

## Women's body morphology and preferences for sexual partners' characteristics<sup>☆</sup>

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### Abstract

Mate preferences are condition dependent (i.e., females in better biological condition might be more demanding with respect to fitness-relevant male traits). Such traits usually indicate male biological quality or ability to secure resources that could be invested in offspring. Here we study female preferences for male resources, commitment, attractiveness, good sense of humor, and sensuality (when seeking both long-term and short-term partners) in relation to women's morphological traits such as height, weight, waist and hip girth, body mass index (BMI), and waist-to-hip ratio (WHR). We show that preferences for resources and attractiveness do indeed depend on women's phenotype. Women with relatively lower WHR and BMI more strongly prefer resources in a potential long-term partner than those with higher WHR and BMI. However, when controlling for age, place of residence, and whether they have had children, it is WHR (but not BMI) that influences female preference for resources and attractiveness. Women with higher WHR (those who, according to many studies, are considered as less attractive) are more prone to prefer physical attractiveness in a potential long-term partner. Furthermore, despite commitment having received the highest score in a long-term context, the preference for this trait in a potential partner was not related to women's body morphology. We suggest evolutionary and proximate explanations for such condition-dependent preferences.

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### 1. Introduction

Female and male preferences for a potential sexual partner differ in key criteria with strong evolutionary significance, which each sex uses when judging the quality of potential mates. Age, physical attractiveness, resources, commitment to relationship, or social skills seem to be important for mate choice (Bereczkei, Voros, Gal, & Bernath, 1997; Greenlees & McGrew, 1994; Waynforth & Dunbar, 1995; Wiederman, 1993). Women, however, pay

much attention to commitment and resources, while men are usually more focused on physical attractiveness (Baize & Schroeder, 1995; Buss, 1989; Li, Bailey, Kenrick, & Linsenmeier, 2002).

The priorities of desired traits in a potential partner may change in relation to the sexual strategy that can be pursued. For instance, when pursuing a short-term relationship (STR) strategy, in contrast to a long-term relationship (LTR), women may place more emphasis on physical attractiveness (Li & Kenrick, 2006). Furthermore, preferences may be dependent on a person's own characteristics, which would mean that they are condition dependent (Waynforth & Dunbar, 1995). Individuals with more desirable mating characteristics can impose higher demands (varying according to what they have to offer) on potential partners. Negotiation can then take place, aiming to "calibrate" one's own preferences in a way that allows the individual to find

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the best-quality partner (relative to one's own mate value) in a relatively short time. For instance, physically attractive and younger women are, on the average, more demanding in terms of potential partner quality than less attractive and older women (Waynforth & Dunbar, 1995). Such conditional preferences have been studied mainly with respect to age (Pawlowski & Dunbar, 1999), and both age and previous mating experience. Koziel and Pawlowski (2003) compared the preferences of people who were never married with the preferences of those who were divorced, and they found that age itself was a more important factor in influencing mate preferences than was experience of a previous marriage. Only a few studies have investigated differences in mate preferences in dependence on the physical characteristics of studied subjects. Jones et al. (2005) showed that women with a more attractive waist-to-hip ratio (WHR) expressed greater attraction to healthier-looking composite male faces, which suggests that they were more demanding than women with a less attractive WHR. Preferences for differences in body height between partners depend on a person's height (Pawlowski, 2003). In women, they may also depend on the sexual strategy that a woman pursues (long-term or short-term strategy) and on the phase of the menstrual cycle (Pawlowski & Jasienska, 2005).

Different condition-dependent preferences could have only evolved if females in better biological conditions were able to obtain better-quality males. Females with high mate value should be more demanding for traits in potential partners that, in given ecological conditions, assure better reproductive success (Barber, 1995). Women who rated themselves as more attractive (Little, Burt, Penton-Voak, & Perrett, 2001) or had lower (i.e., considered as more attractive) WHR (Penton-Voak et al., 2003) preferred more symmetric and masculine male faces. In western societies, female traits such as height (Nettle, 2002; Pawlowski & Koziel, 2002), body mass index (BMI) (Swami, Antonakopoulos, Tovée, & Furnham, 2006; Tovée, Maisey, Emery, & Cornelissen, 1999), percentage of body fat (Smith, Cornelissen, & Tovée, 2007), and WHR (Furnham, Moutafi, & Baguma, 2002; Henss, 2000; Singh, 1993; Singh & Young, 1995) were related to female attractiveness and/or her potential mate value. There is, however, ongoing debate as to which of these female traits is most important for assessing her mate value and which contributes the most to others' perception of her attractiveness (e.g., Furnham, Petrides, & Constantinides, 2005; Swami, Caprario, Tovee, & Furnham, 2006; Swami & Tovée, 2005; Tovée et al., 1999). Although the results of these studies indicate that BMI is more important than WHR for female body attractiveness as assessed by men and women, the perception of the attractiveness of this trait depends on culture and availability of resources (e.g., Furnham & Baguma, 1994; Nelson & Morrison, 2005).

Here we test whether the human female morphology described by her BMI and WHR is related to her preferences

when choosing a potential short-term or long-term partner. Preferences were established on the basis of prepared personal advertisements in which different traits were advertised. These traits were related to five dimensions of human mate choice decisions: resources possessed, commitment, attractiveness, sensuality, and sense of humor. Sense of humor as a component of social skills can be treated as a proxy for social skills (the importance of entertainment skills was highlighted by Miller, 1998 in his *Scheherazade effect*). We use here, therefore, the same evolutionary relevant categories as Pawlowski and Dunbar (2001), who also studied mate preferences using relatively short personal advertisements. Since women with more attractive physical characteristics should be more demanding for traits in potential partners that can increase their own reproductive success (e.g., resources possessed or attractiveness), we test here the following hypotheses:

**Hypothesis 1.** Women with lower values of BMI and WHR (i.e., considered more attractive) are more demanding with respect to resources in potential partners, both for LTRs and for STRs.

**Hypothesis 2.** More attractive women, compared to less attractive women, are more demanding with respect to the attractiveness of potential partners, both for LTRs and for STRs.

Furthermore, since male traits related to commitment are very important for female reproductive success, we also hypothesize that:

**Hypothesis 3.** Women should highly value commitment irrespective of their own physiques (without trading off for this trait), meaning that there should be no difference in the preference for this trait in dependence on the studied morphological traits of a woman. An alternative hypothesis suggests that less attractive women (those with higher BMI and/or WHR) should be more concerned about this trait because their chances of getting another partner are lower and the risk that their partner will abandon them for another woman is higher.

We also tested the relative contributions of WHR and BMI as determinants of women's condition-dependent preferences. A trait that is more important for assessing female attractiveness should be related to a higher level of female selectiveness.

## 2. Methods

The women who participated in this study were subjects in a larger project on lifestyle variation and reproductive function conducted in Poland from 2001 to 2003 (Jasienska, Ziolkiewicz, Ellison, Lipson, & Thune, 2004). Women were recruited for the study through advertisements posted on newspapers and television programs. Only women who met the following criteria could take part in the study: between 24 and 37 years of age (age-related variation in

steroid hormones is low for women in their peak reproductive years; i.e., between 25 and 35–37 years; Lipson & Ellison, 1992); with regular menstrual cycles and without fertility problems; not taking any hormonal medication or hormonal contraception; and neither pregnant nor lactating during the last 6 months before recruitment. All women were of the same ethnic origin (all were Polish citizens). Participants' body weight, body height, and waist and hip circumferences were measured by a professional anthropologist. WHR was calculated as the circumference of the waist divided by the circumference of the hip. The descriptive statistics for body measurements and two body morphology indices were as follows: height (mean=163.1 cm; S.D.=6.39; range, 147.3–182.7); weight (mean=61.6 kg; S.D.=10.16; range, 42.0–99.5); waist girth (mean=71.1 cm; S.D.=8.50; range, 58.0–103.6); hip girth (mean=97.9 cm; S.D.=7.11; range, 81.5–122.8); WHR (mean=0.725; S.D.=0.049; range, 0.64–0.88); and BMI (mean=23.18; S.D.=3.72; range, 17.2–38.0). According to Kolmogorov–Smirnov tests, all these variables do not deviate statistically from normal distribution.

The participants were given a two-page questionnaire. On each page, there were nine short personal advertisements, with an instruction to rank them from 1 to 9, where 1=*most attractive* and 9=*least attractive* (the one they would be least likely to respond to). One page referred to choosing a partner for an LTR, and the other page referred to choosing a partner for an STR. In order to avoid simple repetitions of preferences in long-term and short-term contexts, the order of the nine short advertisements was different in tests for long-term and short-term contexts. Neither the participants nor the investigators distributing the questionnaires were informed about the predictions of this study.

In the text of the advertisements, fitness-relevant male traits were grouped into five categories: resources (“resourceful”/“RES”; in four ads); attractiveness (“handsome”/“ATR”; in four ads); commitment (“affectionate”/“COM”; in four ads); good sense of humor (as a proxy of social skills/“HUM”; in three ads); and sensuality (“sensual”/“SEX”; in three ads). In each advertisement, there were only two categories (for instance, “resourceful and sensual” or “handsome and with good sense of humor”). In this way, we obtained the following combinations (both for long-term and short-term partners, but presented in a different order): RES+SEX, COM+SEX, RES+HUM, RES+COM, ATR+SEX, ATR+HUM, RES+ATR, COM+HUM, COM+ATR.

The participants were expected to rank these advertisements from 1 (*the first they would have chosen*) to 9 (*the least desirable*). The sum of the ranks for each woman for each category was calculated separately. Therefore, values ranged from 10 (when a woman chose the first four advertisements in which there was, e.g., RES, the total rank for this trait was: 1+2+3+4) to 30 (when such a trait was present only in the last four least desirable choices, the total

rank was 9+8+7+6) for RES, ATR, COM, and from 6 to 24 for HUM and SEX, which were present in only three advertisements, both for LTRs and STRs. Higher values meant a less desirable trait. To make the interpretation of the results easier, we transformed these variables into variables in which higher values meant higher preference (for RES, ATR, and COM, we subtracted the previously calculated value from 30; for HUM and SEX, we subtracted the previously calculated value from 24). The range of such obtained values was 0–20 for RES, ATR, and COM, and 0–18 for HUM and SEX (where higher values mean higher preference for a given trait).

Altogether, 148 women (mean age=29.9 years; S.D.=3.37) completed the questionnaire on preferences for a long-term partner. Four women did not complete the questionnaire on preferences for a short-term partner ( $N=144$ ; mean age=29.9 years; S.D.=3.38). There were 48 women who lived in rural areas (which are usually poorer than urban communities in Poland), and 100 were city dwellers. There was no difference in age between rural and urban women (29.75 vs. 29.96 years;  $t=-0.35$ ,  $df=146$ ,  $p=.7$ ), but rural women, on the average, were shorter (160.8 vs. 164.2 cm;  $t=-3.01$ ,  $p<.002$ ), were heavier (64.1 vs. 60.4 kg;  $t=2.06$ ,  $p<.05$ ), had higher BMI (24.8 vs. 22.4;  $t=3.79$ ,  $p<.001$ ), and had higher WHR (0.75 vs. 0.71;  $t=5.46$ ,  $p<.001$ ). Among women, 73 had at least one child, and 75 were childless. Mothers, on the average, were older (31.1 vs. 28.7 years;  $t=-4.67$ ,  $p<.0001$ ), were heavier (64.7 vs. 58.6 kg;  $t=-3.83$ ,  $p<.001$ ), had higher BMI (24.4 vs. 22.0;  $t=-4.24$ ,  $p<.001$ ), and had higher WHR (0.74 vs. 0.71;  $t=-5.03$ ,  $p<.001$ ). There was no difference in height (162.9 vs. 163.3 cm;  $t=0.42$ ,  $p=.68$ ).

Differences in preferences for the same trait (e.g., RES) between a choice for a long-term partner (LTR) and a choice for a short-term partner (STR) were determined by  $t$  test. On the next step, we calculated partial correlations between the categories of preferences and body measurements (height, weight, and waist and hip girths) and body shape indices (BMI and WHR) when controlling for age. The relationship between BMI and WHR, when controlled for each other and for preferences, was tested in multiple regression analyses separately for short-term and long-term choices. Due to the potential influence of age, place of residence, and parity on women's preferences and body shape, age and two dummy variables [residence (urban/rural) and having or not having a child] were added to the model. All analyses were run using SPSS software (version 8.0).

### 3. Results

The differences between LTR and STR appeared to be statistically significant for each category of preference (Table 1). The biggest difference in preference between long-term and short-term strategies was for commitment ( $t=16.56$ ,  $p<.001$ ). The most important trait for a long-term

Table 1  
Comparison between long-term and short-term preferences

	Long term [mean (S.D.)]	Short term [mean (S.D.)]	<i>t</i>	<i>p</i>
RES	6.5 (4.92)	9.9 (5.60)	-6.76	<.001
COM	15.8 (3.66)	7.9 (5.08)	16.56	<.001
ATR	9.3 (3.33)	12.6 (3.39)	-8.34	<.001
HUM	8.6 (3.21)	7.8 (3.77)	2.23	<.027
SEX	7.9 (3.23)	9.8 (3.53)	-5.94	<.001

Only those women who answered both long-term and short-term questionnaires ( $N=144$ ) were included.

partner was commitment (COM; the *t* values for differences between COM and any of the other four categories were between 13.8 and 18.5;  $p<.001$ ); for a short-term partner, it was attractiveness (ATR; the *t* values for differences between ATR and any of the other four categories were between 4.4 and 10.8;  $p<.001$ ).

We have also tested Spearman's correlations between five categories and found that preference for RES correlated negatively with preference for COM ( $\rho=-0.23$ ), ATR ( $\rho=-0.59$ ), HUM ( $\rho=-0.32$ ), and SEX ( $\rho=-0.29$ ); COM correlated negatively with ATR ( $\rho=-0.34$ ); and HUM correlated negatively with SEX ( $\rho=-0.43$ ) (in all cases,  $p<.005$ ) in a long-term context; RES correlated negatively with COM ( $\rho=-0.60$ ), ATR ( $\rho=-0.37$ ), and HUM ( $\rho=-0.23$ ); COM correlated negatively with ATR ( $\rho=-0.29$ ) and SEX ( $\rho=-0.19$ ); and HUM correlated negatively with SEX ( $\rho=-0.61$ ), but ATR correlated positively with SEX ( $\rho=0.18$ ) (in all cases,  $p<.05$ ) in a short-term context.

Partial correlations between the strength of preference and body measurements (height, weight, waist girth, and hip girth) and body morphology indices (BMI and WHR), when controlling for age, showed that, altogether, there are fewer statistically significant correlations for STR than for LTR (Table 2). Condition-dependent preferences are strongest for resources and attractiveness preferences. WHR and waist circumference were most frequently associated with women's preferences.

Table 3 shows all statistically significant or marginally significant results from multiple regression analyses. Because of differences in BMI and WHR between rural and urban women, we included place of residence in the analysis. For the same reason, we also included motherhood. All statistically significant effects were for LTR preferences (only the result for COM in the long-term context was not significant:  $R=.18$ ,  $p=.4$ ). Multiple *R* values indicate that models for RES and ATR explain more variance than models for good sense of humor or sensuality. There is no single conditional preference that depends on BMI (when controlling for other factors), and there are three conditional preferences (for resources in long-term and short-term contexts and for attractiveness in a long-term context) that are related to WHR. Allowing a nonlinear function with age (i.e., adding age squared to all

these analyses) neither improved the models nor changed the results.

Place of residence and having or not having a child, which we included in our models, appeared also to have a significant impact on some women's preferences. Women living in the city prefer resources more than village dwellers, while village dwellers show higher preferences for male attractiveness and good sense of humor than city dwellers. Women with children prefer more sensual partners in LTRs and resources in a short-term partner, and less sense of humor in the long-term context than childless women.

#### 4. Discussion

Our results confirmed only one part of Hypothesis 1—Women with lower WHR (i.e., with more attractive WHR) were more demanding for resources. BMI, another suggested indicator of attractiveness, had no relationship to women's preferences, when controlling for age, place of residence, and motherhood (Table 3). This indicates that female mate choices are related to their WHR, but not to their BMI. Women with lower WHR have higher levels of estradiol in their menstrual cycles (Jasienska et al., 2004), and estradiol levels are positively related to probability of conception (Lipson & Ellison, 1996). This would also explain why women with lower WHR had a higher probability of successful pregnancy (Zaadstra et al., 1993) or a higher success rate for in vitro fertilization involving embryo transfer (Wass, Waldenstrom, Rossner, & Hellberg, 1997). WHR then provides a reliable cue to fecundity and, therefore, to higher reproductive potential. In contrast to WHR, BMI does not show a linear relationship with ovarian function. While women with very low or very high BMI often have reduced levels of ovarian estradiol and progesterone (Furberg et al., 2005), and therefore a lower probability of pregnancy, there is no relationship between BMI and

Table 2  
Partial correlations between five categories and different morphological traits, when controlled for age

		Weight	WHR	Waist	BMI
Long-term choices ( $N=148$ )	RES	-.18 *	-.29 **	-.26 **	-.19 *
	COM	-.07	-.12	-.10	-.12
	ATR	.22 **	.35 **	.30 **	.24 **
	HUM	.12	.13	.15	.19 *
	SEX	.01	.08	.04	-.02
Short-term choices ( $N=144$ )	RES	-.10	-.17 *	-.20 *	-.14
	COM	.12	.14	.19 *	.14
	ATR	.04	.07	.05	.05
	HUM	-.18 *	-.10	-.14	-.14
	SEX	.14	.11	.14	.12

There was no conditional preference for height and hip size.

\*  $p<.05$ .

\*\*  $p<.01$ .

Table 3  
Results of multiple regressions

	<i>R</i>	Age		Residence (1–city)		Child (1–mothers)		BMI		WHR	
		$\beta$	<i>t</i>	$\beta$	<i>t</i>	$\beta$	<i>t</i>	$\beta$	<i>t</i>	$\beta$	<i>t</i>
RES	.41	.13	1.41	.26	3.1***	.12	1.36	–.02	–0.18	–.21	–2.04**
ATR	.43	–.13	–1.64	–.24	–2.8***	–.07	–0.76	.03	0.36	.25	2.46**
HUM	.30	.11	1.21	–.19	–2.09**	–.21	–2.15**	.19	1.87	.01	0.11
SEX	.28	–.23	–2.64***	.08	0.83	.26	2.66***	–.12	–1.2	.09	0.84
RES, short term	.27*	.04	0.45	–.06	–0.60	.20	2.11**	–.07	–0.71	–.23	–2.08**

The category of preference is the dependent variable; the independent variables are age, residence, parity, BMI, and WHR (only those categories of preferences for which the results were significant or marginally significant).

\*  $p = .051$  (marginally significant).

\*\*  $p < .05$ .

\*\*\*  $p < .01$ .

levels of ovarian steroids in women within a normal range of BMI (Ziomkiewicz, Ellison, Lipson, Thune, & Jasienska, in preparation).

Furthermore, our results suggest that Hypothesis 2—that women with lower WHR and BMI show a higher preference for male attractiveness—should be rejected. We found that, in fact, the opposite is true. Women with higher WHR expressed a higher preference for male attractiveness (there was no significant relationship with BMI). It can be hypothesized that women with higher WHR (i.e., less attractive ones) may more intensively “hunt for genes” related to attractiveness to increase their offspring’s chance to be more attractive and, therefore, to have a greater chance of reproductive success. Jones et al. (2005) and Penton-Voak et al. (2003) showed that more attractive women prefer more attractive male faces. Such conditional preference was expressed when the authors studied only differences in one dimension, namely, attractiveness. By contrast, in our results, attractiveness per se appeared to be less important than resources offered in terms of conditional preference. This might be related to the fact that, in our studies, traits such as attractiveness had to compete with other male characteristics. According to Li et al. (2002), when choosing a long-term partner, male resources are more important than male attractiveness. In our study, general attractiveness (“handsomeness”) competed with resources. This may explain why we observed a positive relationship between female body attractiveness and male resources, which are a necessity, and a negative relationship with male attractiveness. Only when other traits are equal in importance to resources or when other traits are not controlled in a study can positive conditionality for “luxury” traits (based on the terminology of Li et al., 2002) such as attractiveness become significant.

We confirmed Hypothesis 3—There is no conditionality or tradeoff between any of the tested women’s traits and preference for a man’s commitment in the long-term context. The mean score for commitment was much higher than for any other trait included in the

study. The lack of any conditional preferences for commitment (at least as far as female body morphology is concerned) and a very high preference for this trait seem to confirm the evolutionary importance of this male trait for women.

In the short-term context, we found only a few correlations between women’s preferences and their morphology (Table 2). This indicates that preferences for short-term partners are condition dependent to a lesser extent than preferences for long-term partners. Our results, however, confirmed that male attractiveness is most important in the short-term context (Table 1). This trait is generally treated as a cue of good genes; when pursuing a short-term strategy (i.e., not expecting paternal investment as they would from a long-term partner), women usually pay more attention to signs of good genes (i.e., attractiveness) (Buunk, Dijkstra, Fetchenhauer, & Kenrick, 2002; Li & Kenrick, 2006). In general, significant differences between women’s preferences in the long-term and short-term contexts for all studied traits provide additional evidence of differences between those two sexual strategies pursued by women.

City dwellers’ higher preference for resources probably reflects ecological aspects such as higher competitiveness and higher costs of living in big cities than in villages.

In conclusion, our study indicates that women’s preferences for male resources and attractiveness are dependent on their body shape. WHR, rather than BMI, shows a relationship with women’s selectiveness for the resources of their potential partners. As expected, commitment in an LTR is so important for women that we found the preference for this male trait to be independent of women’s body shape. Although we observed WHR-conditional preferences for attractiveness in a potential long-term partner in a direction opposite to what we expected, we suggest that this result can be explained on both ultimate and proximate levels of causation. This study was conducted, however, on a single sample of Polish women, and further studies are necessary to determine whether this kind of condition dependence is universal.

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