The Body Beautiful

Evolutionary and Sociocultural Perspectives

Edited by

Viren Swami

and

Adrian Furnham

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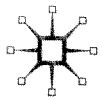

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9

Interpersonal Metaperception: The Importance of Compatibility in the Aesthetic Appreciation of Bodily Cues

Kerri L. Johnson and Louis G. Tassinary

> Beauty is the proper conformity of the parts to one another and to the whole.
>
> ~ Heisenberg (1974: 183)

Psychology enjoys a rich history of theorising that is rooted in Gestalt psychology (Koffka, 1935; Köhler, 1929, 1947). Gestalt psychology has informed not only our understanding of how simple geometric objects are perceptually parsed, but also how global attitudes toward objects and individuals are formed. In both cases, one's ultimate perception is multiply determined, integrating the basic perception of a range of cues that, collectively, yield an overarching percept or attitude. In other words, each simple cue is perceived directly but contextualised by other cues that together affect a more global perception, or Gestalt.

This principle has been applied to a variety of domains including the perception of physical objects, personality traits, and interpersonal interactions. Three overlapping lines in one configuration can yield a percept of discontinuity, yet the same lines in a slightly different arrangement can yield the percept of a single unit – a triangle (Köhler, 1929, 1947); a colleague who is challenging, assertive, and warm may be viewed as *astute*, whereas a colleague who is challenging, assertive, but cold may be viewed as *pompous* (Asch, 1946); and a favourable attitude toward John may tarnish when one learns that John befriended a detested individual (Heider, 1946, 1958). These examples can be described as *metaperception* – the first physical, the second intrapersonal, and the last interpersonal. In each instance, the contextualised relation between two

or more elemental percepts and/or attitudes ultimately yielded a Gestalt impression.

In spite of these valuable insights, the application of Gestalt theory to person construal has focused primarily on the perception of intrapersonal personality traits and on attitudes toward individual members of triads. Surprisingly, these Gestalt principles have rarely been applied to investigations of how physical cues affect basic interpersonal perception, in spite of the fact that prominent theorists have highlighted the value of such inquiry (see Neisser, 1994). Instead, the study of person perception traditionally isolated and manipulated a single physical cue to measure how it affected social perception (but cf. Sheldon, Stevens, & Tucker, 1942). Several researchers, for example, have tried to better understand the physical determinants of perceived attractiveness (e.g., bilateral symmetry, facial composites, and body shape) using this approach (e.g., Gangestad, Thornhill, & Yeo, 1994; Langlois & Roggman, 1990; Singh, 1993). Critically, this approach affords precision at the expense of breadth, and has met increasing criticism (e.g., Buller, 2005a, 2005b). Consequently, there remains no comprehensive account of how the basic perceptions of various cues ultimately coalesce to yield an evaluative social Gestalt.

Here, we adopt a broad approach to investigate how a subset of physical cues – those originating in the body – affect interpersonal metaperception. We posit that conspicuous bodily cues, such as body shape and motion, affect basic social perceptions in reliable ways that correspond to social judgements of biological sex and gender (i.e., masculinity and femininity; Unger, 1979).[1] Collectively, these basic social perceptions affect interpersonal metaperception – evaluative social judgements such as perceived attractiveness. We propose a *cue compatibility* model that accounts for these effects.

Bodily cues and evaluative social judgements

To explore how body shape affects evaluative social judgements, researchers have created line-drawn stimuli that depict men and women's bodies in various shapes and sizes (e.g., Lippa, 1983; Fallon & Rozin, 1985; Singh, 1993). Such stimuli have been used routinely to determine the particular somatotypes that people find attractive. To date, the most systematic investigations of this kind focused on a single physical cue, the waist-to-hip ratio (WHR).

Singh (1993) presented participants with a set of line-drawn women that varied both the WHR and weight. Across all weight categories, women with small WHRs were judged to be more attractive than women with larger WHRs, although body weight was a stronger inverse predictor of attractiveness (see also Tassinary & Hansen, 1998; Tovée & Cornelissen, 2001). Buttressed by biomedical research relating the WHR to health and fertility (e.g., Björntorp, 1988; Lanska, Lanska, Hartz, & Rimm, 1985; Laws, King, Haskell, & Reaven, 1993; Ostlund, Staten, Kohrt, Schultz, & Malley, 1990; Zaadstra et al., 1993), these findings were initially interpreted from a particular evolutionary perspective: the WHR, it was argued, is a biological marker of health and fecundity, and male preferences for small WHRs are adaptive (Singh, 1993). Specifically, such preferences were characterised as adaptations for mate choice (cf. Rhodes, 2006).

The WHR hypothesis became well-known by scientists and lay-people alike due in part to its widespread and continued coverage in the popular media (e.g., Chen, 2005; Cowley, 1996; Heiman, 1999; Newman, 2000; Stanish, 1996). Moreover, predictions drawn from the WHR hypothesis spawned an abundance of research to further investigate the adaptive significance of men's preferences for small WHRs (Furnham, Tan, & McManus, 1997; Furnham, Dias, & McClelland, 1998; Henss, 1995). In fact, replications and extensions of the findings abound (see Swami & Furnham, 2006 for a review).

This popular and empirical attention is not surprising. The WHR hypothesis articulated an uncomplicated supposition that was tested by manipulating a simple physical cue. This strength, however, proved ultimately to be a weakness as well. The absence of context, while affording precision, prohibited a broad understanding of how body cues *in situ* affect perceived attractiveness. Similarly, the specificity of the theory, while elegant, failed to anticipate and could not account for the contradictory data that subsequently emerged. Indeed, recent research has documented methodological shortcomings and theoretical flaws that undermine the viability of the WHR hypothesis, generally, at least in the strong form that it was originally articulated.[2]

Thus, although prior research has revealed a clear relation between body shape and perceived attractiveness, a mechanism to account for these observations has yet to be identified. Because these prior studies focused narrowly on a distal evolutionary mechanism and explored only a single physical cue, we believe a more proximal psychological mechanism may have been overlooked. From our perspective, adopting a more comprehensive approach that approaches this question from a different level of analysis – a cognitive one – is necessary to clarify how body cues affect basic social perception and interpersonal metaperception.

Bodies in balance

Characterising perceived attractiveness as interpersonal metaperception invites two critical changes to previous methodologies. First, the perspective of interpersonal metaperception highlights the fact that *multiple social judgements* are made during person perception. Second, this perspective acknowledges that *additional bodily cues* also affect social perception. These two changes may potentially uncover the evolutionary-based cognitive mechanisms that guide evaluative social judgements.

Multiple social judgements

In the vast majority of the prior research, the stimuli were readily identified as women. Thus, the judgements made by participants – whether they were ranking the stimuli by attractiveness or rating the stimuli for fecundity – were contextualised by the known biological sex of the target. Indeed, the key manipulations of the target were alterations of the body's shape and size, the *individual* was held constant across the stimuli, and the majority of the studies used a common stimulus set. In contrast, isolated judgements of attractiveness in real life rarely occur for different renderings of an individual in succession. Instead, we simultaneously make several judgements about others with great facility. Unlike the majority of laboratory studies, the category membership of each individual is judged from the available information (Allport, 1954). Among the most likely social categories to be noted, biological sex tops the list (e.g., Stangor, Lynch, Duan, & Glass, 1992; Taylor, Fiske, Etcoff, & Ruderman, 1978). In life, the perceived sex of a conspecific is a *decision* not a *given*. Subsequent social judgements are likely to be perceived in the context of this fundamental social category (Bem, 1993). Consequently, other cues that tend to covary with biological sex are likely to affect perceived gender (i.e., masculinity and femininity), and they may be deemed compatible or incompatible with the judged sex of an individual. If correct, these perceptions of sex and gender may ultimately determine the level of perceived attractiveness.

Additional bodily cues

The majority of prior research isolated a single physical cue, the WHR, while neglecting other cues that are potentially meaningful for the basic perception of sex and gender. One cue, in particular, enjoys a rich background in the arts and sciences. Artists and philosophers, for example, have written extensively about the beauty of the body's motion. Frumkin (1954) referred to body motion as a 'visual aphrodisiac'; on their 1969 album *Abby Road* and in his 1968 self-titled album, both The Beatles and James Taylor independently noted that that there is 'something in the way she moves...'; and in his *Leaves of Grass*, Whitman (1900) pointed out that, 'the expression of a well-made man appears not only in his face...it is in his walk.' Fortuitously, scientists have also noted that bodily motion in general, and gait in particular, convey important social information (see Allport & Vernon, 1933, for an early foray into this area).

A substantial scientific literature corroborates the importance of body motion for social perception. Body motion is sexually dimorphic, and these differences are evident perceptually, kinematically, and stylistically. For example, observers can accurately distinguish men from women from minimal information (e.g., point-light displays; Cutting, 1978). In addition, more shoulder twist than hip translation characterises a 'male' gait, the opposite combination characterises a 'female' gait (Cutting, 1978; Murry, Kory, & Sepic, 1970), and these motion parameters have been well-specified (Barclay, Cutting, & Kozlowski, 1978; Cutting, 1981; Cutting, Moore, & Morrison, 1988; Cutting, Proffit, & Kozlowski, 1978, Troje, 2002). Perceived differences between male and female gaits are seen in studies of kinematics, as well. Women, for example, walk at greater cadences, with greater hip flexion and pelvic motion, and with less knee extension than do men (Kerrigan, Todd, & Della Croce, 1998; Smith, Lelas, & Kerrigan, 2002). Finally, anthropologists have noted sex differences in expressive movement (e.g., dancing style, Brown et al., 2005; Eibl-Eibesfeldt, 1988; Frable, 1987). Given this abundance of evidence for the aesthetic appreciation and sex-specific nature of body motion, it is likely to contribute substantially to metaperceptual judgements.

A broad approach and cue compatibility model of interpersonal metaperception

We applied this basic principle of interpersonal metaperception to explore a range of social judgements that arise from body cues. Our stimuli varied along two dimensions – shape and motion, and our participants provided several social judgements for each target. We predicted that each physical cue would effect a basic social judgement, and that the compatibility of these cues would affect a more evaluative social judgement.

Perceived sex and gender as the foundation for interpersonal metaperception

As noted above, the body's shape and motion are, in reality, both sexually dimorphic and visually conspicuous. They are, therefore, also likely to be perceived to be gendered, and are prime candidates to affect metaperceptual judgements. In a recent series of experiments, we explored the relative importance of body shape and motion for gendered judgements that are categorical and continuous. In one set of studies (Johnson & Tassinary, 2007a), participants judged the sex and gender of humanoid animations that depicted a person walking in place. These 'walkers' varied in body shape (i.e., five WHRs from 0.5 to 0.9, see Figure 9.1) and in walk motion (i.e., five gaits from a masculine shoulder 'swagger' to a feminine hip 'sway,' see Figure 9.2).[3] As seen in Figure 9.3, sex judgements were tightly coupled to body shape, but only moderately coupled to body motion; gender judgements, in contrast, were strongly related to body motion, but were also moderately related to

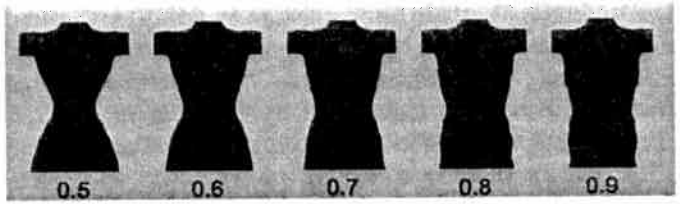

Figure 9.1 WHR from 0.5 to 0.9. Wireframe models were exported to Maya™ for accurate circumference measurements.

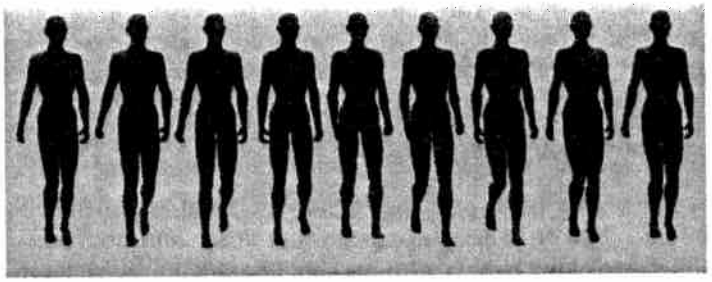

Figure 9.2 Each walker completed approximately 10 steps over 10s. Figure depicts key frames of an animation sequence. Exact motion parameters are specified in Johnson and Tassinary (2005, 2007a) and, Johnson, Gill, Reichman, and Tassinary (2007).

body shape. Thus, although related both to sex and gender judgements, the body's shape appeared to be the primary cue used to make sex category judgements.

We corroborated this finding in a set of experiments that utilised a decidedly different methodology – eye tracking (Johnson & Tassinary, 2005). In these experiments, participants viewed each of our walkers as we recorded their precise point of gaze using corneal reflection eye tracking. When we then examined the distribution of their visual scanning within four critical areas of the body – the head, the chest, the waist/hips, and the legs. We reasoned that participants would direct their visual attention toward the body regions that provided critical

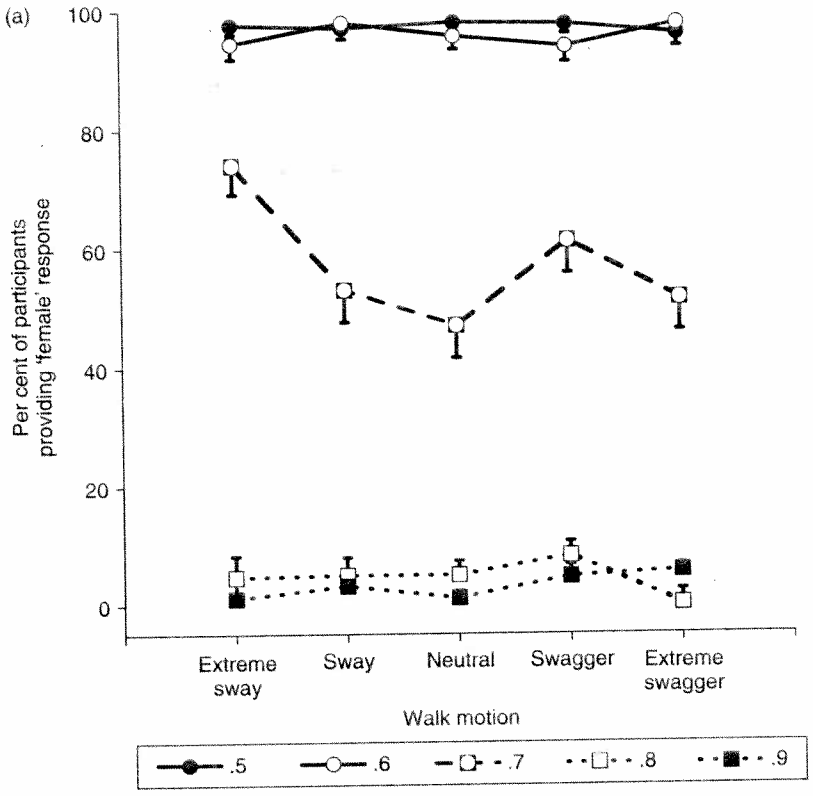

Figure 9.3 Judgements of sex (a) and gender (b) for animated walkers. One-sided error bars represent 95 per cent confidence intervals. Data from Johnson and Tassinary (2007a) were replotted using WHR and Walk Motion.

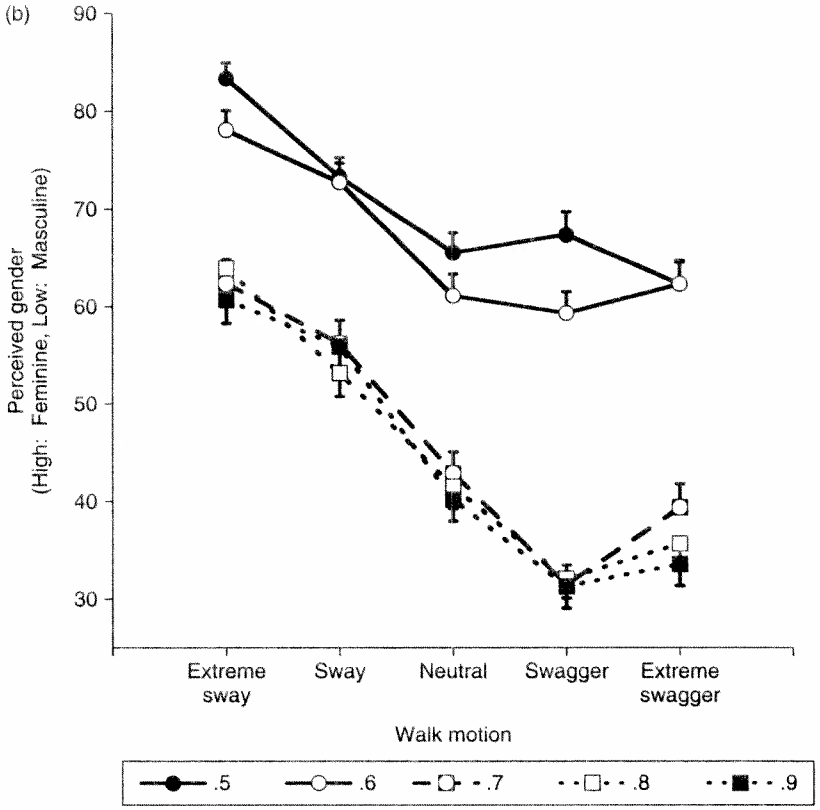

Figure 9.3 (Continued).

information for social judgements. We hypothesised that participants would concentrate their scanning within the waist and hip region, an area that was related to both sex and gender judgements in our previous studies. Indeed, participants looked longer and with a higher frequency at the waist and hip region of the walkers, data consistent with the notion that this sexually dimorphic region of the body conveyed critical information for social judgements. Yet the specificity of the information gleaned from that region remained uncertain because participants judged both sex and gender for each target.

Consequently, we next examined *why* participants concentrated their scanning within the waist and hip region of the body. We reasoned that if body shape is the primary cue to a target's sex, then preempting

sex category judgements should weaken the importance of scanning the waist and hips. Said differently, when scanning the waist and hip regions no longer served a functional end (i.e., to determine a target's sex), concentrating one's scanning within the waist and hip region should no longer be necessary. As predicted, when the sex of a walker was prespecified, visual scanning of the waist and hip region dropped to chance levels, and was significantly lower than scanning of that region among a group of participants for whom the sex remained unspecified (see Figure 9.4). Thus, participants looked at the waist and hip region only when doing so was necessary to learn the targets' sex.

Based on these findings, we concluded that the body's shape is a critical visual cue to a target's sex – and for good reason. The body's shape is indeed sexually dimorphic, in both absolute and relative terms (Johnson & Tassinary, 2007b). In yet another series of experiments, we examined, among other things, whether the body shapes of men and women is,

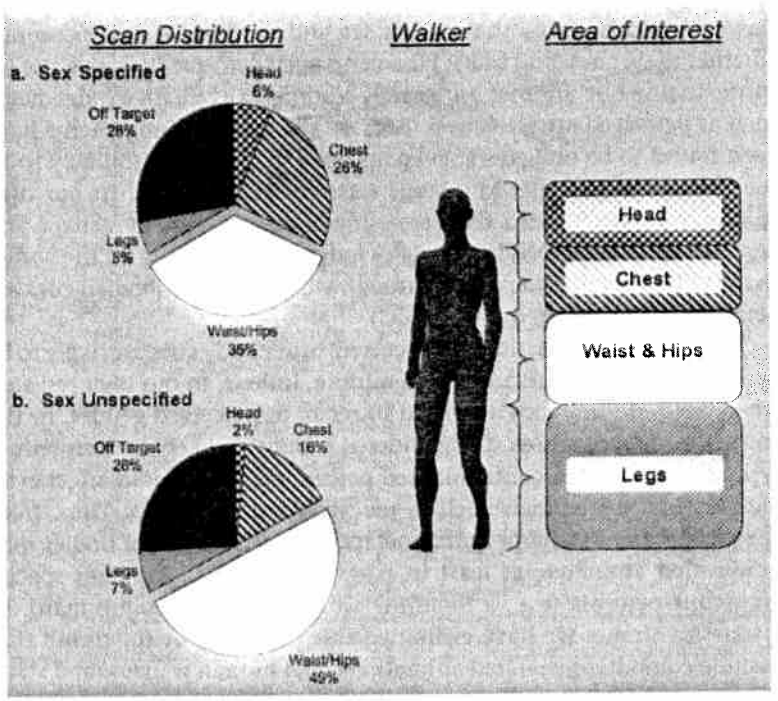

Figure 9.4 Distribution of visual scanning when the sex of a walker had been specified (a) or remained unspecified (b).

in reality, diagnostic of biological sex. First we established that the bodies of men and women varied in both absolute and relative terms. We analysed a widely used anthropometric database that contained the physical measurements of over 4,800 men and women (Clauser, Tebbetts, Bradtmiller, McConville, & Gordon, 1987–1988; Donelson & Gordon, 1988). Not surprisingly, men and women differed in their absolute body size, and classifying the sex of a target based on measures of height and weight alone would lead to accuracy nearing 86 per cent. When the relative measures of the waist and hips were included in the analyses, both independently and interactively, accuracy in classification jumped to nearly 98 per cent. Consequently, observers who use the WHR as a cue to a target's sex have a solid empirical foundation for doing so. Men's and women's bodies are dimorphic both in absolute and relative measurements.

Perceived attractiveness as interpersonal metaperception

Having found two cues that specify sex and gender, we next examined whether these cues (and indeed the very social percepts they give rise to) contextualise one another, ultimately leading to evaluative judgements such as perceived attractiveness. Because sex category judgements have been found to be obligatory, even automatic, they are also likely to be the first social percepts to emerge (Stangor et al., 1992). In our own studies, we have found a tight coupling between the body's shape and perceived sex. Therefore, sex category judgements that rely on the body's shape will likely provide a lens through which other embodied cues are perceived and evaluated (Bem, 1993).

Once a sex categorisation has occurred, other body cues are likely to be perceived as either masculine or feminine. Indeed, in our own research we have found the body's motion to relate to perceived gender. In the context of perceived sex, this gendered motion is likely to seem either typical or atypical, a contextualised perception that should affect evaluative social judgements such as perceived attractiveness. Thus, from the perspective of interpersonal metaperception, particular bodies may be deemed attractive, at least in part, because available cues specify accordant percepts (e.g., a feminine woman or a masculine man). In a series of studies we have examined this possibility with stimuli that include computer-generated animations, real human walkers, and static line drawings (Johnson & Tassinary, 2007a).

In two studies, we examined this model of interpersonal metaperception using our computer-generated animations that varied in WHR and Walk Motion. For each walker, participants judged sex, gender, and attractiveness. As before, we found sex category judgements to be strongly related to WHR, and gender judgements to be related to both WHR and Walk Motion. Because sex categorisation is thought to be a fundamental judgement, we predicted that this would constrain the aesthetic appeal of gendered gait – ultimately determining the level of perceived attractiveness. Indeed, the predicted interaction between WHR and Walk Motion was strong and significant, and this obtained for walkers facing forward and backward (see Figure 9.5). The cues that differentially signalled sex and gender combined to determine perceived attractiveness.

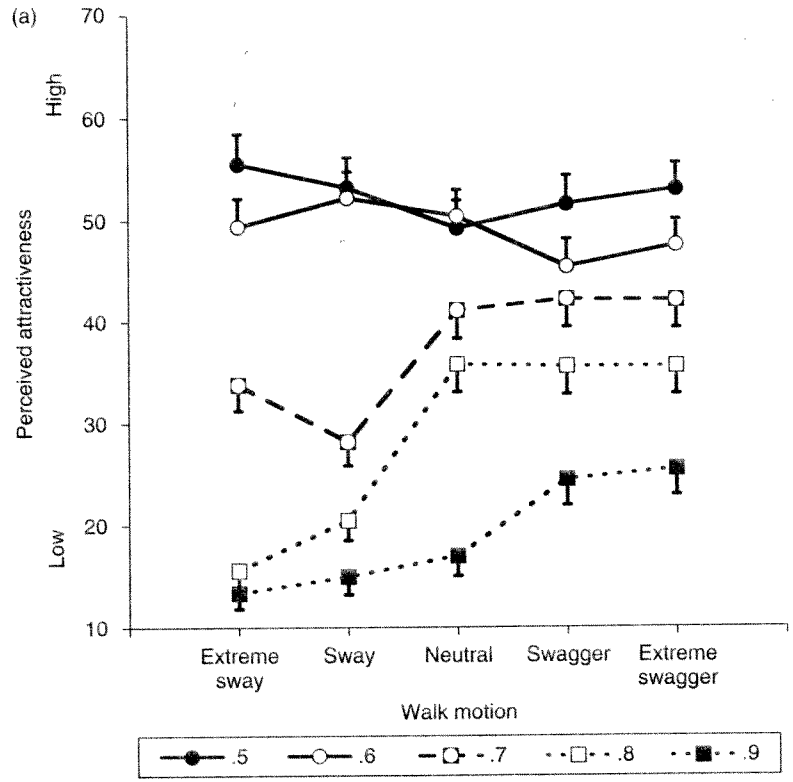

Figure 9.5 Judgements of attractiveness for walkers facing forward (a) and backward (b). One-sided error bars represent 95 per cent confidence intervals. Data from Johnson and Tassinary (2007a) were replotted using WHR and Walk Motion.

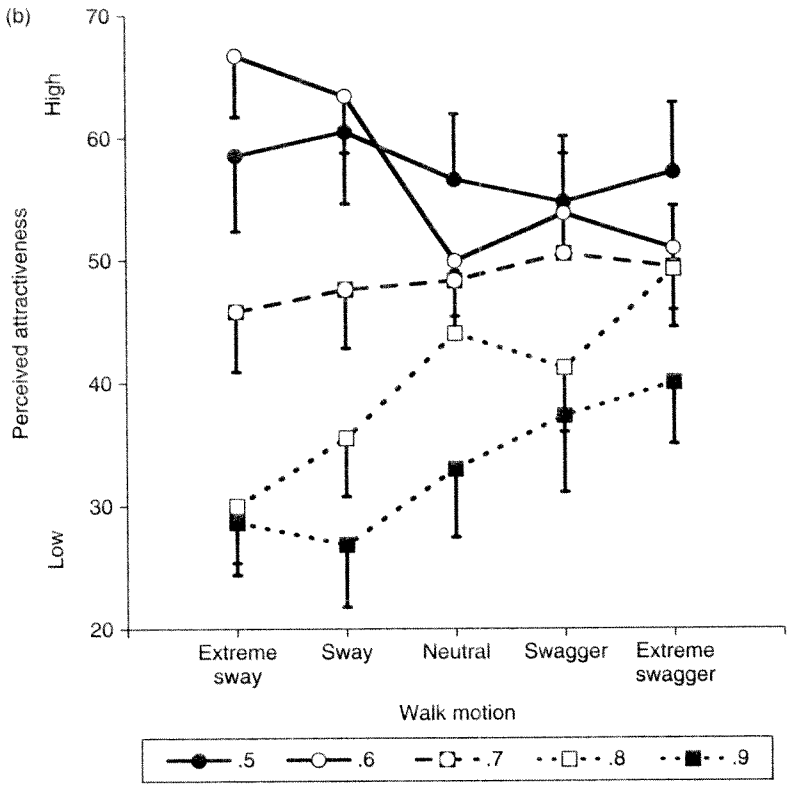

Figure 9.5 (Continued).

We interpret these effects to be consistent with our theoretical perspective of interpersonal metaperception. Though the particular cues that specify sex and gender may vary across studies, the cue that specifies perceived sex will predominate the perception of other gendered cues – and ultimately determine which bodies will be deemed attractive. This implies that it is not the physical cues, per se, but contextualised social perceptions that emerge from those cues that lead bodies to be deemed attractive. In our animated walkers, the WHR was most tightly coupled to sex category judgements, and it contextualised the perception and interpretation of the body's motion, bringing about an aesthetic Gestalt. In other stimuli that have been widely used, however, different physical parameters guide these judgements. In studies that have used the

original stimuli from Singh (1993), for example, the sex of each target was not judged, but was both pre-specified and held constant. Because the sex was given, the WHR – a cue related to both sex category and gendered judgements in our own research – was perceived to be congruent or incongruent with the given category, and therefore guided judgements of attractiveness. It is in this manner that the cognitive processes described above could account for the aesthetic appeal of small WHRs for female targets.

Indeed, elsewhere we have examined these metaperceptual aspects of our approach (i.e., how the compatibility of perceived sex and gender affect perceived attractiveness). In this treatment of the data, we analysed the perceived attractiveness of our walkers as a function of perceived sex and gender (as opposed to WHR and Walk Motion as we have done here; Johnson & Tassinary, 2007a). When analysed in that way, the interaction between perceived sex and gender for judgements of attractiveness was strong and significant, just as the interaction between WHR and Walk Motion was significant.

We have replicated these findings for a range of stimuli including: (a) computer-generated animations in which we experimentally manipulated the purported sex of the target; (b) video recordings of actual men and women who were trained to move in characteristically masculine or feminine ways, and; (c) static line drawn images that depict a woman with various WHRs (i.e., the stimuli from Singh, 1993). In some cases, the sex of the target was implicit, and judged by the target (e.g., specified by WHR in some of our studies, or experimentally manipulated in others), and the gendered cue that was either compatible or incompatible was the body's motion. In other cases, the sex of the target was held constant, and the gendered cue that varied was body shape (i.e., Singh stimuli). Finally, in other cases, the sex of the target was apparent from multiple cues (e.g., videos of real people), and the gendered cue that varied across stimuli was the body's motion.

Across all of these variations, one cue (or manipulation) specified the sex of the target, and another sexually dimorphic cue varied across the range of stimuli. In spite of these variations in the stimuli, perceived attractiveness was predicted by the interaction of sex and gender in all cases. Female targets were judged to be more attractive when they were also perceived to be feminine, but the opposite was true for male targets. These findings clearly support our general proposition that body cues invoked a range of basic social percepts that coalesced to either a pleasing or unpleasant Gestalt, a global evaluation that was reflected in our participants' judgements of attractiveness.

Social categories as interpersonal metaperception

Because the cues involved in interpersonal metaperception affect multiple gendered perceptions, they may be perceived to be either typical or atypical given the perceived sex of a target. The resulting metaperceptual judgements that subsequently arise may extend beyond evaluative social judgements, also affecting other social categorisations. Specifically, gender-atypical expressive body motion and even shape has been shown to reliably predict both actual and perceived sexual orientation (Ambady, Hallahan, & Conner, 1999; Bailey & Zucker, 1995; Rieger, 2006; Rieger, Linsenmeier, Gygax, & Bailey, 2006; Sirin, McCreary, & Mahalik, 2004). Consequently, in addition to affecting perceived attractiveness (or lack thereof), perceiving sex and gender from body cues may affect presumed sexual orientation, either implicitly or explicitly. And this may or may not be related to the perceived attractiveness of the target. We addressed this possibility in a separate set of studies in which participants judged the sexual orientation of our computer-animated walkers (Johnson, Gill, Reichman, & Tassinary, 2007). Not surprisingly, perceived sexual orientation was determined by the interaction of WHR and Walk Motion. From these data we concluded that metaperceptual judgements that arise from body cues need not be restricted to evaluative judgements, but that they may also extend to other social categorisations.

Given the similarity between the findings for perceived sexual orientation and perceived attractiveness described above, we were concerned that our effects of compatibility on perceived attractiveness were somehow mediated by perceived sexual orientation. If correct, this implies that the evaluation of particular combinations of body cues were low specifically because they implied a stigmatised social category – homosexuality (Aberson, Swan, & Emerson, 1999; Herek, 1984; Sirin et al., 2004; Storm, 2001). We examined this possibility, and we reported the results in Johnson et al. (2007a). In sum, we found that the attractiveness effect remained significant after controlling for the perceived sexual orientation of each target. Thus, gender typicality's importance for judgements of attractiveness appears distinct from its importance for judgements of sexual orientation.

Practical implications

Collectively, our findings have numerous practical implications. First, our research has implications in terms of its basic approach to why/how the WHR affects judgements. Prior research has been criticised due to its repeated reliance on somewhat impoverished line drawn stimuli. Henss (2000), for example, pointed out that because research on face recognition utilising line drawn or photographic stimuli has yielded discrepant results, one might expect the same to occur when investigating the human body. This is difficult to confirm, however, because few studies have used photographic stimuli to investigate the role of bodily cues in social judgements. The studies that have used photographs in such studies have altered the WHR by changing the relative *width* of the waist and/or the hips (Henss, 2000; Singh, 1994; Rozmus-Wrzesinska & Pawlowski, 2005; Streeter & McBurney, 2003; but for a different use of photographic stimuli, see Bateson, Cornelissen, & Tovée, Chapter 4; Tovée & Cornelissen, 2001; Tovée, Maisey, Emery, & Cornelissen, 1999). Critically, the WHR as it has been related to actual health and fecundity is a measure of circumference, not one of width (e.g., Björntorp, 1988). Because the overarching goal of previous research was to relate a social judgement (i.e., attractiveness) to a visible feature that corresponds to health and fecundity (WHR), this shortcoming is a potential lynchpin.

Our research has overcome this limitation, albeit without using photographs, by using animations of human walkers. Each of the walkers was rendered in three-dimensional space, in which the circumference of both the waist and the hips were measured (Higa, 1999). Thus, the WHR in our walkers is a more precise portrayal of the human body than can be achieved using two-dimensional width manipulations. Furthermore, the walkers were dynamic. Animation enriched the stimuli such that judgements correspond more closely to what participants experience in real life; that is, people in motion. Moreover, the androgyny of the walker pinpointed the heretofore-neglected effects of both the WHR and Walk Motion in judgements of sex. To our knowledge, only one other study has obtained sex judgements for androgynous figures (Lippa, 1983), but that study used line-drawn stimuli.

Our general approach to the study of how the WHR affects social judgements also has practical implications. Prior research investigating judgements of the human body has isolated a single physical cue and manipulated (or measured) its relation to a single dependent variable. Thus, the precise relation between the physical cue and the social judgement can be described, yet contextualising forces have been almost entirely ignored. This approach, therefore, has favoured precision over breadth. Other research investigating the accuracy of social perceptions has typically presented static or dynamic recordings of actual people to determine the accuracy of social perception. Thus, the surprising accuracy of social judgements has been demonstrated, yet the cues that inform those judgements have been intractable. In contrast to the first,

this second approach has favoured breadth over precision. Our approach strikes a balance between precision and breadth that we believe will provide a foundation for future research in a variety of domains.

Finally, our approach is highly integrative. Until recently, research investigating the social perception of the body's motion and shape has occurred in isolation, uniformed by the other field's current findings and theories. Our perspective of interpersonal metaperception has, quite literally, borrowed the best of both programmes of research. By applying the gaits described in the cognitive literature to the body shapes investigated in the social literature, we have achieved a new level of descriptive specificity. Both shape and motion are important in basic social perceptions, and the current research explicates how the relation of those perceptions affects interpersonal metaperception.

Theoretical implications

The conceptualisation of perceived attractiveness as interpersonal metaperception has important theoretical implications that are both specific and general. Specifically, our model can account for the contradictory findings with respect to the WHR hypothesis. Heretofore, the psychological mechanisms that triggered these discrepant results remained elusive. Our model and results fill this theoretical gap by positing a single metaperceptual mechanism, cue compatibility, which accounts for the previous effects. Moreover, our model can explain these previous findings in parsimonious and proximal terms without positing the presence of unique and special-purpose adaptations.

The stimulus set employed by previous researchers (e.g., Singh, 1993) permitted the emergence of the effect of WHR on judgements of attractiveness for functional reasons unrelated to evolved signals of fecundity. As noted previously, the line-drawn Singh stimuli suffer confounds that make interpreting the results difficult. Moreover, and more important from our perspective, the sex of the targets in the Singh stimuli (and the few studies that used other stimuli) was always unambiguous. For the female targets, attractiveness was found to have an inverse relationship with WHR. In the sole study of the implications of the WHR for male targets, larger WHRs that corresponded to the normal male rage were deemed more attractive (Singh, 1995). This precise pattern is predicted by the cue compatibility model. More broadly, prior studies have precontextualised attractiveness judgements by holding constant (and indeed highlighting) the targets' sex.

This basic fact has implications for the psychological processes that undergird interpersonal metaperception. When presented with a clearly

female stimulus and given the task of judging her attractiveness, each participant faced a congruence problem, not a decision of reproductive potential. Those figures that were deemed to have a more gynoid shape (smaller WHRs), congruent with the unambiguous female sex, were judged to be more attractive than were those that had more android shapes (higher WHRs), and the opposite is true for clearly male targets. That is, women are judged to be attractive when they are feminine in shape and motion, and men are judged to be attractive when they are masculine in shape and motion (Johnson & Tassinary, 2007a).

This interpretation also has clear implications for cross-cultural research. Indeed, the cue compatibility model supplies a common mechanism that accounts for cross-cultural differences in preferences. When viewing line-drawn women, men from the Hadza tribe of Tanzania did not exhibit a systematic preference for any particular WHR (Wetsman & Marlowe, 1999; Marlowe & Wetsman, 2000) and the Matsigenka men from southeast Peru preferred larger WHRs (Yu & Shepard, 1998). From our perspective, it seems likely that the cultural definitions of femininity differ in these remote tribes. Based on our model, we predict that particular bodily cues have little influence over perceived gender in the Hadza and that the Matsigenka perceived large WHRs to be more feminine. The nearest examination of differences in perceived gender in remote cultures is found in anthropological descriptions of sex differences.[4] Although some research has examined cultural differences in perceived attractiveness (e.g., Swami, Antonakopoulos, Tovée, & Furnham, 2006; Swami, Caprario, Tovée, & Furnham, 2006), no systematic study has directly assessed the features perceived to be masculine and feminine in remote cultures. Instead, aesthetic preferences have been recorded for stimuli that were previously judged to be masculine or feminine by Western respondents. Matsigenka women, for example, prefer masculine (as judged by Western participants) male faces for a son-in-law, but the same women choose feminine male faces as more attractive (Yu, Proulx, & Shepard, Chapter 6). These results suggest a critical role for perceived gender in interpersonal judgements rendered by participants in remote cultures, but they are mute with respect to precisely what is perceived to be masculine or feminine by those participants.

Importantly, this highlights the primary strength of our model, but it also points to its limitation. Our model is agnostic with respect to whether preferences for specific body shapes are the result of specific mate choice adaptations, exaptations, by-products of how humans process information generally, or the product of sociocultural influence (see Rhodes, 2006). Instead, the cue compatibility model specifies a

common cognitive mechanism that can result in culture-specific preferences – the model is thus flexible enough to incorporate cultural variability, yet specific enough to predict what will be deemed attractive.

Previous research that explained WHR preferences as due to specific mate choice adaptations used line-drawn stimuli with a lower bound of 0.70, and the sex of the target was unambiguous. Our current and prior research, in contrast, employed stimuli with WHRs as low as 0.50, and the sex of the target was ambiguous. The inclusion of more extreme stimuli has proven to be descriptively interesting and theoretically meaningful for our own and our reinterpretation of others' research. Descriptively, the inclusion of these stimuli has permitted a better understanding of the boundaries and distributions of social perceptions beyond attractiveness. Theoretically, the inclusion of these stimuli has illuminated some critical asymmetries that further limit the viability of the WHR hypothesis. Specifically, previous research identified a WHR of 0.70 to be the 'ideal' female body shape, and these authors posited an adaptive model to explain their findings. Unfortunately, their limited range of WHRs obfuscated the important fact that attractiveness ratings can be even higher for *smaller* WHRs (see Tassinary & Hansen, 1998). Furthermore, we found that a substantial portion of our participants perceived walkers with a WHR of 0.70 to be men, rendering dubious the probability that this WHR is indeed the ideal female shape and the related tenability of a distal evolutionary mechanism.

Although these findings appear to contradict a prominent evolutionary theory, they are actually consistent with an entire class of cognitive theories on categorisation. Categorical prototypes are frequently more extreme than the exemplars experienced previously, and this has been shown to facilitate recognition of faces (e.g., Lee, Byatt, & Rhodes, 2000; Lee & Perrett, 2000; Lewis & Johnston, 1999; Mauro & Kubovy, 1992; Tversky & Baratz, 1985; cf. Rhodes & Moody, 1990, for recently presented faces), the identification of emotions (Benson, Campbell, Harris, Frank, & Tovée, 1999; Calder et al., 2000; Pollick, Hill, Calder, & Paterson, 2003), and the individuation of point-light movements (Hill & Pollick, 2000; Pollick, Fidopiastis, & Braden, 2001). Moreover, experience-based theories have described how the most appealing category members are those that are both rare and infrequent (Parducci, 1965). In other words, the 'best' exemplars for a category are extreme. Thus, both cognitive phenomenological perspectives underscore the value of including extreme stimuli in the assessment of preferences.

In addition, these findings augment recent reports that have also questioned the validity of the WHR hypothesis. Specifically, Fan (Chapter 3) and Bateson et al. (Chapter 4; see also Tovée et al., 1999) have claimed that the body mass index (BMI), relative to the WHR, is a more potent cue to perceived attractiveness. We believe that our theoretical perspective shares a common foundation with the literature comparing the importance of BMI and WHR. Indeed, in both the BMI perspective and ours, judgements of both men and women arise from a common psychological mechanism, rather than a psychological adaptation that is unique to the male psychology. That said, the two perspectives do differ in their origins. In our cue compatibility model, we assume that the preference for compatibility in body cues (and social perceptions) is co-opted for evaluative judgements from other fundamental cognitive strategies, a mechanism that may have had evolutionary implications but requires no evolutionary theorising. The underpinnings of BMI preferences, in contrast, have been described almost exclusively in terms of their adaptive advantage. Thus, our perspective shares one aspect with the BMI hypothesis – an emphasis on a common mechanism, but differs in another aspect – the presumed origin of the preferences.

Like other research concerned with how the body is perceived and evaluated, the research we have described in this chapter has focused exclusively on how two body cues – its shape and motion – affect judgements of perceived attractiveness. We recognise, however, that these cues may not be the primary cues to attractiveness. In real interactions, social judgements are likely to incorporate an array of physical cues; quite possibly relying heavily on facial characteristics (see Rhodes, 2006). Thus, as researchers investigating the importance of body cues for social judgements, we must remain mindful that, at least in some circumstances, the body may come in second (or even third!).

Final thoughts

Lord Byron entitled one of his most well known poems, *She Walks in Beauty*. Like Byron, scientists have long been interested in the precise mechanisms that underlie the appreciation of beauty. A more specific understanding of this process, however, has heretofore remained elusive. By adopting a perspective of interpersonal metaperception, we have taken a first step toward a theoretical and empirical understanding for why (and how) *she* (or he) *walks in beauty*.

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stimuli used in this research may be obtained from either author upon request.

Notes

1. Following the recommendations of Unger (1979), we will refer to sex judgements to indicate categorical judgements of biological sex (i.e., man or woman); we will refer to gender judgements to indicate the perceived masculinity and femininity.
2. The majority of the prior studies, for example, used an identical stimulus set (i.e., from Singh, 1993), thus raising the possibility of an artifactual interpretation. Additionally, several confounds in those stimuli limit the generalisability of previous studies. The Singh line drawings, for example, confound WHR with waist size and body weight with hip size (Tassinary & Hansen, 1998). To overcome these limitations, Tassinary and Hansen (1998) generated a new set of two-dimensional stimuli based upon anthropometric data (see Hansen, 1996). When more accurately depicted, the putative invariant relationship between the WHR and perceived attractiveness disappeared, and the authors interpreted this as 'a clear and unambiguous disconfirmation of the WHR hypothesis' (Tassinary & Hansen, 1998: 155).

   The assumption of cultural invariance, a cornerstone of the WHR hypothesis, has been discredited. Singh (1993: 305, italics added) noted the importance of cross-cultural consistency:

   > [C]ross-cultural studies should find diverse notions of what constitutes attractiveness in bodily (stature and breast size) and facial features (i.e., complexion, shape and color of teeth, shape of lips, etc.) and associated personality factors... *WHR, as the first filter, should be culturally invariant in its significance and its relationship to female attractiveness. The fact that WHR conveys such significant information about the mate value of a woman suggests that men in all societies should favor women with a lower WHR over women with a higher WHR for mate selection or at least find such women sexually attractive.*

   Yet this assumption has been disconfirmed. Tribal Hadza men of Tanzania prefer heavier women and show no systematic WHR preference (Wetsman & Marlowe, 1999; Marlowe & Wetsman, 2000). Similarly, Matsigenka men from southeast Peru also prefer heavier women and higher WHRs (Yu & Shepard, 1998). As the populations studied become less isolated, however, judgements begin to resemble those collected from American participants (i.e., reveal a preference for a small WHR; see Swami & Furnham, 2006, for a review). Such culturally mediated findings are strikingly consistent with what is observed even for judgements of facial expressions of emotion (Sorenson, 1975; see Russell, 1994, for a review).
3. Similar silhouetted stimuli have been judged previously to be more realistic than line-drawn stimuli (Salusso-Deonier, Markee, & Pedersen, 1993). Our walkers have the added realism afforded by motion and depth cues (such as shading). Nonetheless, our walkers are not fully representative of human appearance. Notably, some of our walkers fall outside the range of human variation. But we currently inhabit a world that validates the inclusion of such stimuli within our set of walkers. We are bombarded with images that stretch reality in a way that makes the perception of extreme images not only interesting, but also socially relevant. Little girls, for example, play with Barbie, and she is not perceived as unnatural. Instead, some have argued that she is idealised. Additionally, movies such as *Shrek* make relevant precisely what proportions are deemed by observers to be male/female. Indeed, the 'suspension of disbelief' when watching Princess Fiona (in her pre-ogre form) may have been thwarted if her WHR (approximately 0.52) had been within the normal range of human variation (see Higa, 1999, for a discussion of this issue).

   That said, because our walkers depict novel combinations of WHR and walk, we assessed directly how realistic the walkers appeared relative to other stimuli that have been used in research. Participants judged one of three sets of stimuli (all walkers in our stimulus set, all Singh stimuli, or a set of five point-light displays) and made two judgements about them. The first rating assessed where the images fell on a continuum from *artificial* (1) to *lifelike* (11). The second scale assessed how well the stimuli represented humans from *not at all* (1) to *perfectly* (11). These judgements were averaged to yield an index of realism. The realism scores between the three sets of stimuli were comparable: walkers ($M = 6.65$, $SD = 1.6$, $n = 20$), Singh ($M = 6.43$, $SD = 2.0$, $n = 20$), and point-light displays ($M = 6.91$, $SD = 1.8$, $n = 13$). (We thank Randolph Blake for providing us with a set of point-light displays for this test.)
4. Eibl-Eibesfeldt (1988: 57), for example, characterised the motion of male dancers – abrupt movements oriented toward the audience – as an expression of power, and he argued that the specific poses of men served to 'enlarge the frontal appearance.' The motion of female dancers, in contrast, was described as 'coquetry,' an expression of approach and withdrawal, and he argued that the graceful motions presented the body from various angles. Others have described the 'male' and 'female' qualities of all individuals (and objects). Arve Sørum (1993) described the gendered nature of all things in the Bedamini from Papua New Guinea. Those aspects of an individual that are hard and unyielding, such as bones, are thought to be male characteristics, and are believed to be inherited from the father. In contrast, those aspects of an individual which are soft and yielding, such as flesh, are thought to be female characteristics, and are believed to be inherited from the mother. This distinction carries over into more general gender descriptions, as well. Sørum (1993: 114) notes, 'Strength and endurance are generally talked of as masculine qualities, and softness and weakness are talked of as feminine qualities. To express that a man is strong and courageous, they say that "he has got bones"... A weak man is like cooked meant, he might easily be consumed (destroyed).' These descriptions of how motion and form are perceived intimate a critical role for motion and morphology in perceived gender, although they do not explicate with precision what guides such percepts.

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10

Mate Preferences in Social Cognitive Context: When Environmental and Personal Change Leads to Predictable Cross-Cultural Variation

Leif D. Nelson, Terry F. Pettijohn II, and Jeff Galak

> Shall I compare thee to a summer's day?
> Thou art more lovely and more temperate.
>
> ~ Shakespeare, 1564–1616

As is common for many men, Shakespeare was idealising a woman. The search for an ideal partner was not only critical for Shakespeare – it is, by evolutionary standards, the central goal for all male and female life forms (Buss, 1985; Darwin, 1859; Vandenberg, 1972). Anthropological and psychological evidence continues to document the features women seek in a male partner (Symons, 1979), but for the purposes of this chapter we primarily focus on the features men seek in a female partner. The ideal feminine form has been characterised by painters and sculptors for as long as paintings and sculptures have existed (e.g., see Zollner & Nathan, 2003) and Shakespeare is, of course, hardly the first writer to try a verbal description.

For all of this artistic endeavor, it remains unknown whether beauty has a truly universal ideal or whether it is idiosyncratically in the eye of the beholder. Anthropologists have documented both sides of the argument, identifying those features idealised in all cultures as well as those uniquely pursued within specific cultures (e.g., Ford & Beach, 1951). Evolutionary psychologists have seized upon the former concept, and have detailed evidence supporting the universality hypothesis. Among other features, men seek youthfulness (Buss, 1989), facial averageness (Rhodes et al., 2001), a low waist-to-hip ratio (Singh, 1993; Singh & Young, 1995), and generally healthy body weights (Tovée & Cornelissen, 1999).