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The influence of men's sexual strategies on perceptions of women's bodily attractiveness, health and fertility

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Abstract

The purpose of this study was to investigate the influence of men's sociosexual orientation on their perceptions of women's physical attractiveness, health and fertility. Fifty British male participants were assigned to two groups (restricted versus unrestricted) based on their responses to items on the Revised Sociosexual Orientation Inventory. Participants rated the attractiveness, health and fertility of a series of 50 photographs of women varying in body mass index (BMI) and waist-to-hip ratio (WHR). Results suggested that both groups of men based their judgements primarily on BMI rather than WHR. However, there were significant between-groups differences: unrestricted men judged women with a lower BMI as more attractive, healthy and fertile than restricted men. Unrestricted men also showed a stronger preference for women with a low WHR. The results support a dynamic psychological model of interpersonal attraction, which many earlier studies have neglected.

Keywords: Physical attractiveness; Sexual strategies; Body mass index; Waist-to-hip ratio

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1. Introduction

Ratings of feminine beauty are known to be influenced by several feature dimensions, notably a woman's body mass index (BMI) and waist-to-hip ratio (WHR). In recent years, much scholarly debate has focused on the relative importance of these cues in defining women's attractiveness (see Swami, 2007; Swami & Furnham, 2006, 2007). Whereas Singh (1993, 2006) maintains that the WHR is the key component to understanding women's attractiveness, other researchers have shown that BMI accounts for relatively greater variance in attractiveness ratings (Fan, Liu, Wu, & Dai, 2004; Smith, Cornelissen, & Tovée, 2007; Tovée & Cornelissen, 2001; Tovée, Hancock, Mahmoodi, Singleton, & Cornelissen, 2002; Tovée, Maisey, Emery, & Cornelissen, 1999).

However, the role played by both these cues is sensitive to environmental and ecological conditions. In terms of the WHR, for instance, converging evidence suggests that, while a low WHR is considered attractive in contexts of high socioeconomic status (e.g. Furnham, Swami, & Shah, 2006; Singh, 1993; Streeter & McBurney, 2003), hunter-gatherer and forager groups tend to prefer higher WHRs (Marlowe & Wetsman, 2001; Sugiyama, 2004; Wetsman & Marlowe, 1999; Yu & Shepard, 1998). Even so, there is considerable debate as to whether the WHR is utilised in mate selection in contexts of low socioeconomic status (Yu & Shepard, 1999), and it appears that BMI 'trumps' WHR considerations particularly in contexts characterised by food scarcity.

For instance, a number of recent studies have shown that, across cultures, BMI is a stronger predictor of women's attractiveness than WHR (Swami & Tovée, 2005, 2007; Swami, Antonakopoulos, Tovée, & Furnham, 2006; Swami, Caprario, Tovée, & Furnham, 2006; Swami, Knight, Tovée, Davies, & Furnham, 2007; Swami, Neto, Tovée, & Furnham, in press; Tovée, Swami, Furnham, & Mangalparsad, 2006). Moreover, higher BMIs appear to be regarded more positively in contexts of low socioeconomic status and/or environments experiencing food scarcity. The latter finding is corroborated by studies that find hungry men to idealise a heavier body weight in a potential partner than satiated men (Nelson & Morrison, 2005; Swami, Poulogianni, & Furnham, 2006; Swami & Tovée, 2006).

These studies suggest that it is important to consider ecological and environmental factors that may influence perceptions of physical attractiveness. Importantly, most studies to date have tended to examine such perceptions in the absence of a broader framework of motivations that give rise to preferences (Schmalt, 2006). But motives, or the disposition to strive for certain goals, are known to exert a powerful influence on sexual relationships and attractiveness ideals (Buss & Schmitt, 1993). One potentially important variable is the mating strategy of the observer (Brase & Walker, 2004), which is typically described as being either short-term or long-term. Individuals who follow a short-term mating strategy tend to pursue low-commitment, transient sexual relationships with multiple partners. By contrast, individuals who follow a long-term mating strategy tend to pursue a single, high-investment relationship (Buss & Schmitt, 1993).

Of course, long- and short-term mating strategies are not mutually exclusive (Gangestad & Simpson, 2000), but when asked, individuals tend to evaluate potential partners from either one or the other of these view-points. Moreover, their responses are known to change predictably depending on whether they are seeking long- or short-term partners (Buss & Schmitt, 1993). For instance, men and women tend to compromise on physical attractiveness when seeking a long-term partner (Kenrick, Sadalla, Groth, & Trost, 1990; Regan, 1998). By contrast, when consider-

ing a casual, short-term partner, both women and men tend to emphasise physical attractiveness while compromising on interpersonal and emotional responsiveness (see Penke, Todd, Lenton, & Fasolo, in press).

Some studies have looked at whether preferences for women's body shape and weight are mediated by men's sexual strategies, but most have reported no significant difference between men seeking short- and long-term partners. Two studies using line drawings of the female figure, for instance, observed that a low WHR was the most attractive for both long- and short-term relationships (Furnham, Moutafi, & Baguma, 2002; Singh & Young, 1995). More recently, Brase and Walker (2004) used the Sociosexual Orientation Inventory (SOI; Simpson & Gangestad, 1991), a measure of people's willingness to engage in sexual activity in the absence of a committed relationship, but still failed to find major differences in preferences for WHR between long- and short-term relationships.

Nevertheless, Brase and Walker (2004) *did* find a consistent pattern in more specific differences: men's ratings of women's attractiveness were more conservative when evaluating a potential long-term relationship partner. In addition, men's own desirability had an influence on the ratings of female models. Men who had lower-than-average WHRs themselves, higher-than-average BMI, or rated themselves as lower in desirability tended to be less discriminating in some of their ratings. Similar results were reported by Schmalt (2006), who found that participants' preference for a low WHR was moderated by their 'power motive' (the predisposition to strive for status and power), as well as by short- and long-term mating strategies. Specifically, Schmalt (2006) found a stronger preference profile for individuals high in power motivation and for individuals looking for a short-term partner.

One explanation for these equivocal results has to do with the nature of the stimuli used in earlier studies. Line drawings have been criticised for having poor ecological validity and for confounding BMI and WHR (Tovée & Cornelissen, 2001). Where photographic stimuli have been used (e.g. Brase & Walker, 2004), these have tended to limit the BMI range in favour of WHR. In addition, earlier studies have tended to classify participants as seeking long- or short-term partners using imprecise methodology (e.g. asking participants to rate images based on how attractive a potential mate is as a long- or short-term partner).

In an attempt to overcome these limitations, the present study employed a set of photographic stimuli of the female figure, ranging in size and shape. This allowed us to more precisely examine (i) the relative influence of BMI and WHR on ratings of women's attractiveness, health and fertility, and; (ii) differences in the ideal BMI and WHR of sociosexually 'restricted' and 'unrestricted' men (as measured by a revised version of the SOI).

2. Methods

2.1. Participants

The participants of this study were 50 heterosexual men, who were enrolled in various courses at a university in Greater London at the time of the experiment (mean age = 23.8, SD = 11.8). The mean BMI of participants was 24.77 (SD = 3.80), which is within the normal weight range.

To avoid the potential confound of ethnicity, only participants of European Caucasian descent were invited to take part in the study. All participants took part on a voluntary basis and were not remunerated for their participation.

2.2. Materials

Stimuli. All participants rated a series of 50 images of real women in front view (hereafter referred to as the 'stimuli'; for details of their development and examples, see Tovée et al., 2002). To avoid effects of skin tone on participants' judgements, the stimuli were presented in greyscale. In addition, the heads of the stimulus women were obscured so that they could not be identified and so that facial attractiveness would not be a factor in participants' ratings. Ten images of women were drawn from each of the five BMI categories: emaciated (<15 kg/m^2), underweight (15–18.5 kg/m^2), average (18.5–24.9 kg/m^2), overweight (25.0–29.9 kg/m^2) and obese (>30 kg/m^2). The range of BMI values was 11.6–41.2 kg/m^2, whereas the range of WHRs was 0.68–0.98. The stimuli were printed on sheets of paper measuring 210×297 mm, so that each image covered the entire page. This was done to ensure that all images appeared within the same border and so that the women's height would not affect participants' judgements.

Sociosexual orientation. All participants completed the Revised Sociosexual Orientation Inventory (SOI-R; Penke & Asendorpf, in press), a nine-item questionnaire that assesses an individual's propensity to engage in low-investment, transient sexual relations. While the original SOI (Simpson & Gangestad, 1991) is widely used in research settings (Simpson, Wilson, & Winterheld, 2004), it has been criticised for being psychometrically problematic (Asendorpf & Penke, 2005; Voracek, 2005). We, therefore, used a more recent revision of the SOI, which overcomes some of the earlier problems (Penke & Asendorpf, in press). The SOI-R assesses facets of past sociosexual behaviour, desire, and attitudes. Responses on all items are scored on a five-point scale and are aggregated to form a composite SOI-R score, ranging from 9–45. Those scoring low on the inventory possess a 'restricted' sociosexual orientation (requiring high emotional investment and prolonged courtship before engaging in sexual relations), while those scoring high on the inventory possess an 'unrestricted' sociosexual orientation (willing to engage in sexual relations in the absence of commitment).

Demographics. All participants also provided their demographic details, which included their age, university course, weight and height (the latter two traits were used to compute participants' BMIs).

2.3. Procedure

All participants were tested individually in a neutral setting. Participants were presented with a booklet in which to record their ratings and responses, beginning with their ratings of the stimuli and followed by the SOI-R and demographic details. The booklet provided nine-point Likert-type scales on which participants made their ratings based on the presentation of stimuli. The stimuli were presented by a female experimenter in a randomised order. The entire set was presented twice, the first presentation to make participants aware of the range of variability in body features represented in the stimulus set. Participants provided three ratings for each image during the second presentation: for physical attractiveness, health and reproductive potential (1 = least attrac-

tive/healthy/fertile, 9 = most attractive/healthy/fertile). The entire procedure took approximately 40 minutes to complete, and all participants were debriefed following the experiment.

3. Results

3.1. Sociosexual orientation

The SOI-R total score had a good internal consistency (Cronbach's $\alpha = .88$). The mean aggregated score for all participants on the SOI-R was 25.72 (SD = 7.32). The SOI-R scores were slightly negatively skewed, with a median of 25. Categorising participants using a median split produced 24 participants with restricted orientation (age $M = 28.6$, SD = 12.8; BMI $M = 25.16$, SD = 3.83) and 26 participants with unrestricted orientation (age $M = 25.2$, SD = 10.8; BMI $M = 24.41$, SD = 3.80). There were no significant differences between the two groups in terms of age [$F(1, 49) = 1.10$, $p > .05$] or BMI [$F(1, 49) = .48$, $p > .05$].

3.2. Multiple regression results

Following the procedure established in previous studies (e.g. Swami & Tovée, 2005), a series of multiple polynomial regressions were used to estimate the variance in attractiveness, health and fertility ratings explained by BMI and WHR. To this end, second- and third-order terms were included in the regression model for BMI, and single-order terms were used for WHR. This model balances the amount of variance accounted for with the simplest possible regression model (Tovée & Cornelissen, 2001). The model, which was run separately for the restricted and unrestricted participants, was:

$$y = a + b_1x_1 + b_2x_2 + b_3x_3 + b_4x_4 + e$$

where y is the attractiveness, health or fertility ratings, a is the intercept, x_1 is the WHR, x_2 is the BMI, x_3 is the BMI^2, x_4 is the BMI^3 and e is random error.

For both restricted and unrestricted participants, BMI and WHR were significant predictors for ratings of attractiveness, health and fertility (see Table 1). However, for both groups and for all three sets of ratings, BMI accounted for far greater variance than WHR, suggesting that it is the stronger predictor of women's physical attractiveness.

3.3. Group differences in 'peak' BMI

For each of the three ratings, we calculated the 'peak' or optimal BMI preference for both groups. To do this, we fitted third-order polynomials to the ratings by all participants for both groups, allowing peak BMI to be calculated for each participant (see Table 1). In general, restricted participants preferred a slightly higher BMI for ratings of attractiveness, health and fertility than unrestricted participants. To test the significance of these differences, we carried out one-way analyses of variance (ANOVAs) for each of the ratings. Results showed significant group differences on ratings of attractiveness [$F(1, 49) = 8.40$, $p < .05$; $\eta_p^2 = .15$], health [$F(1, 49) = 8.90$, $p < .05$; $\eta_p^2 = .16$] and fertility [$F(1, 49) = 5.17$, $p < .05$; $\eta_p^2 = .10$].

Table 1
Total variance explained by BMI and WHR, peak attractiveness and WHR gradients

Group	Rating	Explanatory variable	Regression F	% variance	Mean'peak' BMI (SD)	Mean WHR gradient (SD)
Restricted	Attractiveness	BMI	37.09**	70.7	22.41 (3.38)	−9.34 (13.26)
		WHR	4.23*	8.1		
	Health	BMI	63.43**	80.5	21.35 (1.63)	−11.87 (9.58)
		WHR	4.75*	9.0		
	Fertility	BMI	87.11**	85.0	21.52 (1.67)	−11.23 (9.08)
		WHR	4.12*	7.9		
Unrestricted	Attractiveness	BMI	28.66**	65.1	19.90 (2.72)	−18.64 (11.26)
		WHR	11.91*	9.9		
	Health	BMI	50.08**	76.6	20.11 (1.30)	−19.06 (8.20)
		WHR	10.85*	9.0		
	Fertility	BMI	66.76**	81.3	20.59 (1.22)	−15.67 (8.37)
		WHR	7.93*	11.2		

* $p < .05$.
** $p < .001$.

3.4. Group differences in WHR gradients

For each group, we calculated the mean WHR gradient following the regression analysis (see Table 1), as this provides a measure of the strength of preference for a low WHR. That is, a more negative gradient signifies a stronger preference for a low WHR. Descriptive statistics showed that unrestricted participants had a stronger preference for lower WHRs than restricted participants. To test the significance of these differences, we conducted a series of one-way ANOVAs, which showed significant between-group differences for ratings of attractiveness [$F(1, 49) = 7.19$, $p < .05$; $\eta_p^2 = .13$] and health [$F(1, 49) = 8.17$, $p < .05$; $\eta_p^2 = .15$], but not fertility [$F(1, 49) = 3.24$, $p > .05$; $\eta_p^2 = .06$].

4. Discussion

The results of this study suggest that, when improved sets of stimuli are used, there are small but significant differences in the way sociosexually restricted and unrestricted men perceive women's attractiveness, health and fertility. Specifically, unrestricted men (who tend to engage in short-term sexual relationships with low commitment) perceive women with a significantly lower BMI as more attractive than restricted men (who tend to engage in exclusive long-term relationships requiring high emotional commitment). In addition, unrestricted men were also more likely to show a stronger preference for a low WHR than restricted men.

These results have a number of important implications for this research area. Firstly, they suggest that men's sociosexual orientation is an important mediating factor in perceptions of women's attractiveness. Evolutionary psychologists have proposed that successfully engaging in short-term relationships will tend to improve men's reproductive potential (Buss & Schmitt,

1993). Therefore, in seeking short-term partners, men may be especially concerned with cues that signal a woman's reproductive potential and health. To the extent that a BMI towards the lower end of normal weight range and a low WHR are correlated with improved health and fertility outcomes (see Singh, 1993; Tovée & Cornelissen, 2001), these results support the conclusion that sociosexually unrestricted men are more focused on such salient cues.

Restricted men, by contrast, may prioritise traits other than physical attractiveness, particularly interpersonal responsiveness. Nevertheless, it should be noted that the difference in the body size and shape perceived as attractive by restricted and unrestricted men – while significant – was small. It would seem, therefore, that restricted men do not radically alter from the preferences of unrestricted men, and they should still be choosing partners who are *relatively* healthy and fertile. In general, this set of findings is consistent with previous studies showing that men seeking long- or short-term partners tend to prioritise different traits in a potential partner (e.g. Buss & Schmitt, 1993; Kenrick et al., 1990; Regan, 1998) and that physically attractive mates are more valued by sociosexually unrestricted individuals (e.g. Fletcher, Simpson, Thomas, & Giles, 1999; Simpson & Gangestad, 1992). Indeed, recent evidence suggest that even the basic cognitive processes of more unrestricted individuals are better 'attuned' to the perception of attractiveness (Maner et al., 2003; Maner, Galliot, & DeWall, 2007).

At the same time, however, our results are in contrast to the lack of significant findings found in earlier studies between men who rate women in terms of long- and short-term relationships (e.g. Furnham et al., 2002; Singh & Young, 1995), as well as between restricted and unrestricted men (Brase & Walker, 2004). We believe these differences stem from limitations associated with both the stimuli and the assessment of sexual strategies used in earlier studies. The use of more sophisticated sets of stimuli allow researchers to investigate more accurately the perception of attractiveness, just as the usage of a psychometrically validated measure of sociosexuality allows for a more valid differentiation between individuals with long-term and short-term mating orientation. This study benefitted in both regards.

More generally, our results support a dynamic process of interpersonal attraction which is necessarily distinct from the more static versions proposed by some early theorising. In this sense, there are a large number of factors associated with both the observer and the observed, which have the potential to alter the perception of physical attractiveness. Such factors might include the sexual strategies employed by individuals, but will likely be complicated by other traits such as personality (Swami, Greven, & Furnham, 2007), self-partner comparison levels (Swami & Furnham, in press), motives and incentives (Schmalt, 2006), gender roles (Swami, Antonakopoulos, et al., 2006), and even temporary affective states (Nelson & Morrison, 2005; Swami & Tovée, 2006; Swami, Poulogianni, et al., 2006).

A dynamic psychological model of interpersonal attraction, then, will need to take into account such different factors to arrive at a more realistic account of physical attractiveness. Such frameworks are not necessarily beyond the realm of psychological modelling and testing. Kenrick, Li, and Butner (2003), for instance, have proposed a model in which individual differences and differences in situational circumstances influence an individual's reproductive potential, which in turn influence others' perceptions of them. Similarly, Swami and Furnham (2007) have attempted to integrate both biological and cultural pathways within the same framework to explain the way in which judgements of attractiveness are formed. While a detailed examination of such models is beyond the scope of the present paper, they nevertheless point towards a useful framework that

could be adopted by researchers studying physical attractiveness (see also Gangestad & Simpson, 2000; Simpson & Oriña, 2003; Gangestad, Haselton, & Buss, 2006).

There were two other interesting results in the present study. First, regardless of the experimental group, BMI appeared to be the more important predictor of perceived attractiveness, health and fertility. This is consistent with much recent work on the issue of the relative importance of BMI and WHR to judgements of women's attractiveness and health (e.g. Fan et al., 2004; Swami & Tovée, 2005, 2007; Tovée & Cornelissen, 2001; Tovée et al., 1999, 2002, 2006). Our study adds to this body of work and suggests that, overall, BMI may act as the first-pass cue of women's attractiveness rather than WHR (cf., Voracek & Fisher, 2006).

Second, within groups, ratings of attractiveness, health and fertility appear to mirror each other. Two possible explanations account for this set of findings. Firstly, evolutionary psychologists suggest that perceived health and fertility act as stabilising cues for judgements of attractiveness (e.g. Buss, 1999). However, we are not aware of any theoretical reason for why perceptions of health and fertility should vary with sociosexual orientation. A more plausible reason, therefore, is that the perception of health and fertility is a 'halo' of perceived attractiveness. The 'what is beautiful is good' bias suggests that individuals who are perceived as attractive are also imbued with other positive qualities (e.g. Eagly, Ashmore, Makhijani, & Longo, 1991), which may have affected the present results.

This appears to be an important limitation of both the present study and many other similar investigations. Typically, studies have assumed a unidirectional link between perceived health and/or fertility, and perceived attractiveness, which is in line with the evolutionary psychological models. However, providing evidence of a correlation between ratings of health and/or fertility, and ratings of attractiveness does not necessarily prove the underlying theoretical association, given the attractiveness halo. To overcome this limitation, studies will need to devise more sophisticated methodologies that get the association between health and attractiveness (e.g. Smith et al., 2007).

An additional limitation of the present paper is the possible effect of confounding variables. For instance, given the effects of desirability on ratings of attractiveness (such that less desirable men tend to be less discriminating in their ratings), it might be argued that the present results reflect the fact that restricted men were less desirable as mates and so were less discriminating. Future work could resolve this confound by including measures of self-reported mate desirability. These limitations notwithstanding, our results suggest that there are predictable differences in the perception of women's attractiveness, health and fertility as a function of men's sociosexual orientation, which lend credence to more dynamic models of mate perception.

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