

MALE SEXUAL STRATEGIES MODIFY RATINGS OF FEMALE MODELS WITH SPECIFIC WAIST-TO-HIP RATIOS

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Female waist-to-hip ratio (WHR) has generally been an important general predictor of ratings of physical attractiveness and related characteristics. Individual differences in ratings do exist, however, and may be related to differences in the reproductive tactics of the male raters such as pursuit of short-term or long-term relationships and adjustments based on perceptions of one's own quality as a mate. Forty males, categorized according to sociosexual orientation and physical qualities (WHR, Body Mass Index, and self-rated desirability), rated female models on both attractiveness and likelihood they would approach them. Sociosexually restricted males were less likely to approach females rated as most attractive (with 0.68–0.72 WHR), as compared with unrestricted males. Males with lower scores in terms of physical qualities gave ratings indicating more favorable evaluations of female models with lower WHR. The results indicate that attractiveness and willingness to approach are overlapping but distinguishable constructs, both of which are influenced by variations in characteristics of the raters.

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Ratings of women's attractiveness as potential partners appears to be mediated, in part, by their waist-to-hip ratio (WHR; the waist circumference divided by hip circumference). Singh and colleagues (Singh 1993a, 1993b, 1994a, 1994b; Singh and Luis 1995) have found that female models with relatively low WHR—between about 0.68 and 0.72—are rated by males as more attractive than models with higher WHR (e.g., greater than 0.72). WHR is correlated with youth, fertility, prior and current pregnancy, health problems, and pathogen load (Bjorntorp 1988, 1991; Kaye et al. 1990; Singh 1993a; Zaastra et al. 1993), all of which are plausible candidates for selection pressures that could have led to the evolution of an assessment of WHR in judging female physical attractiveness.

The preference for a low female WHR, furthermore, is sensitive to ecological contexts. Marlowe and Wetsman (2001; Wetsman and Marlowe 1999) found that a low WHR is not preferred in mates within the context of some foraging and swidden agriculture societies. Specifically, in circumstances that include acute food scarcities (i.e., high famine risk, little or no chance of obesity) the weight of women (heavier weight being preferred) can trump considerations of WHR (see Anderson et al. 1992 on fat and culture). Just as cross-cultural investigations of WHR as a factor in attractiveness ratings have elucidated the possibilities that WHR may be differentially used across different ecological circumstances, male individual differences in ratings—and different types of ratings—may help clarify the extent and function(s) of WHR as a cue of attractiveness within cultures.

INDIVIDUAL DIFFERENCES RELEVANT TO MATE EVALUATIONS: MATING STRATEGIES

An immediately relevant factor in considerations of how individuals differ in their evaluations of mate attractiveness is the *mating strategy* that the evaluator is employing. Mating strategies are typically described as being either short-term or long-term (which are actually opposite ends of a continuum). Individuals who follow a *short-term* mating strategy tend to pursue low-commitment, relatively transient sexual relationships with multiple partners. On the other hand, individuals who follow a *long-term* mating strategy tend to pursue a single, long-term, high-investment relationship. In a simplistic sense, short-term mating strategies emphasize possible quantity of offspring produced whereas long-term mating strate-

gies emphasize possible quality of offspring produced. These strategies are not mutually exclusive in an absolute sense (Gangestad and Simpson 2000), although the effective pursuit of one strategy tends to make the alternative strategy much more difficult to enact. When asked, however, people are capable of evaluating potential partner traits from the point of view of either a short-term or a long-term mating strategy, and their responses change in significant and predictable ways. Chastity, for example, is (from the point of view of males) a valued trait in female long-term partners but is an unwanted trait in short-term partners (Buss and Schmitt 1993).

Andrews, Gangestad, and Matthews (2002) point out that if WHR is a cue just of reproductive value then a low WHR should be specifically preferred for long-term mating partners, but if WHR is only a cue for non-pregnancy then a low WHR should be preferred for both short-term and long-term mating partners. Prior studies have collected ratings of attractiveness for both short- and long-term relationships for stimulus models varying in WHR, but those studies have done little in terms of evaluating the ratings in relation to each other. Singh and Young (1995) found that a relatively low WHR (between 0.68 and 0.72, with slender build and large breasts) was the most attractive body type for both short- and long-term relationships. Singh (1995a) found a correlation of 0.74 between short- and long-term relationship ratings of attractiveness for models with varying WHR, whereas Furnham, Moutafi, and Baguma (2002) found a lower correlation of 0.47. However, across many studies (e.g., Kenrick et al. 1990), men's standards for a short-term mate are generally much lower for a number of traits than their standards for a long-term mate. If any component of perceived attractiveness is based on these standards it would stand to reason that attractiveness ratings (of the same models) would be higher for a short-term relationship than for a long-term relationship.

In the real world, short- and long-term mating strategies are not assigned by experimenters, even though to some extent this seems to be possible (at least for discrete judgments outside of actual behavior). People instead develop their particular strategy based on some combination of phenotypic characteristics and environmental circumstances (Belsky 1997; Draper and Belsky 1990; Gangestad and Buss 1993; Gangestad and Simpson 2000; Kim, Smith, and Palermiti 1997).

The Sociosexual Orientation Inventory (SOI; Gangestad and Simpson 1990; Simpson and Gangestad 1991, 1992; Snyder, Simpson, and Gangestad 1986) was developed to measure the extent to which individuals place restrictions on sexual activity—in other words, how willing (or unwilling) they are to engage in sexual relations without closeness, commitment, and other indicators of emotional bonding. People who are towards the *restricted* pole of sociosexual orientation typically insist on commitment and

closeness in a relationship prior to engaging in sex with a romantic partner, whereas people towards the *unrestricted* pole of sociosexual orientation tend to feel relatively comfortable engaging in sex without commitment or closeness. Restricted individuals claim, for instance, that they need closeness before feeling comfortable with sex; they have had few sexual relationships in the past year; and they rarely if ever have had sex with a partner on one and only one occasion. Conversely, unrestricted individuals tend to indicate that they could enjoy sex without commitment, they have had several different sexual partners in the past year, and they have engaged in sex with partners once and only once on several different occasions.

Sociosexual orientation appears to measure, at least approximately, an individual's mating strategy (see, e.g., Snyder et al. 1986; Townsend and Wasserman 1997, 1998). Consistent with the idea that it reflects mating strategies, sociosexuality shows a consistent between-sex difference, with males exhibiting more unrestricted (i.e., short-term strategy) attitudes and behaviors than women. Studies have also found, however, that the variations within each sex are far greater than that between sexes (e.g., Simpson and Gangestad 1991). Thus, sociosexual orientation appears to capture a modal sex difference, but with substantial within-sex variations.

INDIVIDUAL DIFFERENCES RELEVANT TO MATE EVALUATIONS: OWN QUALITIES

Another factor that could influence evaluations of prospective mates is one's own quality and desirability as a partner. The general pattern of assortative mating (people of similar quality and traits tend to form relationships) indicates that very dissimilar potential mates will be either undesirable or unattainable. Specifically, high quality (and, therefore, very desirable) males should give more positive ratings to high quality/desirable females (compared with lower quality males). On the other hand, lower quality (less desirable) males should be less discriminating in their evaluations of potential mates, giving relatively higher ratings to lower quality/less desirable females and possibly even showing an aversion to approaching high quality/desirable potential mates.

As the current topic involves the physical attractiveness of women, the focus in this research will be on physical aspects of male desirability as well (acknowledging of course that, for both males and females, many other aspects are typically involved in interpersonal attractiveness within real relationships). Singh (1995b) documented that male WHR and body weight are significant factors in female judgments of male attractiveness; specifically, normal-weight males with WHR in the typical range (0.85–0.95) are judged as more attractive than males with other combinations of these fac-

tors. That the male WHR should also be a factor in females' evaluations of male physical attractiveness makes sense for some of the same reasons that female WHR is a factor in males' evaluations. The male WHR, as a measure of fat distribution patterns, is an indicator of both overall health and levels of circulating testosterone (Haffner et al. 1993; Jankowska et al. 2000a). Male body weight, which can be measured using the Body Mass Index (BMI), is also a predictor of overall health and testosterone levels (Jankowska et al. 2000b).

The link between male WHR, BMI, and testosterone levels is not entirely agreed upon, and a relationship is not always found (Denti et al. 2000; Jankowska et al. 2000a). To supplement the use of male WHR and male BMI as indicators of male physical attractiveness, therefore, the present study also asked the male participants to provide a self-rating of their own desirability.

RATINGS OF ATTRACTIVENESS VERSUS RATINGS OF APPROACH LIKELIHOOD

Various studies have associated female models' WHR with ratings of several traits besides attractiveness (e.g., healthiness, fertility, and youthfulness: Furnham, Moutafi, and Baguma 2002; social dominance: Dijkstra and Buunk 2001; sexiness, healthiness, fertility, and pregnancy: Furnham, Lavancy, and McClelland 2001). Little, however, has been done on raters' *behavioral* reactions to different WHR models (i.e., not what the WHR indicates about the model, but what reactions it is likely to produce from the evaluator). In particular, it may be informative to distinguish ratings of how attractive a target is from *approach likelihood* (i.e., how likely one would be to approach the person to try to initiate a relationship). While physical attractiveness is expected in general to be positively related with willingness to approach that person regarding beginning a relationship, there may be some specific deviations from a monotonic relationship. Specifically, towards the lower end of attractiveness, approach likelihood may drop off more quickly (i.e., as the model falls below a threshold of acceptability). Towards the upper range of attractiveness, approach likelihood may increase more slowly, as raters could evaluate that their chances of success are very low (e.g., if the rater considers himself much lower in mate value than the model and reputation losses due to rejection outweigh the likelihood of success).

PREDICTIONS

We generated the following predictions based on the above considerations:

1. In general, female models with WHR in the 0.68–0.72 range will be rated as most attractive (as found in prior research, e.g., Singh and Young 1995), and ratings of approach likelihood will follow this same overall pattern.
2. Overall, models will be rated as more attractive, and more likely to be approached, when evaluated in the short-term relationship context, as compared with the long-term relationship context.
3. The difference between ratings for short- and long-term relationships (prediction 2) will be larger for males with unrestricted sociosexual orientations, as compared with sociosexually restricted males.
4. Males with unrestricted sociosexual orientations will provide generally higher approach-likelihood ratings, as compared with sociosexually restricted males.
5. Males in the normal ranges of WHR and BMI (and/or high self-ratings of attractiveness) will provide higher ratings of female models with WHR between 0.68 and 0.72 than males with physical features outside those typical ranges, who will give comparatively higher ratings to female models outside the 0.68–0.72 WHR range (and possibly give lower ratings inside this range).

METHODS

Participants

Participants were 40 heterosexual male students at a university in north-east England who participated either as partial fulfilment of a course requirement or as volunteers. The mean age of the participants was 23.4 years, with a range of 18–43 and a standard deviation of 7.1.

Materials and Procedure

Prior to evaluating the female models, each participant was given information about the study and signed an informed consent form. Physical, demographic, and personality measurements were then recorded for each participant. These measures included age, weight, height, waist and hip circumferences, and answers to sexual history and sexual attitude questions which included the sociosexual orientation inventory (Simpson and Gangestad 1991) and a self-rating of attractiveness (on a 0–9 scale). The Sociosexual Orientation Inventory (SOI) consists of seven items concerning both attitudes and behaviors. Higher SOI scores indicate a more unrestricted sociosexual orientation (i.e., short-term mating strategy).

Participants were seated at a perpendicular orientation to a 19-inch computer monitor. A C++ program displayed pictures of female models

(details below) for a duration of 20 seconds each, with a grey screen and center fixation point in between pictures. Participants were asked to give their ratings after the viewing period had ended, and progression to the next picture was controlled by the experimenter, after the rating was obtained. The images shown to the participants were a series of 10 photographs of different Caucasian women, each of which showed the women's unclothed body from the hips upwards (see Henss 2000 on the use of photographic stimuli rather than earlier research using line drawings of female models). The images were all of a standardized posture (standing upright, arms extending down the sides of the body), neutral expression, and perpendicular orientation to the camera. All of the models were college-age, within the healthy (normal) region in Body Mass Index, and their waist-to-hip ratios ranged from 0.66 to 0.81 (i.e., within normal variation, but extending in both directions beyond the most desirable range of 0.68–0.72). By these measures, therefore, these models were all generally attractive, with variations in WHR that were representative of the college population (i.e., two models with WHRs between 0.66 and 0.68, three models with WHRs between 0.68 and 0.72, and five models with WHRs between 0.73 and 0.81). The order of the image presentations was randomized for each participant.

The ratings were made in four blocks, with five of the randomly ordered images in each block. In the first block, the participants were asked to give a rating of attractiveness for a sexual relationship for one night (i.e., a "one-night stand") using a scale from 0 to 9 (0 being highly unattractive and 9 being highly attractive). In the second block, the remaining five randomly ordered images were shown, with instructions to rate the targets on attractiveness for a long-term romantic relationship using the same rating scale as in the previous stage. The third and fourth blocks showed the same pictures, in the same random orders as before, but with instructions to rate the first five models on approach likelihood for a one night stand on a scale from 0 to 9 (0 being highly unwilling to approach and 9 being highly willing to approach) and to rate the remaining five models for a long-term romantic relationship, again using the same rating scale. Approach likelihood was explained to each participant as a measurement of how willing they would be to approach the woman to determine whether or not she is interested in them (i.e., "chat her up"). The ANOVA and correlational analyses were conducted using the SPSS software.

RESULTS

When indicated, participants were categorized into the following groups for analyses, using SPSS:

1. Participant scores on the SOI were positively skewed, with a median of 78 (mean of 86.3) and standard deviation of 42.8. Categorizing participants using a median split produced 20 “restricted” orientation (i.e., sociosexuality scores below the median) and 20 “unrestricted” orientation (i.e., scores above the median) participants.

2. Body Mass Indices (BMI) of participants were calculated using their heights and weights. “Normal” (i.e., healthy) BMI range is 18.5–24.9, and all the participants were either within this range or above it (overweight). Accordingly, 25 participants were categorized as “normal” (BMI 18.5–24.9) and 15 as “overweight” (BMI > 24.9).

3. The normal WHR range for men is 0.85–0.95 (Singh 1993a), and 26 participants fell within this range. The remaining 14 participants had smaller WHR, and so participants were categorized as having “normal” or “low” WHR.

4. The average self-rating of attractiveness was 5.25, with 25 participants lower than this mean and 15 higher than the mean.

Patterns of Ratings across Female WHR

A 3×2 ANOVA was conducted, using the factors of target model WHR categories (greater than 0.72, 0.72–0.68, and less than 0.68) and rating type (attractiveness and approach likelihood). As expected, there was a significant main effect for the WHR of the models ($F_{2,78} = 24.79, p < 0.001, \eta^2 = 0.389$), with models in the 0.72–0.68 WHR range rated higher than models with either lower or higher WHR. There was no significant difference between the two types of ratings ($F_{1,39} = 1.29, p = 0.263, \eta^2 = 0.032$) and only a marginal interaction ($F_{2,78} = 2.81, p = 0.067, \eta^2 = 0.067$; Figure 1). There was a significant positive correlation between the ratings of attractiveness and approachability ($r = 0.55, p < 0.001, n = 400$).

Because of the random presentation of the models, not all participants encountered all possible combinations of model WHR and relationship type (short-term and long-term). The ratings from the 15 participants who did receive all combinations, however, were used to evaluate differences in attractiveness ratings across these factors. A 3×2 ANOVA found no significant interaction ($F_{2,28} = 1.89, p = 0.170, \eta^2 = 0.119$).

Patterns of Ratings across Male Variations in Sociosexuality

To evaluate the effects of sociosexual orientation on ratings, a $2 \times 2 \times 2$ ANOVA was conducted, using the factors of rating type (attractiveness and approach likelihood), relationship type (short-term and long-term), and sociosexual orientation (restricted and unrestricted). Although there was a slight trend towards female models being rated higher overall for short-term relationship contexts, as compared with long-term relationship

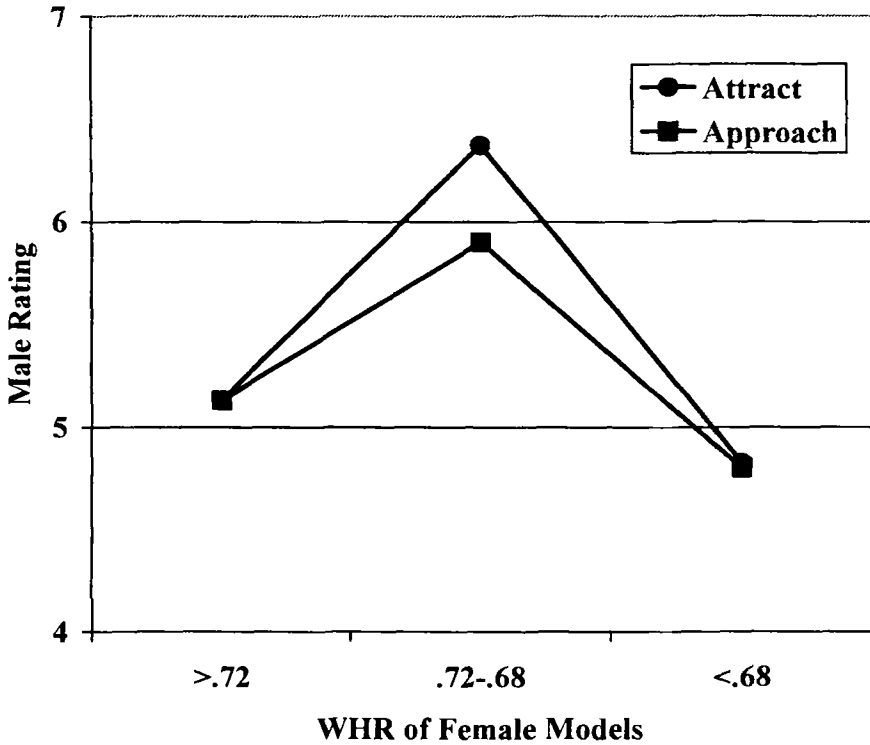


Figure 1. Average attractiveness and approach-likelihood ratings for female models plotted by WHR (>.72, .72–.68, and <.68).

contexts (i.e., more attractive and more willing to approach; $F_{1,38} = 3.01$, $p = 0.09$, $\eta^2 = 0.073$), there were no significant main effects or interactions. Although unrestricted males did provide higher approach-likelihood ratings than restricted males, it was a small difference and only in the short-term relationship condition. The effect of sociosexual orientation on ratings was also evaluated across the different WHR for female models (a $2 \times 2 \times 3$ ANOVA), and this analysis did find a significant three-way interaction (rating type \times female WHR \times sociosexuality: $F_{2,76} = 3.24$, $p = 0.045$, $\eta^2 = 0.079$; Figure 2). Whereas the ratings of males with an unrestricted sociosexual orientation were very similar across all conditions, restricted orientation males showed a drop in approach likelihood for just the most attractive females (WHR between 0.72 and 0.68).

Patterns of Ratings across Male Variations in Physical Attractiveness

A $2 \times 2 \times 2 \times 2$ ANOVA found no significant relationships among the factors of rating type (attractiveness and approach likelihood), relationship

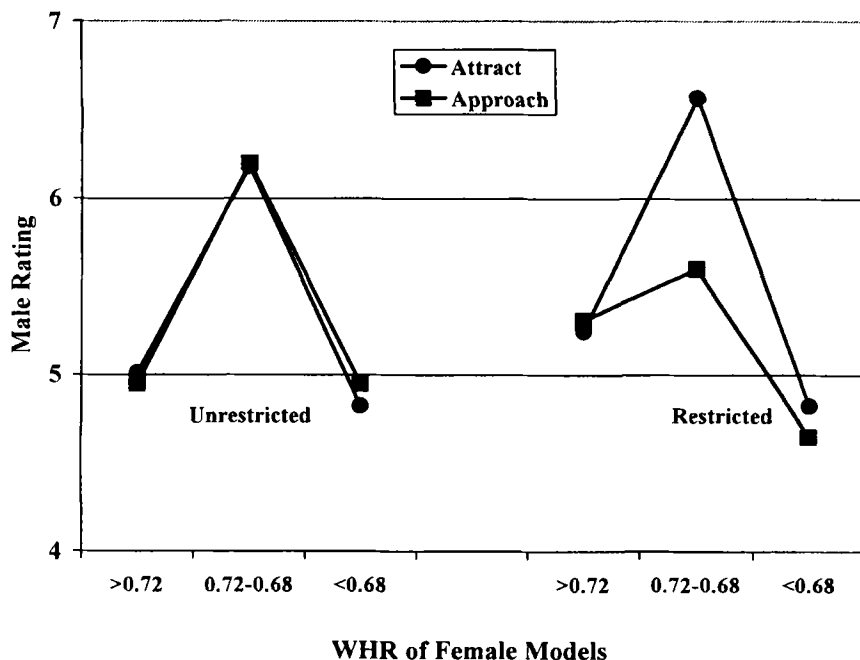


Figure 2. Plotting of average ratings showing an interaction among WHR of female models (>0.72, 0.72–0.68, and <0.68), type of ratings (attractiveness and approach likelihood), and sociosexual orientation of male raters (unrestricted and restricted).

type (short-term and long-term), and physical measures of male physical attractiveness (male BMI and male WHR). Nor did a $2 \times 2 \times 2$ ANOVA find a relationship among rating type, relationship type, and self-ratings of attractiveness. When these measures were evaluated in relation to different WHR for female models, however, there were significant interactions. Specifically, a $3 \times 2 \times 2 \times 2$ ANOVA found a significant interaction among female model WHR, male rater WHR, and male rater BMI ($F_{2,76} = 3.24$, $p = 0.045$, $\eta^2 = 0.079$) and among type of rating, female model WHR, and male rater WHR ($F_{2,76} = 3.24$, $p = 0.045$, $\eta^2 = 0.079$). The first of these interactions was due to males with low WHR and overweight BMI scores giving higher ratings to female models with waist-to-hip ratios of less than 0.68. This particular combination of male characteristics (low WHR and overweight), however, is relatively unusual in the general population and constituted just three participants in this study. Therefore this interaction should be interpreted with extreme caution. The second interaction was produced by two phenomena: Males with normal-range WHR tend to

give higher ratings overall, except when rating their likelihood of approaching a female model with a WHR greater than 0.72 or when rating the attractiveness of a female model with a WHR less than 0.68 (in which case their rating is actually lower; Figure 3).

A $3 \times 2 \times 2$ ANOVA also found a crossover interaction between male self-ratings of attractiveness and female model WHR ($F_{2,76} = 3.37, p = 0.039, \eta^2 = 0.082$). Males who rated themselves as low in desirability tended to rate high-WHR models (over 0.72) more favorably, whereas self-rated highly desirable males gave higher ratings to lower-WHR models (less than 0.72; Figure 4).

DISCUSSION

Female physical attractiveness ratings, using actual female models, were very strongly predicted by variations in waist-to-hip ratios. Specifically, female models in the 0.72–0.68 WHR range were rated as most attractive, as

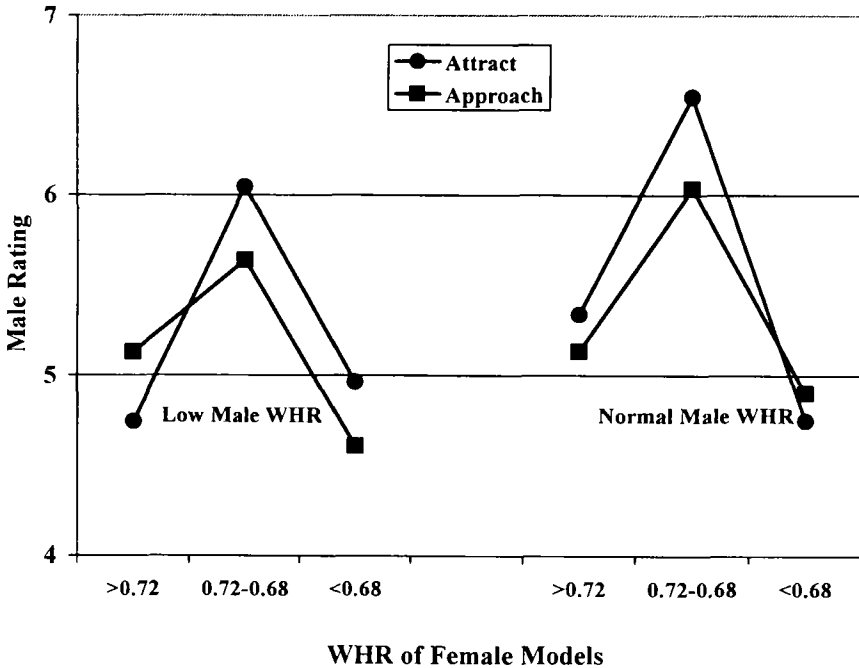


Figure 3. Plotting of average ratings showing an interaction among WHR of female models (>0.72, 0.72–0.68, and <0.68), type of ratings (attractiveness and approach likelihood), and WHR of male raters (low and normal).

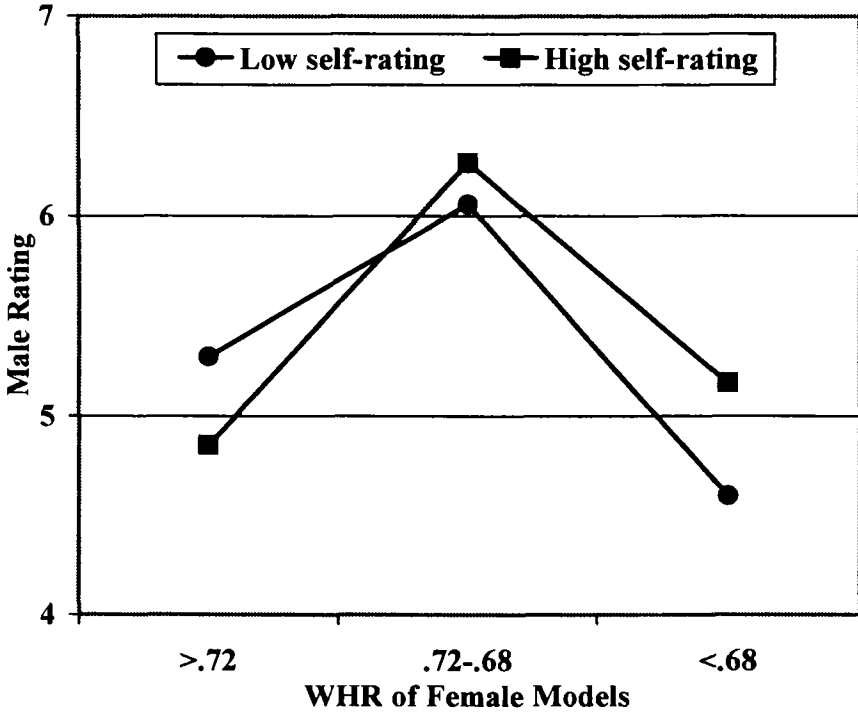


Figure 4. Plotting of average ratings showing an interaction between WHR of female models (>0.72, 0.72–0.68, and <0.68) and self-ratings of attractiveness by male raters (low and high).

well as most likely to be approached in order to solicit a relationship. Whereas these ratings by males with unrestricted sociosexual orientations were very similar (i.e., attractiveness ratings were the same as approach likelihood), sociosexually restricted males were much less likely to approach very attractive females (with WHR between 0.68 and 0.72). Sociosexual orientation, however, did not have any significant effects on either of these ratings in reference to a short-term relationship or a long-term relationship. There was only a slight (nonsignificant) tendency to give higher ratings in the short-term relationship context.

Measures of the physical quality and desirability of the male raters were found to influence ratings as well. Less-desirable males (below-typical WHR or self-rated as less desirable) tended to give lower ratings, and be somewhat less discriminating in their ratings. The prediction that more desirable males would provide higher ratings for higher-quality female models was only supported to some extent; normal WHR males gave generally higher ratings, but not for some evaluations of models outside the

0.72–0.68 WHR range. Males who self-rated themselves as higher in desirability also gave higher ratings to female models with WHR of 0.72 or lower.

CONCLUSIONS

The fact that changes in male sociosexuality had a differential effect on approach-likelihood ratings, but not on attractiveness ratings, indicates that these measures tap into slightly different constructs. As a distinct dimension, then, the general nature of approach-likelihood ratings is in need of further research and clarification. It does seem sensible that, as was found, the tendency for someone to take certain actions is related significantly to the characteristics of the actors involved. One should be likely to approach a person to offer a relationship only when there are expected net benefits (i.e., the potential benefits of acceptance, companionship, and reproduction outweigh the potential costs of time, effort, rejection, and poor choice). It appears that the models used in this study (college age women of reasonably high attractiveness) were generally all above a possible acceptability threshold at which we might have seen an abrupt drop in approach likelihood. Further research with a wider range of models for evaluation would be necessary to evaluate the full relationship between perceived attractiveness and approach likelihood.

This study found that there were not major differences in ratings that depended on the situational context being evaluated (i.e., short-term versus long-term relationship), but there does seem to be a consistent pattern to what little difference does exist: Ratings appear to be slightly more conservative when evaluating a prospective long-term relationship partner. More specifically, attractiveness ratings for a low (i.e., between 0.68 and 0.72) WHR were not higher for long-term relationship contexts, as Andrews et al. (2002) predicted if WHR is a cue just of reproductive value. This suggests that WHR is used either as a cue for nonpregnancy or as a more general overall cue of mate quality.

Finally, there was some evidence in the results to support the influence of male raters' own desirability on their ratings of female models. Males who had lower than normal WHR themselves, higher than normal BMI (i.e., were overweight), or rated themselves as lower in desirability tended to be less discriminating in some of their ratings. This lends some support to the idea that males may adopt differing sexual strategies in their pursuit, development, and maintenance of personal relationships. The present research used male participants typical of the general population, rating actual female models, and thus has good ecological validity. Further research, however, would benefit from the selection of participants (and

possibly stimuli) that focus on special populations (e.g., particularly attractive or unattractive raters and models). Further research could also incorporate more measures of mate quality, including personality, resources, and social status.

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