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Health Cues

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phenotypic traits as attractive. One such hypothesis is that these phenotypic traits act as cues that reveal valid information about the bearer's underlying physiological health. Choosing healthy long-term (or even short-term) mating partners confers obvious fitness benefits. Understanding precisely what aspects of health such traits reflect is not always straightforward. Modern medicine and abundant high calorie food (at least in Western diets) has likely weakened, obscured, or even modified ancestral relationships between health and some phenotypic traits. Further complexities arise from the breadth of states (such as current nutritional state, and disease burden) and traits (MHC heterozygosity and immunocompetence) that contribute to an individual's health.

Synonyms

[Honest signals](#); [Signals](#)

Definition

A phenotypic trait that reflects underlying physiological health.

Introduction

Researchers have advanced a range of hypotheses to explain why individuals perceive some

The Evolution of Cues and Signals of Health

One important consideration is whether the phenotypic trait in question is a cue or a signal of health. Signals are traits that have evolved under selection pressures arising from others' – the receivers' – behavioral responses to the trait in question. Cues, on the other hand, are traits that correlate with physiological health in such a way that observers can extract reliable information, but have not evolved under selection pressure to communicate that information (Scott-Phillips 2008). It is frequently difficult to establish whether a trait is an evolved signal of health or simply a cue that

correlates with health. For example, fluctuating facial asymmetry (random deviations from bilateral symmetry) are thought to reflect developmental perturbations, resulting from developmental stressors. Thus, high facial symmetry reflects few developmental perturbations and may reliably indicate a robust immune system or a well-nourished development – two factors that would positively contribute to health. For facial symmetry to be an evolved signal of health, however, the human face would need to be under direct (sexual) selection pressure, arising from the mate choices of the opposite sex, to resist developmental perturbations and develop symmetrically. While more symmetrical faces are perceived as more attractive, it is not clear whether such preferences have translated into the necessary selection pressures. Because of the difficulties in ascertaining whether any given trait constitutes a signal or a cue, no clear consensus exists about this distinction for nearly any given health-related trait. For simplicity, we will refer below to all potentially health-related traits as cues, but do not mean to imply that such traits are definitely not evolved signals.

Theoretically, a health cue might reflect trait-based health or state-based health. By trait-based health we mean an intrinsic, genetic trait that predisposes an individual (and their offspring) to being healthy, like a robust immune system. By state-based health we refer to an individual's current state along any of a number of dimensions (such as being nutritionally replete or free of parasites) that can potentially vary over time.

Trait-based health cues and state-based health cues are not readily separable, with many traits potentially providing information about both trait and state health. For example, fat deposits on women would tend to be thought of as a state-based health cue, indicating adequate energy reserves. However, the capacity to effectively utilize nutritional resources and convert them to energy reserves likely varies genetically. So fat deposits on women could indicate both a genetic predisposition to efficiently metabolize food as well as providing reliable information about a woman's current energy reserves.

It is generally presumed that reliable phenotypic signs of health ought to increase perceived attractiveness. The circumstances under which human health cues (or signals) evolved, however, differ from those in which theories of trait-attractiveness-health links are typically tested. So while links between purported health cues and perceived attractiveness are readily reported (and we provide examples of many such cues below), links between purported health cues and objectively measured physiological health are less common. Modern medicine may have erased the correlation between an ancestrally reliable health cue and actual health by buffering more susceptible individuals. For example, an individual with a weaker immune system would, in the absence of population-wide immunization, have endured a development with substantial disease and pathogen stressors, resulting in high levels of fluctuating asymmetry as an adult. In the presence of population wide immunization, however, that same individual may experience no more developmental stress, and subsequently exhibit no more fluctuating asymmetry, than an individual with a more robust immune system. By dramatically reducing variation in both health and health cues, modern medicine may make relationships between the two difficult to observe.

It is also true that conscious ratings of health (which some researchers have used, as discussed below) might not adequately reflect evolved responses to health-relevant cues. It is possible, for example, that a cue increases attractiveness (because it serves – or served – as a cue to health) without necessarily affecting conscious perceptions of health. Conscious ratings of health may more reliably reflect adaptive responses to state-based cues, rather than trait-based cues, since the former are generally the cues that we have the opportunity to consciously learn about as indicators of health. However, just because a physical trait increases conscious ratings of attractiveness, without increasing conscious ratings of health, should not necessarily rule it out as a potential health cue. Health cues could, in theory, affect attractiveness without us being aware that they are cues of health. Conversely, attractiveness will also be influenced by factors other than

health, and so conscious ratings of attractiveness are by no means pure reflections of subjective responses to cues of health.

Cues to Health

A number of traits have been proposed as health cues, including facial traits such as symmetry, averageness, sexual dimorphism, adiposity, skin quality, and skin color, and body cues such as waist to hip ratio (WHR), waist to chest ratio (WCR), body size, and body composition. As discussed above, while there is good evidence that these traits are perceived as healthy and attractive, evidence that they reliably indicate some aspect of physiological health is more mixed. Here, that evidence is reviewed.

Proposed Cues to Trait Health

A number of studies have shown that observers perceive symmetrical faces as more attractive, with authors speculating that low levels of fluctuating asymmetry reflects a strong immune system and ability to resist stressors such as pathogens and lack of nutrition during development (e.g., Rhodes et al. 2001). However, recent studies, including one using a large longitudinal database, have failed to find reliable connections to childhood health measures (Pound et al. 2014) in a modern industrialized society (UK).

Having a face that is close to the population average is also perceived as healthy and attractive, with authors suggesting that averageness indicates a lack of extreme, deleterious alleles, and some evidence suggesting that people with average faces may have been healthier during childhood and adolescence (Rhodes et al. 2001).

Sexual dimorphism – the femininity or masculinity of faces – has been found to have a role in attractiveness perception and is thought to reflect levels of sex hormones during development. The femininity of female faces is thought to be associated with estrogen levels, which are important in female fertility, and female facial femininity is perceived as attractive (Law Smith et al. 2006).

Male facial masculinity, though hypothesized to be an honest signal of health, has shown mixed results, with most studies showing that women have a preference for slightly feminized faces, which may reflect more prosocial qualities (DeBruine et al. 2010).

Proposed Cues to State Health

Skin quality, including skin color (Stephen et al. 2011), has been shown to affect the perceived health and attractiveness of faces, with redder, yellower, and more homogenous skin coloration being perceived as healthier and more attractive. These cues have been associated with aspects of health and fertility, with skin yellowness reflecting levels of carotenoids – antioxidant pigments obtained from fruit and vegetables in the diet, and which may be associated with improved immune and reproductive systems (Stephen et al. 2011, but see Foo et al. 2017).

Cues to body composition have also been found to play a role in the perception of health and attractiveness, with low WHR (thought to reflect estrogen levels) in women and low WCR (reflecting upper body strength) in men suggested as attractive cues to health. More recently, studies have suggested that body size (defined by body mass index, a ratio of weight over height squared) is more important than WHR (Tovée et al. 1999). However, BMI is a flawed measure of body size, since it conflates body fat and muscle. A recent study separated the influence of the fat and muscle components of body size, finding that men are perceived as healthiest and most attractive when their bodies contain healthy levels of fat and muscle, while women's bodies are perceived as healthiest with levels of body fat toward the low end of healthy, and most attractive with levels of body fat below the healthy range (Brierley et al. 2016). This has been interpreted to mean that while health is important in determining what appears healthy and attractive, some other influence, such as Western media or the association between youth (strongly positively correlated with fertility in women) and low body fat, may also be influencing perceptions of attractiveness.

The Relative Importance of Cues to State and Trait Health

Studies examining the relative contributions of these cues to perceptions of attractiveness have shown mixed results, with some finding that state cues (color) are more important than masculinity (Scott et al. 2010), while others suggest that trait cues, such as averageness, symmetry, or sexual dimorphism (Foo et al. 2017), are more important. There may well be no one correct answer to the question of which cues are more important. With different cues reflecting different aspects of health, condition, and genetic quality, their relative importance should be expected to differ from population to population. As threats to health (including pathogen and parasite prevalence and nutritional stress) vary, so too should the relative importance to perceivers of cues to resistance to those different threats. Indeed, state and trait cues are difficult to fully disentangle because of the importance of trait (e.g., immunocompetence, ability to metabolize energy) to health state and of (current or past) health state to expression of trait health in the face and body.

Conclusion

Several cues have been shown to be robustly associated with healthy and attractive appearance of human faces and bodies. However, whether they can be considered valid cues to health depends on whether they accurately reflect aspects of underlying physiological health. Research into this second question is less abundant and results have often been inconsistent across studies. Modern medicine and dietary habits may make it difficult to observe relationships between health cues and actual health that were historically – and in some environments, perhaps currently – reliable. Research into the underlying (developmental and physiological) processes that give rise to purported health cues may reveal mechanistic links between such cues and actual health-relevant traits. Such findings would provide more robust and definitive

evidence of the validity of health cues than has so far been reported.

Cross-References

- ▶ [Body Attractiveness](#)
- ▶ [Costly Signaling](#)
- ▶ [Costly Signaling Theory](#)
- ▶ [Facial Attractiveness](#)
- ▶ [Pathogen Load and Attractiveness](#)
- ▶ [Physical Attractiveness](#)

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