Attractiveness of the female body: Preference for the average or the supernormal?

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The main purpose of the present study was to contrast the two hypotheses of female body attractiveness. The first is the "preference-for-the average" hypothesis: the most attractive female body is the one that represents the average body proportions for a given population. The second is the "preference-for-the supernormal" hypothesis: according to the so-called "peak shift effect", the most attractive female body is more feminine than the average. We investigated the preference for three female body characteristics: waist to hip ratio (WHR), buttocks and breasts. There were 456 participants of both genders. Using a program for computer animation (DAZ 3D) three sets of stimuli were generated (WHR, buttocks and breasts). Each set included six stimuli ranked from the lowest to the highest femininity level. Participants were asked to choose the stimulus within each set which they found most attractive (task 1) and average (task 2). One group of participants judged the body parts that were presented in the global context (whole body), while the other group judged the stimuli in the local context (isolated body parts only). Analyses have shown that the most attractive WHR, buttocks and breasts are more feminine (meaning smaller for WHR and larger for breasts and buttocks) than average ones, for both genders and in both presentation contexts. The effect of gender was obtained only for the most attractive breasts: males prefer larger breasts than females. Finally, most attractive and average WHR and breasts were less feminine in the local than in the global context. These results support the preference-for-the supernormal hypothesis: all analyses have shown that both male and female participants preferred female body parts which are more feminine than those judged average.

Keywords: female body, WHR, buttocks, breasts, attractiveness, average, supernormal, gender, local, global

Highlights:

- Attractiveness of female waist-to-hip ratio, buttocks and breasts was investigated.
- The most attractive body characteristics are more feminine than average ones.
- No gender differences in preference were obtained.

Women and men are sexually dimorphic both in the total amount and the specific distribution of body fat, muscles and bones (Wells, 2007). For instance, women have about twice the amount of body fat as men, which is particularly accumulated in the gluteofemoral region (hips, buttocks and thighs) and breasts (Clarys, Martin, & Drinkwater, 1984). This body fat distribution is one of the most salient secondary female sexual characteristics. It has an important role in maintaining female sexual and reproductive functions (regular menstrual-ovulatory cycles, fertility, fecundity etc.) and is associated with women's general health (Grammer, Fink, Møller, & Thornhill, 2003; Lassek & Gaulin, 2006, 2008; Singh, 2002; Weeden & Sabini, 2005). Evolutionary psychologists suggest that sexual selection has shaped men's sensitivity and preference for these physical characteristics as honest *signals* of female genetic value, health, fertility and fecundity (Barber, 1994; Buss, 2003; Gangestad & Scheyd, 2005; Gangestad & Thornhill, 2008; Grammer et al., 2003; Singh, 2002).

Some physical factors of bodily attractiveness ratings are not gender specific. For instance, the Body mass index (BMI) and the leg length are important factors of both female and male attractiveness: attractiveness increases with the decrease of BMI (Cornelissen, Toveé, & Bateson, 2009; Grillot, Simmons, Lukaszewski, & Roney, 2014; Swami & Tovée, 2005) and with increase of leg length (Brooks, Shelly, Jordan, & Dixon, 2015; Sorokowski & Pawlowski, 2008). Having that in mind, in this paper we focus on the preference of directly observable structural characteristics of the female body, which were mentioned in literature as particularly important for the men's judgment of female physical attractiveness. More specifically, we focus on the three proven indicators of femininity: waist-to-hip ratio (relationship between circumferences of waist and hip), buttocks size and breast size.

Waist-to-hip ratio (WHR)

Studies have indicated that female waist-to-hip ratio, or WHR, is inversely related to various objective parameters: smaller WHR (i.e. more hourglass-like body figure) indicates higher levels of sex hormones such as estradiol and its precursor testosterone (DeRidder et al., 1990; Mondragón-Ceballos, García Granados, Cerda-Molina, Chavira-Ramírez, & Hernández-López, 2015), smaller health risk (Björntorp, 1991; Folsom et al., 1993; Misra & Vikram, 2003), and a greater availability of fat resources needed for successful fetal brain development (Lassek & Gaulin, 2006, 2008). Even though WHR is being used as a unique measure, the waist and hip are associated with different aspects of female health. Hip size is associated with the size of the female pelvis (i.e. reproductive canal) and the amount of fat resources, which might be used during food shortage (Cant, 1981; Huss-Ashmore, 1980). On the other hand, waist size is associated with the general health status (Björntorp, 1991; Misra & Vikram, 2003) and sex hormone levels: smaller waist width is associated with higher levels of estrogen and progesterone (Jasienska, Ziomkiewicz, Ellison, Lipson, & Thune, 2004), and is even singled out as a favored phenotypic trait in the artificial process of selection in digital ecosystems (Brooks et al., 2015).

According to the evolutionary perspective, men evolved preferences for females with low WHRs, because it is a signal of the women's genetic quality (Singh, 1993). This hypothesis has inspired a number of studies which indicated that men find images of women with lower values of WHRs, ranging from 0.6 to 0.8 most attractive (Dixson, Grimshaw, Linklater, & Dixson, 2010; Dixson, Dixson, Li, & Anderson, 2007; Furnham, Tan, & McManus, 1997; Henss, 1995, 2000; Karreemans, Frankenhuis, & Arons 2010; Marlowe & Wetsman, 2001; Rozmus-Wrzesinska & Pawlowski, 2005; Singh, 1993; Singh & Luis, 1995; Singh & Randall 2007; Singh & Young, 1995; Streeter & McBurney, 2003; Tassinary & Hansen, 1998; Wetsman & Marlowe, 1999). Furthermore, there seems to be a cross-cultural consensus regarding these preferences (Singh, Dixson, Jessop, Morgan, & Dixson, 2010; Singh, 2002).

Buttocks size

From the evolutionary perspective, buttocks and the other parts of the gluteofemoral region play an important role as a fat storage which could serve as an additional source of energy in the case of limited food recources (Cant, 1981; Huss-Ashmore, 1980). Studies have shown that gluteofemoral deposits indicate the metabolic health of women (Manolopoulos, Karpe, & Frayn, 2010). More interestingly, some studies found that the amount of gluteofemoral fat in mothers is a good predictor of children's cognitive development (Lassek & Gaulin, 2006, 2008).

Investigating individual differences in the male preference between breasts and buttocks, Dagnino, Navajas and Sigman (2012) found bimodal distribution of preference, albeit skewed towards buttocks as contributors to their choice. Some studies revealed cultural and ethnic differences in the preference for large buttocks. These studies have shown that Brazilians prefer larger buttocks than Czechs (Valentova, Bártová, Štěrbová, & Varella, 2017), and that African-American males preferred females with larger buttocks than Caucasians (Cunningham, Roberts, Barbee, Druen, & Wu, 1995; Thompson, Sargent, & Kemper, 1996). Similarly, in comparison with American males, Hadza men (Tanzanian hunter–gatherers) preferred female profiles with more protruding buttocks (Marlowe, 2004; Marlowe, Apicella, & Reed, 2005). A recent study suggested that the lumbar curvature is an even better attractiveness predictor than the buttocks size (Lewis, Russell, Al-Shawaf, & Buss, 2015).

Breast size

Jasienska and associates (Jasienska, Ziomkiewicz, Ellison, Lipson, & Thune, 2004) found that breast size is related to levels of estrogen and progesterone (hormones which regulate and aid conception, Lipson & Ellison, 1996): the larger the breasts, the higher the level of estrogen and progesterone. Evolutionary oriented authors suggest that large breasts are adaptive for breast-feeding babies because they serve as milk and fat storage reservoirs (Anderson, 1988; Low, Alexander, & Noonan, 1987). For some authors, this adaptive function is more psychological (emotional): larger breasts provide a

comfort soft 'cushion' for the baby and help establish and maintain the affective attachment between the infant and its mother (Smith, 1986). However, some studies questioned the importance of prominent breasts for the lactation and feeding of babies (no significant correlation between breast size and the ability to lactate was found, Anderson, 1988; Pond, 1998). According to an alternative evolutionary approach, large breasts have evolved by the pressure of sexual selection: men preferred large breasts, because they were signals of female sexual maturity (Marlowe, 1998).

By studying eye-movement patterns, it has been previously shown that observers tend to focus primarily on the central and upper abdomen and chest when judging attractiveness (Cornelissen, Hancock, Kiviniemi, George, & Tovée, 2009), more specifically, breasts received longer fixations (Dixson, Grimshaw, Linklater, & Dixson, 2011). However, studies which focused on the male choice of female breast size revealed different, even contradictory results. Some studies have found that sexual attractiveness increases with breast size, with no significant differences between large and medium-sized breasts, and no significant gender differences (Dixson, Duncan, & Dixson, 2015), some indicated that men rated larger breasts as most attractive (Singh & Young, 1995; Zelazniewicz & Pawlowski, 2011). On the contrary, it has also been shown that men seem to prefer smaller breasts (Furnham, Swami, & Shah, 2006), whereas some studies indicated that medium sized breasts are preferred (Wiggins, Wiggins, & Conger, 1968).

Preference for the average or preference for the supernormal?

Previous studies and theories suggest that average female body proportions and sizes are preferred because they represent evolutionary 'victorious' morphological solutions: for instance, preference for the average WHR about 0.7 in females is associated with an objectively higher level of fertility, fecundity, and the capacity to sustain pregnancy (Furnham et al., 1997; Henss, 1995; Singh, 1993). Also, preference for the average was found in other categories of objects, such as faces (Langlois & Roggman, 1990) and animals (Halberstadt & Rhodes, 2000; Halberstadt & Rhodes, 2003). In other words, in average bodily (and also facial) forms, all local deformations, asymmetries, 'strange' variations and other morphological signs of unhealthy and dangerous processes are annihilated. In addition to their biological advantages, average body forms could have some advantages from the perspective of perceptual/cognitive economy (Koffka, 1935; Marković & Gvozdenović, 2001) and processing fluency (Reber, Schwarz, & Winkielman, 2004; Winkielman & Cacioppo, 2001). According to this 'economy approach', average forms are informationally simpler (more familiar, less uncertain) and consequently processed more easily) than informationally complex (unusual and idiosyncratic) forms. The fluent processing spontaneously results in a positive affect, which is attributed to the processed stimulus (fluently

processed = aesthetically preferred, Reber, Schwarz, & Winkielman, 2004; Reber, Winkielman, & Schwarz, 1998; Winkielman & Cacioppo, 2001).

Some authors criticized the idea that averageness is preferred. For instance, Alley and Cunningham (1991) found that most appealing faces are not the average ones (e.g. faces of top models). It appears that some biologically important (essential) features are more prominent in most attractive faces and bodies than in average faces and bodies. This could be an amplification of signs of youth, health and fertility, such as big eyes, small nose, thick red lips in a female face, and smaller WHR (more 'hourglass' proportion), larger breasts and buttocks in a female body. The female body with amplified essential trigger features, the so-called supernormal stimulus, attracts more attention and produces more appetitive behavior than the average (normal) body. This principle, known as the *peak shift effect* was discovered in discriminative learning, where animals prefer objects with amplified trigger features (Tinbergen, 1954; see also Staddon, 1975) but it was also found in the field of pictorial representation, such as the caricature of faces and bodies (Ramachandran & Hirstein, 1999). According to Ramachandran and Hirstein (1999), the function of artistic amplification of feminine characteristics of the female body is to subtract masculinity from femininity. The ultimate effect of this amplification is a higher limbic activation and, correspondingly, stronger attraction.

Attractiveness - Averageness

The primary purpose of our study was to contrast and evaluate two hypotheses referring to the effect of stimulus constraints on female body attractiveness. (1) The 'preference-for-the average' hypothesis supposes that the most attractive female body is the one with the average size of body parts. This hypothesis is based on evolutionary theories of physical attractiveness: average body proportions and the average size of body parts should be preferred because they represent evolutionary optimal morphological solutions for the functions of mating and reproduction (Furnham et al., 1997; Henss, 1995; Singh, 1993). (2) The alternative is the 'preference-for-supernormal' hypothesis which predicts that, according to the so-called *peak shift effect*, the most attractive is a female body with somewhat amplified or supernormal feminine size of body parts (Ramachandran & Hirstein, 1999).

In order to evaluate the above-mentioned hypotheses we investigated the differences between the preferred and average size of three female body parts and proportions: WHR, buttocks and breasts. However, we were not able to obtain objective data on the average sizes of body parts, because representative anthropometric data for Serbian females were not available. Instead, we collected only the WHR from smaller group of 79 female participants (students from the University of Belgrade, mean age 19,7 years). The average WHR of .74 was very similar to those obtained in previous studies (see the WHR section

for references). An additional problem with the specification of average bodily sizes comes from the 'globalization' of visual experience. Namely, modern communication technologies (TV, internet, etc) and the high mobility of contemporary men and women expanded the visual reality from the immediate social environment to the realm of more or less idealized representations of the human body (in fact, both realities are visualy real and effective). Attempting to overcome the problems with objective anthropometrical measures, we found a less objective, but relatively satisfying solution – a participants' subjective judgment of average body parts size. An indirect support for this solution comes from the study which revealed relatively high correlations between objective and self-reported measures of waist, hip and WHR in men and women (between .44 and .83, see Spencer, Roddam, & Key, 2004). The subjective judgment of average sizes served as an anchor and, compared to this anchor, a larger or smaller size of a body part was specified as more or less feminine. The 'preference-for-the average' hypothesis predicts no difference between the preferred and anchor (average) size, whereas, the 'preference-for the supernormal' predicts that the preferred sizes should be more feminine than the anchor (judged average).

Males - Females

Both above mentioned hypotheses assume that the attractiveness of the female body is associated with men's sexual behavior: men prefer female bodily characteristics which carry crucial information about the women's sexual maturity, fertility, fecundity and the like. The main difference between the two hypotheses is in the supposed degree of 'redundancy' of sexually relevant information: the 'preference-for-the average' hypothesis supposes that men prefer the average (typical) female body, whereas the 'preference-for-the supernormal' hypothesis supposes that female bodies with prominent (supernormal) feminine characteristics are sexually more attractive to men.

However, if men's preference for the female body is sexually motivated, the question is what is the basis for the women's preference for the female body. The mate selection theory can be taken as a theoretical frame for a comprehensive answer to this question (Buss, 1992). This theory postulates that both genders use the same criteria in both other and same gender preference: other-gender preference is based on judgments of sexual attractiveness, whereas same-gender preference is based on the identification with possible other-gender's mates. In other words, women are able to judge their own attractiveness and their own position relative to other female competitors in order to adjust their sexual behavior to the estimated mating chance. Some studies show no gender differences in ratings of female body attractiveness, which is consistent with the mate selection theory (Tovee & Corenlissen, 2001), while some studies indicated that men and women are not so successful in judgments of what other males and females find attractive (Cohn & Adler, 1992; Fallon & Rozin, 1985).

One of the purposes of the present study was to investigate the gender differences in the preference for the female body. According to the mate

selection theory (Buss, 1992) we expected that both genders should judge the attractiveness similarly: men and women should prefer the female body parts of the same size (i.e. same femininity level).

Global - Local presentation contexts

In the present study female body characteristics were presented in either a global or a local context. In the global context body parts were presented integrally with the rest of the body (the whole body was visible), whereas in the local context only the target body parts were presented. These two contexts have complementary advantages and shortcomings. Global representation of the whole body is ecologically more valid, but various interactions within this complex Gestalt (i.e. specific relationships between different body parts) could modify the experience of a single body part. Some studies have shown that different female body parts are not equally important for different men; for instance, Wiggins et al. (1968) and more recently Dagnino et al. (2012) specified at least two groups of men – those who prefer breasts and those who prefer buttocks. This difference could be confounding when participants rate the attractiveness of one body part while the other (more or less attractive) is simultaneously present. An additional problem comes from the different status of various body parts in the whole body observation. For instance, an eye tracking study revealed that the lower body areas (e.g. pubic region) received more first fixations, but the breasts were looked at more often and for longer periods of time (Dixson et al., 2011).

All mentioned contextual and confounding information is considerably reduced in the local context. However, isolated presentation of body parts could be problematic because it is less natural, less ordinary and it has lower ecological validity. In addition, the judgment of isolated body parts could be affected by the lack of the reference frame (e.g. the judgment of how breasts are large without regard to the whole body size). By including both contexts, we attempted to balance and contrast potentially opposite effects of the global and local presentation of stimuli.

Purposes of the study: Summary

To summarize, in the present study we intended to test two hypotheses of female body attractiveness. The "preference-for-the average" hypothesis predicts that the female body with average body proportions should be judged as the most attractive. On the other hand, the "preference-for-the supernormal" hypothesis predicts that the most attractive female body should be more feminine than the average one, or, more precisely, it should have smaller WHR, larger breasts and larger buttocks than average. We focused on the attractiveness of only three proportions and body parts, that is, WHR, buttocks and breasts, since they are the most prominent and distinctive feminine characteristics (please, see the introductory sections). However, we do have in mind that the attractiveness of the female body depends on many other gender non-specific characteristics as well (e.g. leg length, skin tone, etc.).

In order to test the two hypotheses we compared the participants' representations of the average and the most attractive size of given body parts. With that in mind, we asked participants to choose the average and the most attractive body parts from the given sets of stimuli. The body parts within the sets were ranged from the less feminine to more feminine sizes.

Finally, in order to investigate the relative generality of the attractiveness judgments, we investigated the effects of two additional factors: the context of stimuli presentation (global context, i.e. whole body visible and local context, i.e. only targeted body part visible) and the participants' gender (males and females). The main question here was whether the average-supernormal dominance is a stable phenomenon independent of both stimulus presentation context and participants' characteristics (gender).

Method

Participants

Two groups of undergraduate and graduate students from the Department of Psychology, University of Belgrade, participated in the experiment. Group 1 (the global context) consisted of 225 participants (105 males, mean age 20.86 and 120 females, mean age 20.18), and Group 2 (the local context) consisted of 231 participants (115 males, mean age 22.7 and 116 females, mean age 21.8).

Stimuli

In the previous studies different categories of stimuli were used, such as drawings (Dagnino et al., 2012; Furnham 1997; Henss, 1995; Singh, 1993), silhouettes (Sorokowski & Sorokowska, 2012; Tovee & Corenlissen, 2001) and naturalistic photographs (Dixson et al., 2011; George, Swami, Cornelissen, & Tovee, 2008; Henss, 2000; Puhl & Boland, 2001; Rozmus-Wrzesinska & Pawlowski, 2005; Thornhill & Grammer 1999). In most of the studies figures were dressed in swimsuits (Henss, 2000; Puhl & Boland, 2001; Singh, 1993; Tovee & Corenlissen, 2001), but some studies used the color pictures of nude females (e.g. Dixson et al., 2011). We found that these categories of stimuli contain various external (non-bodily) factors, which could influence the attractiveness ratings. For instance, swimsuit design can modify the prominence of some bodily characteristics, nudity can stress the sexual aspect of the female body (visible nipples, pubic hair etc.), two-dimensional images (drawings and silhouettes) may look too simple and unnatural, photographs can attract the attention to irrelevant details, etc. In order to overcome, control or eliminate most of the mentioned non-bodily factors we used a program for computer animation *DAZ Studio 4.6 Pro* for generating the stimuli.

A female figure called Victoria 4 (one of the morphs created by *DAZ Productions*) was used as the basic stimulus (see Figure 1). The figure was made with the intention of creating the impression of a relatively natural three-dimensional body (voluminosity was induced by shading). For the sake of eliminating the possible effects of clothes, the figure was not dressed. On the other hand, to reduce the sexual connotations of the nude body, the figure was designed to look like a well-articulated mannequin with the gray color of 'skin' and without prominent sexual features such as nipples and pubic hair. In addition, the figure was generated without other irrelevant details (e.g. hair, color of eyes, etc.).

Only a few studies of body attractiveness used programs for computer manipulation and animation (Bertamini, Byrne, & Bennett, 2013; Fan, Liu, Wu, & Dai, 2004). In many previous studies photographs were processed by photo editing software (George et al., 2008; Henss, 2000; Puhl & Boland, 2001; Thornhill & Grammer 1999; Tovee & Corenlissen, 2001; Tovee, Reinhardt, Emery, & Cornelissen, 1998), but some of these manipulations resulted in an unnatural apperance of figures. However, if one uses photographs of real women which, for instance, have different breast size, then the other problem occurs. Namely, it is very difficult (if not impossible) to vary only one body part (e.g. breasts size) and to keep everything else constant. Computer programs for animation, such as DAZ 3D Studio, overcome all of the mentioned problems and allow a very precise manipulation and systematic variation of different bodily characteristics.

Global context stimuli

Using DAZ 3D Studio, three sets of stimuli were generated: female figures varied in (1) waist-hip ratio (WHR), (2) buttocks size and (3) breasts size. Originally, we specified 10 stimuli for each set. Stimuli were ranked by size of a given body part from minimum to maximum, and the difference between neighboring sizes was equal. However, in preliminary tests we realized that extreme sizes (too small and too large) appear very unusual and that none of preliminary test participants chose those sizes as either average or most attractive. Having that in mind we removed four extreme sizes (the two smallest and the two largest), so the set size was reduced to six stimuli. The figures with different WHRs were generated by simultaneous tuning of the two measures, waist and hip. Six WHRs were specified: .60, .63, .66, .69, .72 and .75. The range of WHRs was specified so to cover both the average and the supernormal WHR: the extreme value of .60 is closer to the hypothetical supernormal WHR, while the other extreme value of .75 is closer to the average WHR (for average measures of WHR see Dijkstra & Buunk, 2001; Hughes & Gallup, 2003; Singh, 1993). In other words, this range was generated to avoid bias to either the average or the supernormal WHR. Figures were presented in frontal, profile and back views (see Appendices A, B and C). The stimulus display size was 23 cm (21 deg) horizontally and 18 cm (17 deg) vertically.

Local context stimuli

Stimuli were generated by using the same method as described above, but only the cropped body parts were shown (see Appendices D, E and F). The stimulus display size was 23 cm (21 deg) horizontally and 12 cm (11 deg) vertically for WHR (Appendix D), 23 cm (21 deg) horizontally and 15 cm (14 deg) vertically for buttocks (Appendix E) and 23 cm (21 deg) horizontally and 15 cm (14 deg) vertically for breasts (Appendix F).

Procedure

There were two groups of participants in either global or local context. Participants were presented with three sets of six stimuli. They were asked to choose the body part size they found the most attractive and average, by clicking on the button below the stimulus. They performed the tasks in two subsequent sessions. Approximately half of participants performed the attractiveness task first, and then the 'averageness task' (110 participants from the Group 1, global context; 115 participants from the Group 2, local context). The other half of participants performed the tasks in a reverse order: first the 'averageness task' and then the "attractiveness task" (115 participants from the Group 1, global context; 116 participants from the Group 2, local context). Stimuli were presented in the same order in all sessions: WHR, buttocks and breasts, respectively. Research was conducted via Qualtrics, the online survey software (www.qualtrics.com). An example of the stimulus set which was presented to participants is shown in Figure 1.
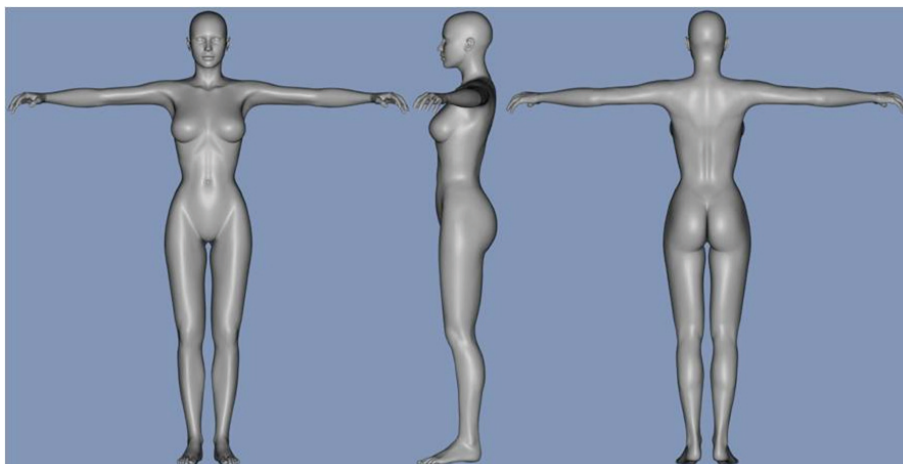
Figure 1. Basic model of female body presented in frontal, profile and back views

Design

The experiment consisted of a 2 (observer gender: males and females) × 2 (context: global and local) × 2 (task: attractiveness and averageness) design with repeated measures on the factor task. The same design was applied for the three sets of stimuli (WHR, buttocks and breasts).

Dependent variables were specified as WHR sizes or as recoded DAZ 3D measures of buttocks and breasts. Original DAZ 3D measures were transformed into values from 1 to 6 (interval was 1).

Results

A three-way analysis of variance was performed. The main effects of the three factors were tested: *task* (within-subjects factor: attractiveness and averageness), *gender* (between-subjects factor: male and female) and *context* (between-subjects factor: global and local).

WHR

Means of the most attractive and average WHRs in the global and local context for male and female participants are shown in Figure 2. The main effect of task was obtained, $F(1, 452) = 189.50$, $p < .01$, $\eta_p^2 = .295$, indicating that the attractive WHR is smaller (more feminine) than the average one. The main effect of context was significant, $F(1, 452) = 165.43$, $p < .01$, $\eta_p^2 = .268$, indicating that WHR is smaller (more feminine) in the global than in the local context. The main effect of gender and interactions were not obtained.
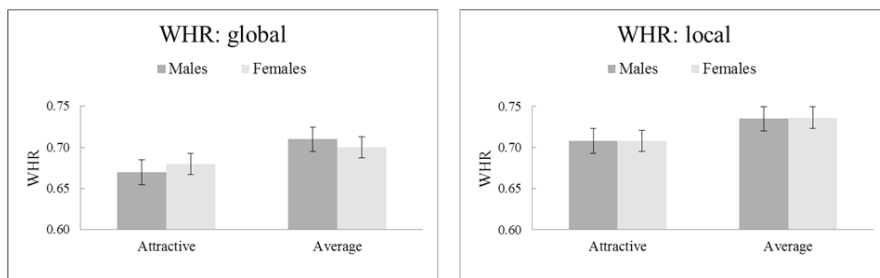
Figure 2. Most attractive and average WHRs for males and females in global and local conditions

Buttocks

Means of the most attractive and average buttocks size in the global and local context for male and female participants are shown in in Figure 3. The main effect of task was significant, $F (1, 452) = 99.18$, $p < .01$, $\eta_p^2 = .250$, indicating that the attractive buttocks are larger than the average ones. No main effects of gender and context were significant. No interactions were obtained.
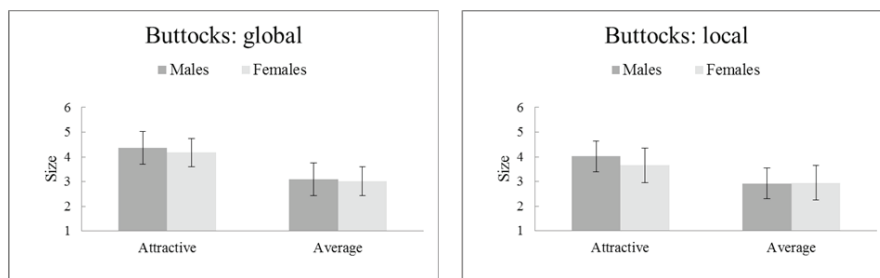

Figure 3. Most attractive and average buttocks sizes for males and females in global and local conditions

Breasts

Means of the most attractive and average breasts size in the global and local context for male and female participants are shown in in Figure 4. The main effect of gender was significant, $F (1, 452) = 22.24$, $p < .01$, $\eta_p^2 = .049$, Post hoc tests (Scheffé) indicated that males chose significantly larger breasts than females in both contexts. No gender differences in the choice of average breast size were obtained. The main effect of context was significant, $F (1, 452) = 56.54$, $p < .01$, $\eta_p^2 = .115$, indicating that the chosen breast size was larger in the global than in the local context. The main effect of task was significant, $F (1, 452) = 277.94$, $p < .01$, $\eta_p^2 = .390$, indicating that the most attractive breasts

are larger than the average ones. The interaction gender × task was significant, $F(1, 452) = 25.34$, $p < .01$, $\eta_p^2 = .055$. Post hoc tests (Scheffé) have shown that, compared to females, males chose larger breasts as the most attractive in both contexts, while this gender difference was not obtained in the choice of the average breast size. Other interactions were not significant.
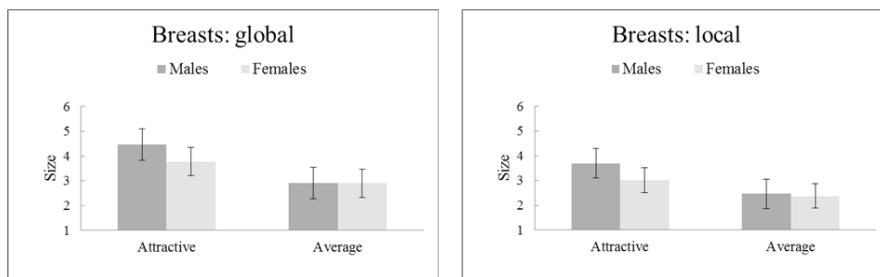

Figure 4. Most attractive and average breast sizes for males and females in global and local conditions

Discussion

Preference for average - supernormal

The main intent of this study was to evaluate two contrasting evolutionary hypotheses on female body attractiveness. The 'preference-for-the average' hypothesis assumed that the average size of female body parts should be most attractive, because they represent the optimal morphological solution associated with female health and the reproductive function (Furnham et al., 1997; Henss, 1995; Singh, 1993). On the other hand, the 'preference-for-the-supernormal' hypothesis supposed that the female body with the more prominent feminine characteristics should be more attractive than the average one, because, according to the *peak shift effect*, appetitive behavior intensifies when essential trigger features are amplified or supernormal (Ramachandran & Hirstein, 1999). Our results are consistently in line with the 'preference-for-the supernormal' hypothesis. For both genders and in both presentation contexts (global and local) the most attractive sizes of female body parts were more feminine (supernormal) than those judged as average. The intensity of this supernormality was established on account of the relative differences between average and most attractive sizes. The most attractive WHR is about one standard deviation smaller than the average WHR, and the most attractive breasts and buttocks are approximately one standard deviation larger than the judged average ones. These findings suggest that the obtained supernormality is rather 'normal' than extreme. For instance, if we measure frontal proportions of two extremely supernatural female figures, such as the sculpture of Hindu Goddess Parvati (bronze sculpture of the 12th-century Chola dynasty in India, cf. Ramachandran & Hirstein, 1999) or Jessica Rabbit (cartoon character from Robert Zemeckis' film *Who framed Roger Rabbit?*) we find that both have unnatural WHRs of about .4,

which is much smaller than the most attractive WHR obtained in our study. In other words, the WHR = .68 obtained in the present study (global context) is far from extremely supernormal WHRs of caricatures, cartoon characters and other artistic stylizations (cf. Lassek & Gaulin, 2016), but it is closer to WHRs measured in 'normally supernormal' females such as Playboy centerfolds (cf. Voracek & Fisher, 2002).

Males - females

The second purpose of the present study was to investigate gender differencess in the preferences for the female body. Our results indicated that, in the cases of WHR and buttocks, both genders behave according to the mate selection theory (Buss, 1992): both men and women chose similar WHR and buttocks as most attractive, consistently in both the global and local presentation contexts. However, in the choice of the most attractive breast size, men have shown preference for larger breasts than women in both the global and local presentation contexts. These results are consistent with the study of Krantz, Bailard, and Scher (1997), which revealed that men prefer larger breasts than women. Other studies also reported a general male preference for larger breasts (Dagnino et al., 2012; Singh & Young, 1995). Although the mate selection theory failed to explain this gender difference, our results still indicate that both genders agree in preference for breasts larger than the judged average (see Figure 4).

Global - local context

Finally, we didn't find interactions between the presentation context and other factors – males and females have shown the same pattern of judgments in both presentation contexts. However, our results indicate interesting main effects of context. In the local context, participants generally chose less feminine (larger) WHRs and smaller breasts compared to the global context. A possible explanation for this difference could be that the body parts are differently perceived in the two contexts. In the local context, isolated body parts are visually and attentively more striking than in the global context, so participants could tend to choose relatively less prominent feminine sizes. However, this 'perceptual hypothesis' has a serious problem with buttocks, because participants chose the buttocks of the same size regardless of context complexity. Further studies should systematically investigate whether this difference comes from stimulus constraints (e.g. does the contextual complexity modify the apparent size of body parts) or it reflects some culturally acquired standards (e.g. a possibly special status of buttocks in respect to the breasts and WHR in contemporary popular culture).

Conclusion

To conclude, it can be said that men and women in both local and global presentation contexts consistently prefer smaller WHR and larger buttocks and breasts than the ones that were judged average. Preference for more feminine

sizes is consistent with the hypothesis based on the *peak shift effect* – appetitive behavior (preference) intensifies with amplification of the critical trigger signals of femininity. Our results indicate that the supernormality effect is relatively 'normal' – the most attractive sizes are about one standard deviation more feminine than the ones judged average. This suggests that participants choose 'realistically ideal' sizes rather than unnaturally supernormal (caricatured) bodily proportions and sizes. The same pattern of results (preference for supernormal) was obtained in both genders and in both presentation contexts. However, we identified gender as a factor that modifies the intensity of the supernormality effect: this effect is greater in the case of men's compared to women's preference for breasts (no other gender differences were obtained). In addition, in the local context (isolated body parts presented) participants generally choose less feminine WHR and breasts than in the global context (body parts presented within the whole body). Further studies should be particularly focused on the investigation of the interaction between the size of body parts and other factors (perceptual, personal and socio-cultural), which could affect the attractiveness of the female body.

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Appendix A

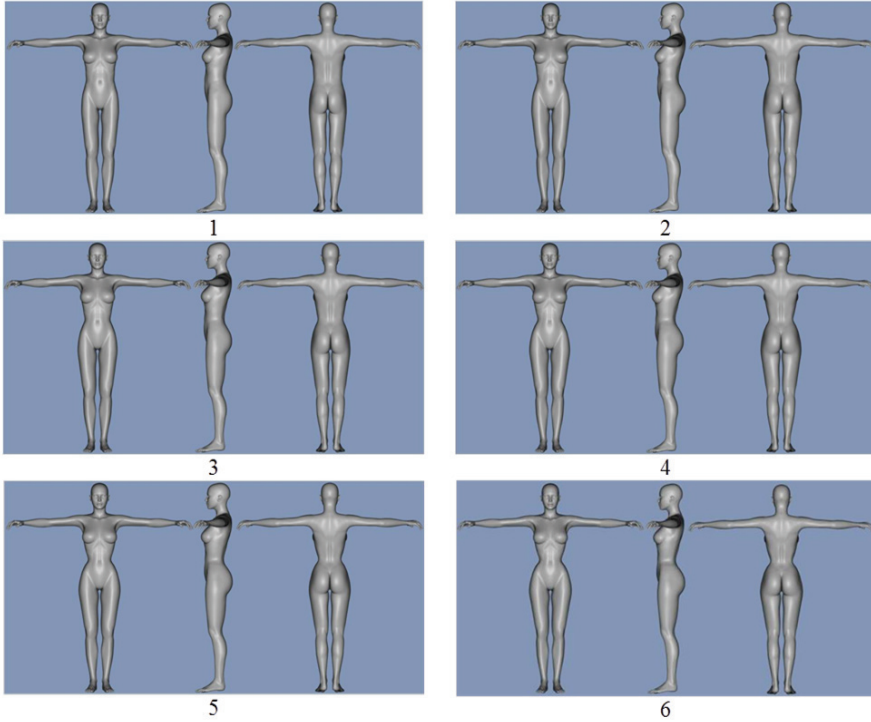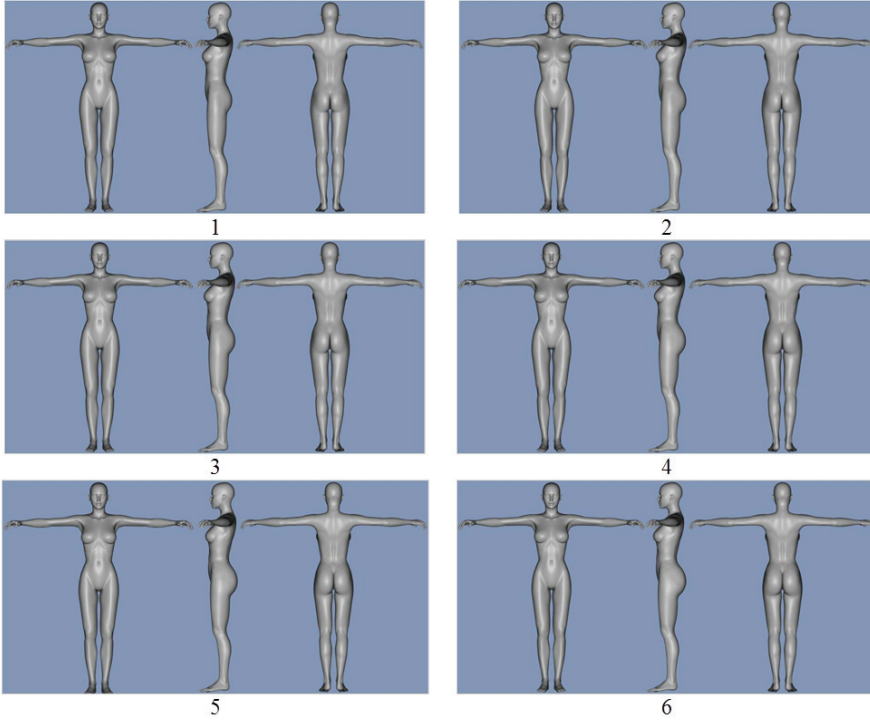Set of six figures with six WHRs presented in global condition
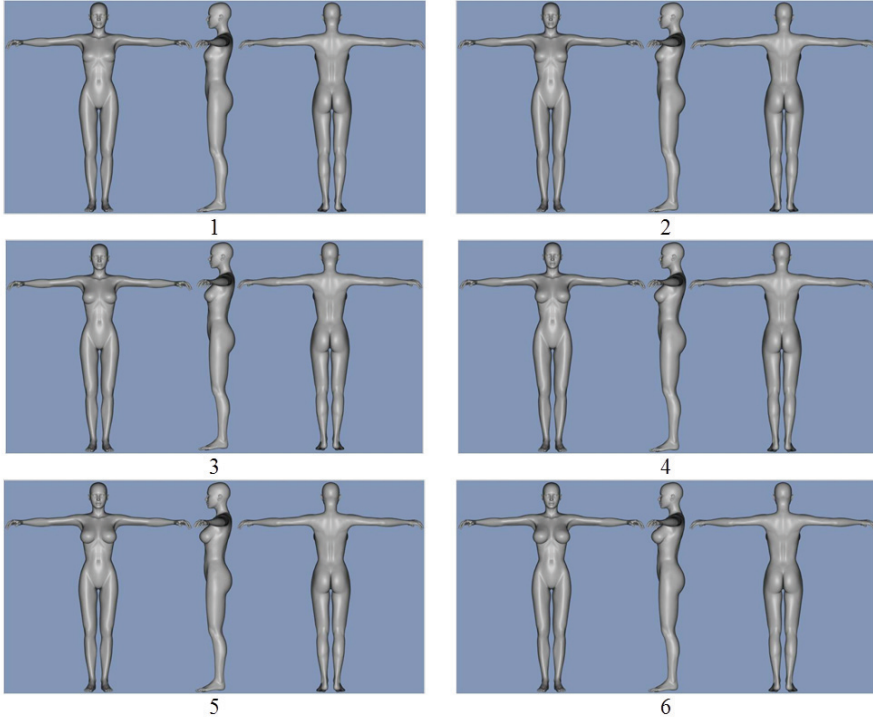
Appendix B

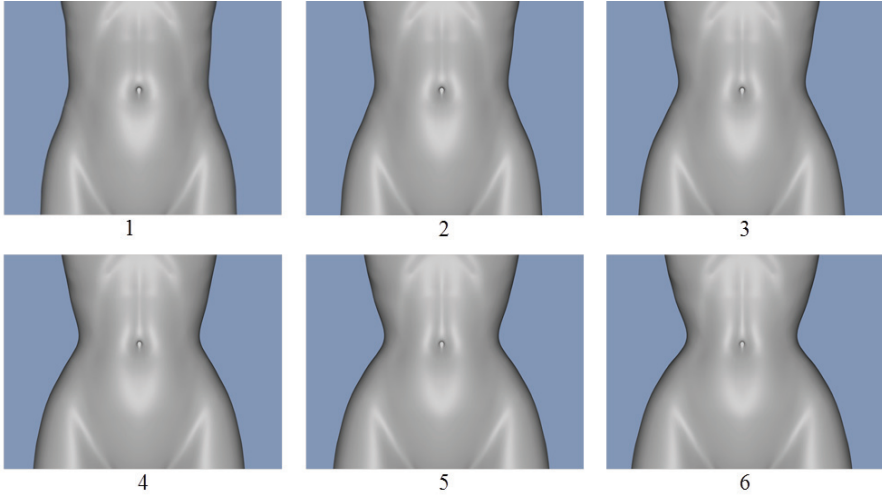Set of six figures with six buttock sizes presented in global condition

Appendix C

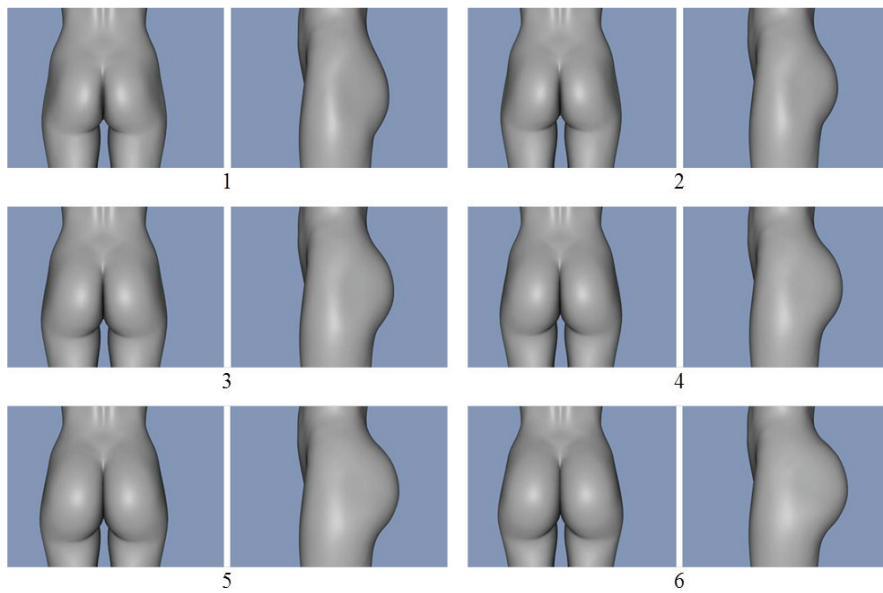Set of six figures with six breast sizes presented in global condition

Appendix D

Set of six figures with six WHRs presented in local condition

Appendix E

Set of six figures with six buttock sizes presented in local condition

Appendix F

Set of six figures with six breast sizes presented in local condition

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