Volume 27, Number 4 ISSN 2224-4476 November 2012

Human Ethology Bulletin

Natural and Augmented Breasts: Is What is *Not* Natural Most Attractive?

James Francis Doyle, Farid Pazhoohi

Independent Researchers

Natural and augmented breasts differ in size and shape. Natural breasts are characterized by concave-to-straight upper-pole contours while augmented breasts are fuller and therefore may have convex upper-pole contours, irrespective of their size. The hypothesis that augmented breasts in a range of cup sizes are rated significantly more attractive than naturalistic breasts was investigated and confirmed using computer generated images of breasts in lateral-view by all males and females cross-culturally in English and Farsi speaking samples. Correlations were then used to show that, for all participants, breast area and breast displacement (concavity or convexity) are positively correlated with attractiveness ratings for natural but not augmented breasts. These results are counter-intuitive since humans could not have evolved in environments that included augmented breasts. The findings are introduced using the ethological concept of supernormal stimuli and the behaviorist/neuroaesthetic principle, the peak shift effect, applied to secondary sexual characteristics (i.e., waist-hip ratios and breasts) and it is concluded that augmented breasts, though deceptive signals of fertility, are supernormal stimuli.

Key words: breasts, supernormal stimuli, peak shift, plastic surgery.

Introduction

Cosmetic breast augmentation is an elective surgical procedure that was performed over 296,000 times in the United States in 2010, an increase of 2% from more than 212,000 procedures performed in 2009 and a 39% increase since the year 2000 (American Society of Plastic Surgeons, 2011). According to some estimates, as many as 6,000,000, or 5%, of the adult women in the U.S. have breast implants (Brody, 2009). Many procedures are reconstructive, performed after mastectomies, but many women choose breast augmentation to improve their self-esteem, self-confidence and appearance (Honigman, Phillips & Castle, 2004; Oberle & Allen, 1994). Yet, while large-breasted women may experience the pleasure, pride and confidence that outward signs of femininity provide, they may also consider their large breasts to be source of embarrassment, anxiety and harassment (Millsted & Frith, 2003). Nonetheless, many women seeking breast implants report that they believe breast augmentation will increase their attractiveness (Hsia & Thompson, 2003).

Breast size and ptosis ("droopiness") are two main factors related to women's body dissatisfaction. In one large-scale investigation 70% of women reported dissatisfaction with their own breasts and 46% of men reported dissatisfaction with their partners' breasts (Frederick, Peplau & Lever, 2008). Although Caucasians accounted for 70% of cosmetic procedures in 2010 (American Society of Plastic Surgeons, 2011), Forbes and Frederick's (2008)

investigation of global body and breast dissatisfaction in samples of African, Asian, European, and Hispanic American college women found no differences between ethnic minorities, though a majority of women from each ethnic group expressed dissatisfaction about their own breast size.

The importance of bilateral breast symmetry is highlighted by Iranian women's experiences with breast cancer and oncoplastic surgeries. Kaviani, Taslimi, Athari, Yunesian, Hosseini & Rabbani (2010), photographed pre- and postoperative breasts from three view points and had these images rated by health professionals. When rated individually, 72% were rated good or excellent, and for size, 94.2% were satisfactory. However, when asked to rate "in comparison with the contra-lateral breast" scores were 68.9% for shape symmetry, 75.8% for "a need for surgery of the contra-lateral breast", and 69% for size asymmetry. These raters found shape and size asymmetries to be less favorable cosmetic outcomes (Kaviani et. al., 2010). Investigating 127 Iranian patients who underwent breast reconstructive surgery, 20% reported their satisfaction with their breasts was excellent and another 78% reported their satisfaction as good (Manafi, Ahmadi, Moghadam & Mirfakhraee, 2007).

Melanie Duncan, in her dissertation research into the impact of breast asymmetry (study 2), created both volume and position asymmetries in frontal views. By changing the apparent volume of one breast (four levels, 102.5 to 110 percent increases) and therefore the bilateral asymmetry of the breasts, she found that greater asymmetry resulted in lower ratings and discovered the left-side breast changes were rated higher, suggesting a possible pseudoneglect effect on the right-side stimuli (Duncan, 2010).

Streeter and McBurney (2003) used three bust sizes and found medium then large followed by small chests had the largest effects on preferences. This study did not, however, consider sex differences in preferences. Using a similar three-size methodology, Prantl and Grundl (2011) found that 40% of men preferred large breasts while only 25% of women reported the same preference. Overall, it has been claimed that 'Bigger is Better'. Men prefer medium or larger breast sizes and this preference is independent of waist and hip size (Furnham, Hester, & Weir, 1990; Gitter, Lomranz, Saxe, & Bar-Tal, 1983). What pertains inside the laboratory pertains without: some ecologically valid studies have shown that increases in woman's breast size influences men's behavior. In a hitchhiking experiment, Guéguen (2007a) demonstrated that when a women's breast size was increased, so did the number of men, but not women, willing to stop and offer assistance. Also, increases in breast size have been shown to increase the number of men that approach women in bars and nightclubs Guéguen (2007b) and waitresses self-reported tips, attractiveness and sexiness have been shown increase with breast size (Lynn, 2009).

There are, however, discrepancies between what women seeking breast augmentation consider attractive and what others believe to be attractive. In one effort to clarify these differences, Hsia and Thomson (2003) asked women seeking breast augmentation, plastic surgeons, and "lay" respondents to rate twelve drawings of breasts for attractiveness, naturalness, personal ideal, and conformity to society's ideal. These images differed in respect to displacement, a measure of the perpendicular distance, "from the point of greatest concavity or convexity to a line drawn from the nipple to the superior base" (Hsia & Thomson, 2003, 313). The plastic surgeons, - familiar with the characteristics of naturalistic and augmented breasts - found concave, naturalistic, breasts to be most attractive, natural, and conforming to personal ideal (Hsia & Thomson, 2003). Women seeking breast augmentation found augmented breasts most attractive, natural, and conforming to personal and society's ideals. Lay respondent ratings were intermediate, suggesting concave (naturalistic) breasts were attractive, but that convex (augmented) contour lines were considered more attractive in three of the five convex conditions. The lay cohort also rated

four of the augmented conditions higher for naturalness, and the lay personal ideal was rated higher in three of five augmented conditions. With respect to naturalness, augmented conditions faired less favorably in cosmetic surgeon and lay judgments than patients' seeking cosmetic surgery. The images showing zero displacement, which is a straight line, were the fullest natural beasts and they were most favorably rated for naturalness.

Why might what is un-natural be more attractive than what is natural? One explanation is that permanently enlarged breasts evolved to advertise reproductive potential in humans and, since ovulation is concealed in females, breast development signals reproductive readiness (Gallup, 1982). Marlowe's nubility hypothesis states that enlarged breasts evolved as honest signals of residual reproductive value, the expected reproductive output of an individual (Marlowe, 1998). Fat is a store of energy used during pregnancy and lactation but fat stores could have been anywhere on the body. He proposes that swollen breasts during pregnancy and lactation were cues to ovulation: only if a female is of reproductive age could she be pregnant or lactating. Fat stored in breast tissue, came to be continuous, occurring before pregnancy and therefore a signal of the beginning of cycling rather than a temporary state of non-ovulation (i.e., pregnancy) and hence attractive. Marlowe reasons that, "even if breasts were initially too small to signal nubility, they could have become attractive because even small, protruding breasts advertised puberty." The nubility hypothesis predicts that firmness is positively correlated with residual reproductive value, that males prefer, cross-culturally, large, firm breasts and that females who have a relative advantage in attracting males at the beginning of their reproductive years achieve higher reproductive success than females that have an advantage only later in life (Marlowe, 1998).

If firmer breasts are more prominent than softer breasts and larger breasts tend to be less firm than smaller breasts and both less firm and older, more ptotic, breasts are less prominent, a more horizontal (straighter) top line contour could serve as a signal of youth (and firmness) and reproductive readiness irrespective of size. However, smaller breasts will tend to be less fatty breasts but not necessarily less prominent - for their size compared to larger breasts- but would be a less abundant store of energy. Marlowe suggests an additional reason for the attractiveness of breasts: breasts are a "supernormal stimuli".

Supernormal Stimuli and Peak Shift Effect

Supernormal stimuli are sign stimuli that elicit greater responses than their more natural, or normally occurring, counterparts (Tinbergen, 1951). It has been suggested that supernormal stimuli result from a phenomenon known as the peak shift effect (Staddon, 1975). The peak shift effect refers to situations when, after a positively reinforcing stimulus (S+) has been discriminated from a less- or non-reinforcing stimulus (S-), peak responding is greatest not to S+ but to a stimulus (S++); a stimulus displaced further from S- than S+ (Keith, 2000). Ramachandran and Hirstein (1999) use the example of training a rat to discriminate a rectangle with an aspect ratio of 3:2 (i.e., the S+) from a square (i.e., the S-): peak responding will be to an elongated rectangle with an aspect ratio of 4:1 (i.e., the S++) even though that is not the shape originally discriminated but an exaggerated version of the original rectangle.

The ethologist Desmond Morris notes that artists can easily replicate a "perfect" breast by simply inventing any shape desired but if a too distorted breast is created the effect is lost. The optimum occurs when, "the basic hemispherical shape is made slightly more hemispherical than usual it is possible to create a super-breast which is perhaps even more stimulating than the real thing." (Morris, 2004). Exaggeration of biologically significant human stimuli, such as larger eyes, lips and smaller, rounder, lower faces has been detected in wide variety of art works and art students have been shown to augment these features both when drawing

portraits from memory and when using mirrors (Costa & Corazza, 2006). In the domain of aesthetic experience, Ramachandran has suggested, from a "neuroesthetic" perspective, that artists exaggerate their art to accentuate feminine characteristics (e.g., bust and hips) in "posture space", creating supernormal stimuli which he hypothesizes activate neural mechanisms within the limbic system that are perceived as rewarding and may create peak shift effects (Ramachandran & Hirstein, 1999; Ramachandran, 2000; Ramachandran, 2004). One recent investigation using fMRI found that post-surgical optimal, .07, waist-to-hip ratio (WHRs), as opposed to pre-surgical, higher, WHRs are rated as more attractive and activate the nucleus accumbens, which is part of the brain's "reward pathway" (Platek & Singh, 2010), providing brain imaging evidence that .70 WHRs are rewarding (S+ stimuli) and the that higher WHRs (S- stimuli) are less so.

A naturally occurring peak shift effect may occur in situations when, after a rewarding stimulus (S+) is discriminated from a non-reinforcing stimulus (S-), a 'supernormal stimulus' (S++) (the exaggerated version the S+, making it less like S-), elicits a greater response than the originally reinforcing S+. Theoretically, the movements of women's bodies create a range of "viewpoint-dependent" waist-to-hip ratios (vdWHRs) that may act as supernormal stimuli by creating a range of stimuli including optimal (S+), high (S-) and ultra-low (S++) (e.g., supernormal) WHRs (Doyle, 2009a). Optimal .70 WHRs (S+) are proposed to be rewarding and super-low (S++) < .70 vdWHRs have been shown to be rated as more attractive than higher (S-) vdWHRs in both standing and contrapposto poses, in images taken from 8 views (45 degree increments, for a 360 degree range of views) and when rated as left- or right-side pairs, the lower (S++) vdWHRs is rated also higher. This model was developed to support the notion of a phylogenetically adapted and ontogenetically attuned 'physical attractiveness detection system' that is sensitive to histories both over evolutionary time scales and to individuals' development and experiences which occur within their life-times with exposure to relevant stimuli (Doyle, 2009b, unpublished research manuscript; see Enquist, Ghirlanda, Lundqvist & Watchmeister, 2003, for details pertaining to human faces). Lateral views of breasts are among the view-dependent stimuli that would normally be encountered in many natural human habitats, and photographs of actual-WHRs in pre- (S-) and post-operative (S+) lateral view conditions have been found to be differentially rated (Singh & Randall, 2007) demonstrating that both view-dependent shape and movement related changes affect attractiveness ratings.

Current Study

For the purposes of the present investigation, the scope of all of the possible roles of peak shift of secondary sexual characteristics has been narrowed to woman's breasts. The preceding discussion provides a theoretical basis for the present claim that cultural practices of beautification, such as cosmetic breast augmentation, involve, at least in part, augmentation of breast size and shape and that one of these, the convex upper-pole contour line, results in a supernormal stimulus. "Push up" bras and breast implants create upper-pole fullness and those stimuli interact with the individual's perceptual proclivities resulting in exaggerated responses, i.e., higher ratings of physical attractiveness than their more natural counterparts. It was predicted that the ratings of physical attractiveness of images of augmented breasts (those with convex upper-pole contour lines) would be higher than those for naturalistic breasts (those with concave upper-pole contour lines) across a range of sizes (A, B, C and D cups), by both men and women in both Farsi and English speaking samples. Farsi speaking culture provides a unique opportunity to include participants from a culture in contrast to the English speaking, "westernized" cohort. The results indicate that both of these sample populations rate stimuli similarly, suggesting they are applicable outside of western contexts.

Methods

Participants

In total, 399 people participated. There were 185 English speaking participants and 214 Farsi speaking respondents. Of the English speaking respondents 14 were removed for providing incomplete data leaving 171 English speaking participant responses (92.43 percent) that were used in the analysis (102 men and 69 women). Their average age was 35.43 (*SD* = 15.67). Eighty three percent of English participants reported themselves as White/Caucasian. Twenty four Farsi speaking respondents were removed for providing incomplete responses, leaving 190 results (88.78 percent) that were used in analysis (130 men and 60 women). The average age of Farsi speaking respondents was 25.04 (*SD* = 7.38). All Farsi participants reported White/Caucasian race.

Materials

Two versions of a survey, one written in the English language and one written in the Farsi language, were developed using SurveyMonkey (https://www.surveymonkey.com).

Computer generated images of women's breasts were created using INAModel™ breast augmentation modeling software (http://www.lookingyourbest.com/inamodel). All of the images showed a lateral view and depicted a woman's body from the iliac crest of the hip and above, to just below the top of the shoulder. All of the images modeled a weight setting of 140lbs (63.5kg) and a height of 5'4" (162.5cm). Representation of the shoulders, abdomen, waist, hips and buttocks were held constant in images. Only one breast in lateral view was visible in each image.

There were two conditions of the independent variable; 1) natural breasts (negative displacement) depicting nearly straight or concave top contour lines, and 2) augmented breasts (positive displacement) depicting convex top contour lines. The images in the natural condition modeled symmetrical breasts characterized by concave top contour lines. Images used in the augmented condition depicted breasts with 480cc McGahn breast implants in "high profile" which created convex top contour lines. Manipulation of the bra size modeled was used to create 4 images in each condition: 1) A cup, 2) B cup, 3) C cup and, 4) D cup.

Breast Area was measured by overlaying a grid of approximately 17 x 17 pixels (~289px^2) onto each breast. Breast displacement area was measured in the same manner as breast area but was either, 1) positive displacement area for augmented breasts - the area of breast above a line placed between the nipple and superior base of the breast, or 2) negative displacement for natural breasts - the area between the breast and a line placed between the nipple and superior base of the breast.

Procedure

Participants were recruited via social networks. All participants provided consent and reported that they are not under 18 years of age and where informed that their responses would be kept confidential. Participants were randomly assigned to view one of these eight images and asked to rate the attractiveness of the breast shown on a 1 to 10 scale, where 1 was "least attractive" and 10 was, "most attractive".

Results

Augmented breasts, A, B, C and D cups, taken together, are rated significantly higher than natural breasts by all groupings (see Table 1) with the exception of female English-Speaking Respondents who did not rate either natural or augmented breasts significantly differently than the other (but see, Figure 7, "Natural and Augmented by Cup").

In each grouping (all respondents, all men, all women, English speaking, Farsi speaking, English speaking men, English speaking women, Farsi speaking men, Farsi speaking women) A cups (natural and augmented together) are rated significantly lower than at least one other cup -and in several cases more- by the survey respondents with the exception of

Farsi-Speaking women and English-Speaking women who did not rate any cup as significantly different than any other cup (but see Figures 7 and 9, "Natural and Augmented by Cup").

The graphs in Figures 1-9, "Natural and Augmented by Cup" show significant differences between natural and augmented breasts for each cup. Augmented A cup is rated significantly higher than natural A cup by all groups. Augmented B cup is rated significantly higher than natural B cup by 7 of the groupings (all survey respondents as a group, women as a group, English-Speaking Respondents, English-Speaking women, Farsi-Speaking Respondents, Farsi-Speaking men, Farsi-Speaking women), augmented C cup was rated higher than natural C cup by 3 of the groupings (males, Farsi-Speaking, and Farsi-Speaking men). Augmented D cup was not rated significantly higher than Natural D cup.

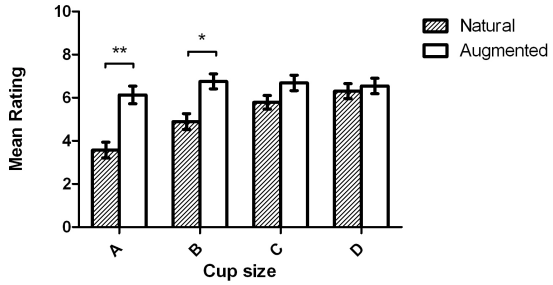

Fig. 1: All respondents: Natural and Augmented by Cup

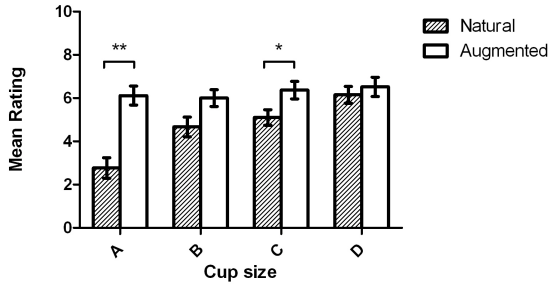

Fig. 2: All male respondents: Natural and Augmented by Cup.

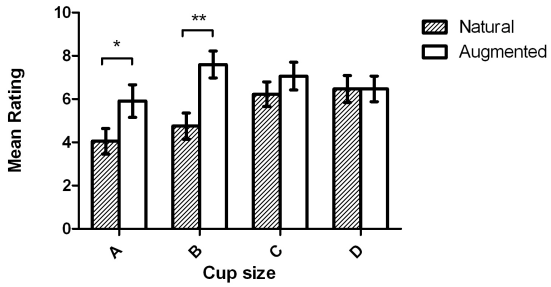

Fig. 3: All female respondents: Natural and Augmented by Cup.

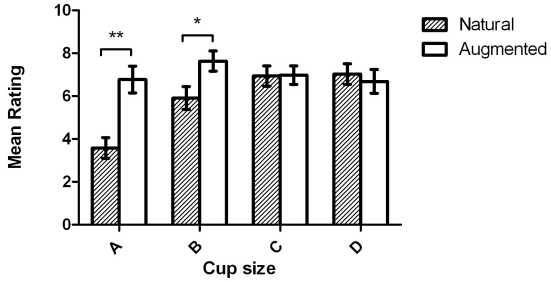

Fig. 4: All English speaking respondents: Natural and Augmented by Cup.

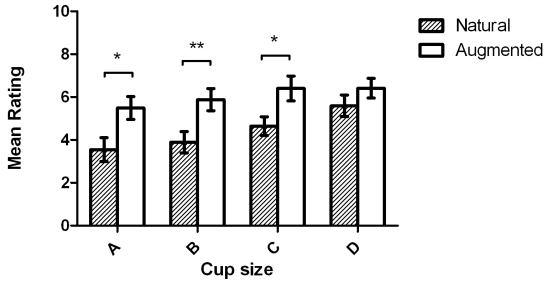

Fig. 5: All Farsi speaking respondents: Natural and Augmented by Cup.

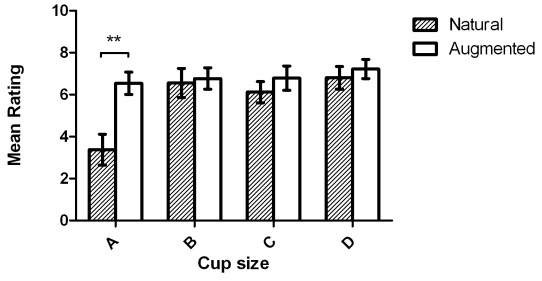

Fig. 6: English speaking males: Natural and Augmented by Cup.

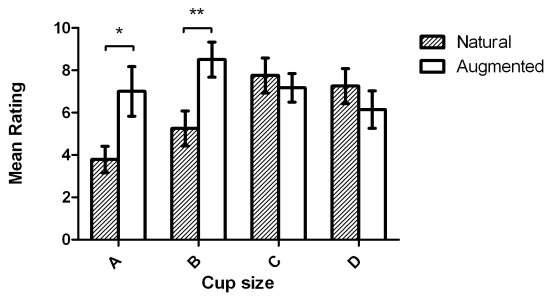

Fig. 7: English speaking females: Natural and Augmented by Cup.

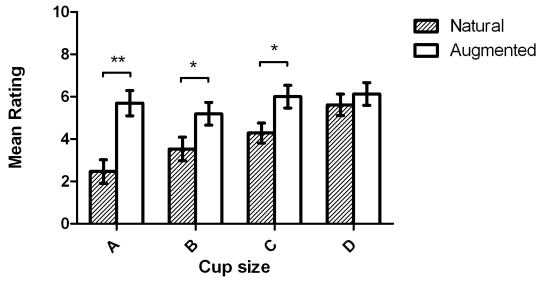

Fig. 8: Farsi speaking males Natural and Augmented by Cup.

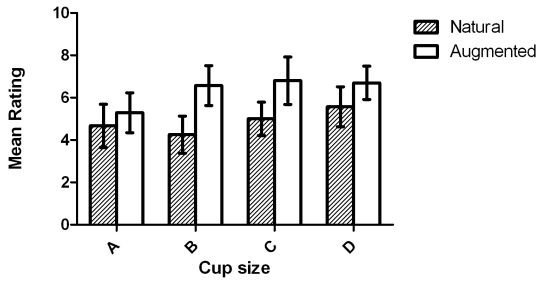

Fig. 9: Farsi speaking females: Natural and Augmented by Cup.

English speaking participants rated the attractiveness of breasts significantly higher (6.44, SD = .18) than Farsi language participants (5.23, SD = .18), $F(1, 329) = 22.36$, $p < .001$). The interaction between breast shape and breast size was significant, $F(3, 329) = 3.88$, $p < .01$, but no other interaction was observed ($F < 1$, ns).

Women as a group and men as a group rated the attractiveness of all of the breasts 6.10 (SD = .20) and 5.57 (SD = .15), respectively and the difference was significant; $F(1, 329) = 4.49$, $p = .035$.

From the English-Speaking Respondents, the women rated the attractiveness of all of the breasts 6.60 (SD = .28) and men 6.27 (SD = .22); the difference was not significant; $F(1, 155) = .87$, $p = .35$. The interaction between breast shape (natural or augmented) and breast size was significant, $F(3, 155) = 4.80$, $p = .003$, but no other interaction was observed ($F < 1$, ns).

From the Farsi-Speaking Respondents, the women and men rated the attractiveness of all of the breasts 5.60 (SD = .30) and 4.86 (SD = .20), respectively; $F(1, 174) = 4.26$, $p = .04$. No significant interaction was observed ($F < 1$, ns).

Tab. 1: Between-Subject ANOVA of Sex (Male or Female), Reporting Language (Farsi or English), Shape (Natural or Augmented), and Cup Size (A, B, C, or D) on the Attractiveness Ratings.

	Natural		Augmented				
Participants	*M*	*SD*	*M*	*SD*	*df*	*F*	*p* value
All Respondents	5.14	.17	6.53	.18	329	29.75	.001
English-Speaking	5.86	.24	7.01	.26	155	10.35	.002
Farsi-Speaking	4.42	.25	6.04	.26	174	20.32	.001
All Male	4.68	.21	6.25	.21	224	28.26	.001
All Female	5.37	.30	6.76	.32	121	9.98	.002
Male English-Speaking	5.71	.31	6.83	.29	94	6.77	.011
Female English-Speaking	6.00	.39	7.20	.45	61	3.98	.051
Male Farsi-Speaking	3.97	.26	5.75	.28	122	21.78	.001
Female Farsi-Speaking	4.87	.46	6.34	.48	52	4.93	.031

The correlations below show that, for all participants, breast area and breast displacement (concavity or convexity) are positively correlated with attractiveness ratings for natural but not augmented breasts.

Tab. 2: Correlations Between Attractiveness Ratings and Breast Area (A) and Displacement (D).

		Pearson's correlation		*p* value	
Participants	N	A	D	A	D
Natural and Augmented					
All Respondents	361	.32	.24	.001	.001
English-Speaking	171	.29	.18	.001	.016
Farsi-Speaking	190	.38	.30	.001	.001
All Men	232	.35	.24	.001	.001
All Women	129	.27	.24	.002	.006
English-Speaking Men	102	.28	.16	.001	ns
English-Speaking Women	69	.30	.21	.012	ns
Farsi-Speaking Men	130	.43	.30	.001	.001
Farsi-Speaking Women	60	.27	.29	.033	.024
Natural					
All Respondents	187	.37	.27	.001	.001
English-Speaking	87	.42	.26	.001	.016
Farsi-Speaking	100	.35	.30	.001	.002
All Men	118	.40	.30	.001	.001
All Women	69	.34	.24	.004	.044
English-Speaking Men	49	.35	.22	.012	ns
English-Speaking Women	38	.48	.30	.002	ns
Farsi-Speaking Men	69	.44	.36	.001	.002
Farsi-Speaking Women	31	.18	.18	ns	ns

Discussion

One of the limitations of the current study is that data was collected with SurveyMonkey by solicitation in social networks online. Not all English or Farsi speaking people have access to the Internet, therefore our sample was biased in that regard. Also, specific stimulus dimensions were isolated in order to identify a unique effect reported here but this necessarily excluded other relevant variables such as skin color, waist to hip ratio, height, leg and torso length, shoulder width, posterior size, movement and possible interactions between these variables. More ecologically valid experiments for future investigations are necessary to improve the generalizability of these findings.

The result of this investigation showed that the augmented breasts, as a group, were rated higher than natural breasts by all participants. There was one exception when each group was analyzed: the English-speaking women cohort. They did not rate all augmented breasts higher than all natural breasts (but see Figure 7, "Natural and Augmented by Cup", showing significantly higher ratings for A and B augmented cups than their natural pairs). This effect was observed regardless of the sex of the participant (i.e., all males as a group, all females as a group) -though women rated all of the breasts significantly higher than the men- or cultural effects, at least between Farsi speaking survey respondents and English speaking survey respondents who were predominantly Americans (though data on nationality of English survey respondents was not explicitly gathered). English speaking survey respondents rated all of the breasts together significantly higher than the Farsi survey respondents. No natural breast was rated significantly higher than any augmented breast. This suggests that humans perceive augmented breasts to be more attractive than natural breasts.

To further investigate the relative contribution of breast size (total breast area, or "largeness") and displacement area (breast area above the topline, "fullness", or space between breast top contour line and a line between the nipple and superior attachment), we performed correlations (Table 2) for all of the breasts together (natural and augmented), by natural cups as a group and by augmented cups as a group. For all participants in any of the groupings when natural and augmented breast attractiveness ratings were analyzed together there was a positive correlation between breast area and attractiveness rating. With the exception of male and female English survey respondents, there were positive correlations between breast displacement area and attractiveness ratings. For natural breasts, there was also a positive correlation between breast area and the attractiveness rating across sexes

and the cultural group sampled. This finding would suggest that as the size of the natural breasts increased, they are perceived as being more attractive. In other words, for natural breasts the, "Bigger is Better" notion received support, at least for the sizes used here. There was also a positive correlation between the increase in displacement area (concavity) of the natural breasts and the rating of attractiveness of breasts. The natural breast stimuli used showed beasts that were larger, but not necessarily more ptotic, as concavity increased. We believe that these two factors require further investigation and in future experiments ptosis and concavity will need to be varied. However, these findings suggest that as natural breasts are larger and more concave they were rated as being more attractive.

These correlations were not preserved in the analysis of augmented breasts. There was no significant correlation between breast area and attractiveness rating or displacement area and attractiveness rating when all participants were analyzed as a group or for any of groups individually. These findings partially contradict other results showing a preference for larger breasts, as larger augmented breasts were not preferred to smaller augmented breasts. There is also a discrepancy between these findings and those suggesting preferences for smaller breasts; however they are in agreement that size is not a "stable preference" (Furnham & Swami, 2007). It appears from our results that for augmented breasts cup size and breast area are less important than displacement --as long as the displacement is positive-- since the correlations between attractiveness rating and displacement disappeared for the augmented cups and augmented cups were rated significantly higher. Although our augmented stimuli were overall (pair by pair) and absolutely larger than the natural breasts, it could be that for smaller breasts, "push up" bras and varying levels of ptosis account for some of the discrepancy previously found between size, shape and attractiveness. Irrespective of cup size, we found that augmented breasts with convex upper-pole contours are preferred to natural breast with concave upper-pole contours.

Larger breasted women have been shown to have higher levels of salivary estradiol than smaller breasted women and it has been suggested that this increases the probability of conception (Jasieńska, Ziomkiewicz, Ellison, Lipson & Thune, 2004). Large and symmetrical breasts may be honest signals of phenotypic quality (Manning, Scutt, Whitehouse & Leinster, 1997) and residual reproductive value (Marlowe, 1998). However, breast augmentation supersedes the proximate biology of individual's mate choices to function at the level of a biomedical cultural practice of beautification. The afferent flow from these practices feeds back to, and has an effect on, individuals. In this case breasts are semi-public enhanced ornaments with some deeply private psychological implications for women, and augmented stimuli that influence the perceptions of men that may affect the emotional and reproductive success of both.

> *"When the media raise attractiveness standards by prototyping beauty, then unreal expectations to mate quality (beauty) will emerge. If the mean is more beautiful than reality, no mate selection can occur on realistic grounds… As human beauty is limited, it is plastic surgery and hormonal treatments which come into play" (Grammer, Fink, Møller & Thornhill, 2003, 402).*

Low, Alexander and Noonan (1987) have suggested that fat deposits may be deceptive when they mimic actual signals of reproductive potential and the milk storing function of breasts and hypothesized that, "if breast shape reflects information about reproductive value and reproductive state, males will tend to prefer high, rounded breasts (of whatever size)… if fat is deceptive, it should contribute to some such condition" (Low et al., 1987). As opposed to naturally occurring signals such as fat deposits that may be deceptive, augmented breasts clearly are deceptive as they do not reflect normal development in context: both natural size and symmetry are modified. In their role as

ornaments, symmetrical augmented breasts may reduce choosy male's reproductive fitness as --by sexual selection-- males may have reduced reproductive success if they reproduce with less fecund females who subsequently reproduce daughters that are less attractive and/or fecund (Møller, Soler & Thornhill, 1994). However, breasts may not need to appear natural or normal to be attractive (Hsia & Thompson, 2003), supernormal stimuli, and thus augmented breasts may help women attract potential mates and resources even if they do not make her more fecund.

It could be concluded from our results that augmented breasts are more attractive than natural breasts regardless of their size or convex area, whether they are deceptive signals or not. This effect was confirmed in both cultures and regardless of participant sex. In other words, natural breasts, in terms of attractiveness, are breasts wanting in 'supernormality', as what is not natural is most attractive.

References

American Society of Plastic Surgeons (2011). American Society of Plastic Surgeons Report of the 2010 plastic surgery statistics. ASPS. Retrieved January 2012, from http://www.plasticsurgery.org/.

Brody, G. (2009). Silicone breast implant safety and efficacy. Medscape Reference. Retrieved January 2012, from http://emedicine.medscape.com/article/1275451-overview.

Costa, M., & Corazza, L. (2006). Aesthetic phenomena as supernormal stimuli: The case of eye, lip, and lower-face size and roundness in artistic portraits. Perception, 35(2), 229-246.

Doyle, J. F. (2009a). A woman's walk: Attractiveness in motion. The Journal of Social, Evolutionary, and Cultural Psychology, 3(2), 81-92.

Doyle, J. F. (2009b, unpublished manuscript). Physical attractiveness ranges: Standing and contrapposto pose waist-to-hip ratio is 360° and pairs.

Duncan, M. (2010). Sexual selection and breast morphology. Thesis submitted to the Victoria University of Wellington. Retrieved January 2012, from http://hdl.handle.net/10063/1406

Enquist M., Ghirlanda S., Lundqvist D., & Watchmeister C. A. (2002). An ethological theory of attractiveness. In.. G. Rhodes & L. Zebrowitz (Eds.), Facial attractiveness: evolutionary, cognitive, and social perspectives (pp. 127-152). Westport, CT: Ablex.

Forbes, G. B., & Frederick, D. A. (2008). The UCLA Body Project II: Breast and body dissatisfaction among African, Asian, European, and Hispanic American college women. Sex Roles, 58, 449-457.

Frederick, D.A., Peplau, A., & Lever, J. (2008). The Barbie Mystique: Satisfaction with breast size and shape across the lifespan. International Journal of Sexual Health, 20(3), 200-211.

Furnham, A., Hester, C., & Weir, C. (1990). Sex differences in the preferences for specific female body shapes. Sex Roles, 22(11), 743-754.

Furnham, A., & Swami, V. (2007). Perception of female buttocks and breast size in profile. Social Behavior and Personality, 35(1), 1-8.

Gallup, G. (1982). Permanent breast enlargement in human females: A sociobiological analysis. Journal of Human Evolution. 11, 597-601.

Grammer, K., Fink, B., Moller, A. P., & Thronhill, R. (2003). Darwinian aesthetics: Sexual selection and the biology of beauty. Biological Reviews of the Cambridge Philosophical Society, 78(3), 385-407.

Gitter, A. G., Lomranz, J., Saxe, L., & Bar-Tal, Y. (1983). Perceptions of female physique characteristics by American and Israeli students. The Journal of Social Psychology, 121(1), 7-13.

Guéguen, N. (2007a). Bust size and hitchhiking: A field study. Perceptual and Motor Skills, 105(3f), 1294-1298.

Guéguen, N. (2007b). Women's bust size and men's courtship solicitation. Body Image, 4(4), 386-390.

Honigman, R. J., Phillips, K. A., & Castle, D. J. (2004). A review of psychological outcomes for patients seeking cosmetic surgery. Plastic and Reconstructive Surgery. 113(4): 1229-1237.

Hsia, H. C., & Thomson, G. J., (2003). Differences in breast shape preferences between plastic surgeons and patients seeking breast augmentation. Plastic and Reconstructive Surgery, 112(1), 312-320.

Jasieńska, G., Ziomkiewicz, A., Ellison, P. T., Lipson, S. F., & Thune, I. (2004). Large breasts and narrow waists indicate high reproductive potential in women. Proceedings: Biological Sciences, 271(1545), 1213 – 1217.

Kaviani, A., Taslimi, S., Athari, B., Yunesian, M., Hosseini, M., & Rabbani, A. (2010). The cosmetic result after oncoplastic breast surgery in Iranian women. Tehran University Medical Journal. 68(4), 213-219.

Keith, K. D. (2002). Peak shift phenomenon: A teaching activity for basic learning. Teaching of Psychology, 29(4), 298-300.

Low, B. S., Alexander, R. D., & Noonan, K. M. (1987). Human hips, breasts and buttocks: Is fat deceptive? Ethology and Sociobiology 8(4): 249-257.

Lynn, M. (2009). Determinants and consequences of female attractiveness and sexiness: realistic tests with restaurant waitresses. Archives of Sexual Behavior. 38(5), 737-745.

Manafi, A., Ahmadi Moghadam, M., & Mirfakhraee A. M. (2007). Breast reconstruction after mastectomy, necessity or luxury? Iranian Journal of Surgery, 15(2): 78-83.

Manning, J. T., Scutt, D., Whitehouse, G. H., & Leinster, S. J. (1997). Breast asymmetry and phenotypic quality in women. Evolution and Human Behavior, 18(4), 223-236.

Marlowe, F. (1998). The nubility hypothesis: The human breast as an honest signal of residual reproductive value. Human Nature, 9(3), 263-271.

Millsted, R., & Frith, H. (2003). Being large-breasted: Women negotiating embodiment. Women's Studies International Forum, 26(5), 455-465.

Møller, A. P., Soler, M., & Thornhill, R. (1994). Breast asymmetry, sexual selection, and human reproductive success. Ethology and Sociobiology. 16, 207-219.

Morris, D. (2004). The naked woman: A study of the female body. Jonathan Cape, London.

Oberle, K., & Allen, M. (1994). Breast augmentation surgery: A woman's health issue. Journal of Advanced Nursing. 20(5), 844-852.

Platek S. M., & Singh D. (2010). Optimal waist-to-hip ratios in women activate neural reward centers in men. PLoS ONE, 5(2), e9042. doi:10.1371/journal.pone.0009042.

Prantl, L., & Grundl, M. (2011). Males prefer a larger bust size in women than females themselves: An experimental study of female bodily attractiveness with varying weight, bust size, waist width, hip width, and leg length independently. Aesthetic Plastic Surgery, 35, 693-702.

Ramachandran, V. S. (2000). Concerning 'The Science of Art'. Journal of Consciousness Studies, 7(8-9), 75-81.

Ramachandran, V.S. (2004). A brief tour of human consciousness: from imposter poodles to purple numbers. Pi Press, New York.

Ramachandran, V.S., & Hirstein, W. (1999). The Science of Art: A neurological theory of aesthetic experience. Journal of Consciousness Studies, 6(6-7), 15-51.

Singh, D., & Randall, P. K. (2007). Beauty is in the eye of the plastic surgeon: Waist-hip ratio (WHR) and women's attractiveness. Personality and Individual Differences. 43(8), 329-340.

Staddon J. E. R. (1975). A note on the evolutionary significance of supernormal stimuli. American Naturalist, 109, 541-545.

Streeter, S. A., & McBurney, D. H. (2003). Waist-hip ratio and attractiveness: New evidence and a critique of "a critical test". Evolution and Human Behavior, 24(2), 88-98.

Tinbergen, N. (1951). The Study of Instinct. Oxford: Oxford University Press.