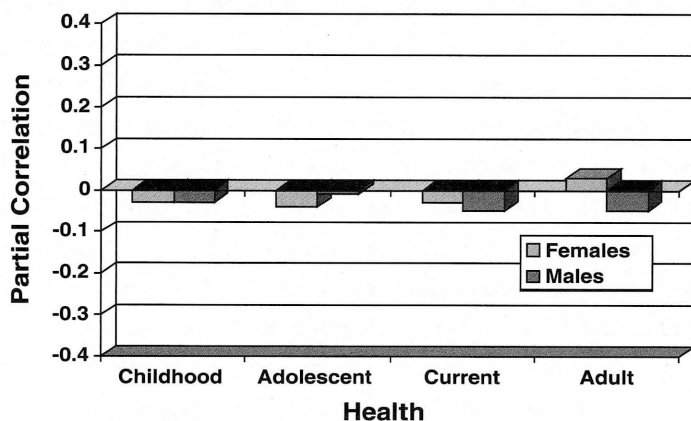### (controlling for averageness, SES)

Figure 1. Partial correlations between rated facial symmetry at age 17 and four measures of health, controlling for averageness and SES.

Averageness at 17 and Health
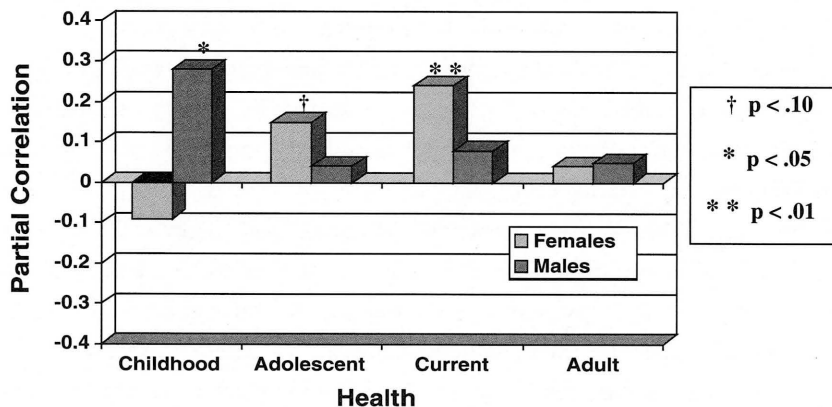### (controlling for symmetry, SES)

Figure 2. Partial correlations between rated facial averageness at age 17 and four measures of health, controlling for averageness and SES.

Perceptual By-Product Mechanism

The link between facial averageness and health suggests that our attraction to average faces may be an evolved psychological mechanism to identify high quality mates. However, more than one mechanism can contribute to the evolution of a preference. Here we consider whether a preference for averages could also reflect the operation of quite general information processing systems. If it does, then the preference would not be limited to potential mates.

Jamin Halberstadt and I conjectured that there might be a general preference for averages, possibly because of their familiarity. Certainly, a preference for familiar over unfamiliar stimuli could be adaptive, given the potential dangers associated with some unfamiliar stimuli. Averaged composite faces are judged as more familiar than their component faces (Langlois et al. 1994) and exposure to unfamiliar faces increases positive affective responses to unseen prototypes of those faces, as well as to the faces themselves (Rhodes, Halberstadt & Brajkovich 2001). These results suggest that the familiarity of average faces may contribute to their appeal. However, average exemplars of many categories appear familiar, even when they haven't been seen before (e.g., Franks & Bransford 1971; Solso & McCarthy 1981; Solso & Raynis 1979) and people respond positively to familiarity in many kinds of stimuli (e.g., the mere exposure effect; Bornstein 1989; Zajonc 1968). Therefore, we hypothesized that the appeal of averages might not be limited to faces or potential mates.

We examined the relationship between averageness and attractiveness for three very different stimulus categories: dogs, birds, and wristwatches (fifty of each). Dogs and watches were rated by 84 participants, and birds were rated by 86 participants. In each case about a third of the participants rated averageness (unusual-looking versus typical looking), a third rated attractiveness, and a third rated familiarity (all ten-point scales). Dogs were always rated before watches. If the attractiveness of average faces reflects a general preference for averageness, we would expect to find significant correlations between averageness and attractiveness for all three stimulus classes. If this preference reflects a general preference for familiarity, we would expect to find significant correlations between familiarity and attractiveness for all three stimulus classes. Finally, if a preference for average exemplars is due to their familiarity, then partialling out the effect of familiarity should eliminate the correlation between averageness and attractiveness.

As shown in Table 1, averageness was attractive for all three classes of object. Therefore, the appeal of averageness is not limited to potential mates. Familiarity was significantly correlated with attractiveness for dogs and watches, but not for birds (see Table 1), offering only partial support for the hypothesis that there is a general preference for familiarity. Finally, partialling out the effect of familiarity did not eliminate the correlation between averageness and attractiveness for either dogs or birds. Therefore, the preference for average exemplars of these categories cannot be due entirely to their familiarity. Taken together,

our results suggest that humans may have a general preference for averageness, but that such a preference is not due simply to the familiarity of average exemplars.[2]

We are continuing to investigate the contributions of subjective familiarity and actual experience to the attractiveness of average stimuli of various types, including faces. Future research is also needed to determine whether the preference for symmetric faces reflects the operation of general information-processing mechanisms. Symmetry is an important cue for detecting objects and we may well have special perceptual mechanisms for symmetry detection. Whether such mechanisms also make symmetry attractive is an open question.

Table 1.

Top row: Zero order and partial correlations (in parentheses) of averageness with attractiveness. Familiarity is controlled in the partial correlations.
Bottom row: Zero order and partial correlations (in parentheses) of familiarity with attractiveness. Averageness is controlled in the partial correlations.

	Dogs		Birds		Watches	
Averageness	.69**	(.58)**	.50**	(.47)**	.65**	(.13)
Familiarity	.47**	(.06)	.20	(.00)	.69**	(.34)*

* p<.05, ** p<.001

Conclusions

High levels of cross-cultural agreement on facial attractiveness (Langlois et al. 2000) and the early development of preferences for faces that adults find attractive (e.g., Langlois et al. 1987) strongly suggest that some preferences are biologically based. Although standards of beauty certainly do vary from one culture to another, from one time to another, and even from one person to another, there also appear to be some shared and enduring preferences that may be part of our human evolutionary heritage. We argued that preferences for symmetric and average faces are good candidates for such biologically based preferences.

We also considered how such preferences might have evolved. Several evolutionary mechanisms could potentially contribute to the evolution of such preferences, but we focussed on two: the *Mate Choice mechanism* and the *Perceptual By-Product mechanism*.

On the mate choice view, attractive traits such as symmetry and averageness signal mate quality, resulting in enhanced reproductive success for those who preferred such traits. In other words, preferences for these traits are seen as adaptations for identifying high quality mates that evolved by processes of sexual selection. Rhodes and colleagues investigated whether such a mechanism might have contributed to the evolution of preferences for facial symmetry and averageness by investigating whether those traits signal health, an important aspect of mate quality. Facial symmetry at age seventeen did not correlate with any measure of health (childhood, adolescent, current, mid-adult). However, facial averageness at seven-

teen was linked to prior and current health. These results suggest that a preference for averageness could be a sexually selected adaptation for identifying healthy mates.

Preferences can also result from the operation of more general information processing systems, without any specific focus on mate choice. These systems may make certain stimuli more salient and/or more attractive than others, irrespective of whether they are potential mates. Consistent with this view, we found evidence that average exemplars were attractive in three non-face categories. We conjectured that a general preference for familiar stimuli might account for the attractiveness of averageness. This account was not supported for dogs or birds, but could not be ruled out for watches.

Taken together, our results suggest that two evolutionary mechanisms may have contributed to the evolution of a preference for average faces. This preference may be partly the result of a general prototype-abstraction mechanism that evolved to facilitate object categorization and recognition. But it may also be partly the result of sexual selection for a preference that identifies healthy mates.

Future research is needed to determine precisely how general information processing mechanisms contribute to the attractiveness of average exemplars and whether such mechanisms also contribute to the attractiveness of symmetric faces.

References

Andersson, M.

1994. *Sexual Selection.* Princeton, NJ: Princeton University Press.

Bornstein, R.F.

1989. Exposure and affect: Overview and meta-analysis of research, 1968-1987. *Psychological Review* 106: 265-289.

Clausen, J. A.

1993. *American Lives: Looking Back at the Children of the Great Depression.* New York: Free Press.

Cronin, H.

1991. *The Ant and the Peacock: Altruism and Sexual Selection from Darwin to Today.* Cambridge: Cambridge University Press.

Cunningham, M. R., Roberts, A. R., Wu, C-H., Barbee, A. P., & Druen, P. B.

1995. "Their ideas of beauty are, on the whole, the same as ours": Consistency and variability in the cross-cultural perception of female physical attractiveness. *Journal of Personality and Social Psychology* 68: 261-279.

Endler, J. A. & Basolo, A. L.

1998. Sensory ecology, receiver biases and sexual selection. *Trends in Ecology and Evolution* 13: 415-420.

Enquist, M. & Arak, A.
   1994. Symmetry, beauty and evolution. *Nature* 372: 169-172.

Enquist, M. & Johnstone, R. A.
   1997. Generalization and the evolution of symmetry preferences. *Proceedings of the Royal Society of London, Series B*, 264: 1345-1348.

Fisher, R. A.
   1915. The evolution of sexual preference. *Eugenics Review* 7: 184-192.

Franks, J.J. & Bransford, J. D.
   1971. Abstraction of visual patterns. *Journal of Experimental Psychology* 90: 65-74.

Grammer, K. & Thornhill, R.
   1994. Human (Homo sapiens) facial attractiveness and sexual selection: The role of symmetry and averageness. *Journal of Comparative Psychology* 108: 233-242.

Hamilton, W. D. & Zuk, M.
   1982. Heritable true fitness and bright birds: A role for parasites? *Science* 218: 384-387.

Hoyme, H. E.
   1994. Minor anomalies: Diagnostic clues to aberrant human morphogenesis. In T.A. Markow (ed.). *Developmental Instability: Its Origins and Evolutionary Implications*, 309-317. The Netherlands: Kluwer Academic Publishers.

Johnstone, R. A.
   1994. Female preference for symmetrical males as a byproduct of selection for mate recognition. *Nature* 372: 172-175.

Jones, D. & Hill, K.
   1993. Criteria of facial attractiveness in five populations. *Human Nature* 4: 271-296.

Kalick, S. M., Zebrowitz, L. A., Langlois, J. H., & Johnson, R. M.
   1998. Does human facial attractiveness honestly advertise health? Longitudinal data on an evolutionary question. *Psychological Science* 9: 8-13.

Kramer, S., Zebrowitz, L. A., San Giovanni, J. P., & Sherak, B.
   1995. Infant preferences for attractiveness and babyfaceness. In B.G. Bardy, R.J., Botsma, & Y. G. Guiard (eds.). *Studies in Perception and Action III*, 389-392. Hillsdale, NJ: Erlbaum.

Langlois, J.H., Kalakanis, L., Rubenstein, A. J., Larson, A., Hallam, M., & Smoot, M.
   2000. Maxims or myths of beauty? A meta-analytic and theoretical review. *Psychological Bulletin* 126: 390-423.

Langlois, J.H. & Roggman, L.A.
   1990. Attractive faces are only average. *Psychological Science* 1: 115-121.

Langlois, J.H., Roggman, L.A., Casey, R.J., Rotter, J.M., Reiser-Danner, L.A., & Jenkins, V.Y.
   1987. Infant preferences for attractive faces: Rudiments of a stereotype? *Developmental Psychology* 23: 363-369.

Light, L. L., Hollander, S., & Kayra-Stuart, F.
  1981. Why attractive people are harder to remember. *Personality and Social Psychology Bulletin* 7: 269-276.
Livshits, G. & Kobyliansky, E.
  1991. Fluctuating asymmetry as a possible measure of developmental homeostasis in humans: A review. *Human Biology* 63: 441-466.
Manning, J. T., Scutt, D., Whitehouse, G. H., & Leinster, S. J.
  1997. Breast asymmetry and phenotypic quality in women. *Evolution and Human Behavior* 18: 223-236.
Mealey, L., Bridgestock, R., & Townsend, G. C.
  1999. Symmetry and perceived facial attractiveness: A monozygotic co-twin comparison. *Journal of Personality and Social Psychology* 76: 151-158.
Miller, G. F. & Todd, P. M.
  1998. Mate choice turns cognitive. *Trends in Cognitive Sciences* 2: 190-198.
Møller, A. P., Soler, M., & Thornhill, R.
  1995. Breast asymmetry, sexual selection and human reproductive success. *Ethology and Sociobiology* 16: 207-219.
Møller, A. P. & Swaddle, J. P.
  1997. *Asymmetry, Developmental Stability and Evolution.* Oxford: Oxford University Press.
Parsons, P. A.
  1990. Fluctuating asymmetry: An epigenetic measure of stress. *Biological Reviews* 65: 131-145.
Perrett, D. I., Burt, D. M., Penton-Voak, I. S., Lee, K. J., Rowland, D. A., & Edwards, R.
  1999. Symmetry and human facial attractiveness. *Evolution and Human Behavior* 20: 295-307.
Perrett, D. I., Lee, K. J., Penton-Voak, I., Rowland, D., Yoshikawa, S., Burt, D. M., Henzi, S. P., Castles, D., & Akamatsu, S.
  1998. Effects of sexual dimorphism on facial attractiveness. *Nature* 394: 884-887.
Rhodes, G., Halberstadt, J., & Brajkovich, G.
  2001. Generalization of mere exposure effects in social stimuli. *Social Cognition* 19: 57-70.
Rhodes, G., Harwood, K., Yoshikawa, S., Nishitani, M., & McLean, I.
  2001. The attractiveness of average facial configurations: Cross-cultural evidence and the biology of beauty. In G. Rhodes & L. A. Zebrowitz (eds.). *Advances in Visual Cognition,* Volume 1, *Facial Attractiveness: Evolutionary, Cognitive, and Social Perspectives.* Westport, CT: Ablex.
Rhodes, G., Hickford, C., & Jeffery, L.
  2000. Sex-typicality and attractiveness: Are supermale and superfemale faces super-attractive? *British Journal of Psychology* 91: 125-140.

Rhodes, G., Proffitt, F., Grady, J., & Sumich, A.
  1998. Facial symmetry and the perception of beauty. *Psychonomic Bulletin & Review* 5: 659-669.

Rhodes, G., Roberts, J., & Simmons, L.
  1999a. Reflections on symmetry and atttractiveness. *Psychology, Evolution & Gender* 1: 279-295.

Rhodes, G., Sumich, A., & Byatt, G.
  1999b. Are average facial configurations only attractive because of their symmetry? *Psychological Science* 10: 52-58.

Rhodes, G. & Tremewan, T.
  1996. Averageness, exaggeration, and facial attractiveness. *Psychological Science* 7: 105-110.

Rhodes, G., Yoshikawa, S., Clark, A., Lee, K., McKay, R., & Akamatsu, S.
  2001. Perceptions of facial attractiveness in non-western cultures: In search of biologically based standards of beauty. *Perception* 30: 611-625

Rhodes, G., Zebrowitz, L., Clark, A., Kalick, S. M., Hightower, A., & McKay, R.
  2001. Do facial averageness and symmetry signal health? *Evolution and Human Behavior* 22: 31-46.

Rubenstein, A. J., Kalakanis, L., & Langlois, J. H.
  1999. Infant preferences for attractive faces: A cognitive explanation. *Developmental Psychology* 15: 848-995.

Scutt, D., Manning, J. T., Whitehouse, G. H., Leinster, S. J., & Massey, C. P.
  1997. The relationship between breast asymmetry, breast size and the occurrence of breast cancer. *British Journal of Radiology* 70: 1017-1021.

Solso, R. L. & McCarthy, J. E.
  1981. Prototype formation: Central tendency model vs. attribute frequency model. *Bulletin of the Psychonomic Society* 17: 10-11.

Solso, R. L. & Raynis, S. A.
  1979. Prototype formation from imaged, kinesthetically, and visually presented geometric figures. *Journal of Experimental Psychology: Human Perception and Performance* 5: 701-712.

Thornhill, R. & Gangestad, S. W.
  1993. Human facial beauty. *Human Nature* 4: 237-269.

Thornhill, R. & Gangestad, S. W.
  1999. Facial attractiveness. *Trends in Cognitive Sciences* 3: 452-460.

Thornhill, T. & Møller, A. P.
  1997. Developmental stability, disease and medicine. *Biological Reviews* 72: 497-548.

Waynforth, D.
  1998. Fluctuating asymmetry and human male life-history traits in rural Belize. *Proceedings of the Royal Society of London, Series B*, 265: 1497-1501.

Zajonc, R. B.
  1968. Attitudinal effects of mere exposure. *Journal of Personality and Social Psychology* 9: 1-27.
Zebrowitz, L. A.
  1997. *Reading Faces*. Boulder, CO: Westview Press.
Zebrowitz, L. A., Montepare, J. M., & Lee, H. K.
  1993. They don't all look alike: Individuated impressions of other racial groups. *Journal of Personality and Social Psychology* 65: 85-101.
Zebrowitz, L. A. & Rhodes, G.
  2001. Nature let a hundred flowers bloom: The multiple ways and wherefores of attractiveness. In G. Rhodes & L. A. Zebrowitz (eds.). *Advances in Visual Cognition, Volume 1, Facial Attractiveness: Evolutionary, Cognitive, and Social Perspectives.* Westport, CT: Ablex.
Zebrowitz, L. A., Voinescu, L., & Collins, M. A.
  1996. Wide-eyed and crooked-faced—Determinants of perceived and real honesty across the lifespan. *Personality and Social Psychology Bulletin* 22: 1258-1269.

Notes

1. Average faces may not be optimally attractive. Several studies have identified extreme traits that can be more attractive than average ones (e.g., feminized traits, Perrett et al. 1998; Rhodes, Hickford & Jeffery 2000c; neotonous traits, Zebrowitz 1997). Nevertheless average faces are attractive and our focus here is on understanding their appeal.

2. In the case of dogs and wristwatches, a preference for averageness could reflect selective breeding or manufacturing designed to increase the incidence of some trait (other than averageness) that people happen to like. In this case a preference for averageness would reflect this artificial selection process, rather than a genuine preference for typical or average exemplars. Such an account could not, however, explain the preference for average birds.