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Men's attraction to women's bodies changes seasonally

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Abstract. Humans exhibit seasonal variation in hormone levels, behaviour, and perception. Here we show that men's assessments of women's attractiveness change also seasonally. In five seasons (from winter 2004 to winter 2005) 114 heterosexual men were asked to assess the attractiveness of the same stimuli: photos of a female with three different waist-to-hip ratios; photos of female breasts, and photos of average-looking faces of young women. For each season, the scores given to the stimuli of the same category (body shape, breast, and face) were combined. Friedman's test revealed significant changes for body shape and breast attractiveness assessments across the seasons, but no changes for face ratings. The highest scores for attractiveness were given in winter and the lowest in summer. We suggest that the observed seasonality is related to the well-known 'contrast effect'. More frequent exposure to women's bodies in warmer seasons might increase men's attractiveness criteria for women's body shape and breasts.

1 Introduction

Humans exhibit seasonal variation in different physiological and behavioural processes (see review in Bronson 2004; Kimura and Hampson 1994). Mood fluctuations over the year, particularly at higher latitudes, have also been shown by many authors (for review see Harmatz et al 2000). For instance, seasonal affective disorder is a depressive disorder that occurs during the winter (Dalgleish et al 1996), but mood and behaviour also vary seasonally in healthy individuals (eg Kasper et al 1989; Lacoste and Wirz-Justice 1987; Terman 1988). Such variation might be important because hormones, neurotransmitters, and/or mood fluctuations over the year may cause seasonal fluctuations in fertility (Lam and Miron 1994) or sexual behaviour (Smolensky et al 1981). It is also known that human taste perception in patients with seasonal affective disorder may change over the year (Arbisi et al 1996). Therefore it is possible that visual perception and judgments of the attractiveness of others or self-attractiveness could also differ in relation to the season of the year. Circannual changes in mood might influence either perception of self-attractiveness or attractiveness of others (including sexual partners). It is also well-known that individuals adjust their judgment of the attractiveness of others according to whether the target person is presented in a set of attractive or unattractive stimuli (Geiselman et al 1984; Kenrick et al 1989, 1994; Kowner and Ogawa 1993). People also judge their self-attractiveness in relation to the attractiveness of the stimuli (Thornton and Maurice 1997). In other words, when people are exposed to attractive stimuli (faces or bodies) they usually assess their self-attractiveness and attractiveness of other target images lower than when they are exposed to unattractive stimuli. This phenomenon is called the 'contrast effect'. If then in different seasons of the year people are exposed in real life to different bodies (or parts of bodies), they can assess the same body stimuli in the two seasons differently.

Here we test whether the perception of female body shape, and breast and face attractiveness by males changes in relation to season, and therefore if there is some seasonality-dependent 'contrast effect'. Since in summer men are much more often exposed to more uncovered women's bodies than in winter, our prediction is that stimuli presented to men in summer will be assessed as less attractive than the same stimuli presented to the same men in winter.

2 Method

The data were collected in January, May, August, and October 2004, and in February 2005; in other words, the four seasons of the year 2004 and the following winter 2005. The studied subjects were 114 heterosexual men, aged 16 to 53 years (with mean age, $M = 28.03$ years, SD = 10.66 years). 57 men were city dwellers living in Wrocław (Poland) ($M = 26.1$ years, SD = 9.08 years), and 57 men ($M = 29.9$ years, SD = 11.8 years) lived in the rural area (ca 80 km from Wrocław). The participants were volunteers recruited by one of the authors (PS) by visiting many households in one village and one city. The data were collected by visiting the participants in their homes or in other places they were willing to meet the investigator. The participants were informed that they were taking part in studies on aesthetic preferences related to women's attractiveness. All participants agreed to repeat the assessment a few times (every 3 months). We did not inform them why those repetitions were necessary, we only asked if they agreed to take part in such a study.

All subjects were asked about their age, education, and marital status. In each season they were also asked whether they currently had a sexual partner and about the duration of this relationship. In each season the subjects were asked to assess attractiveness of the following stimuli:

(i) 3 photos of a female in a black swimming suit (the back silhouettes) with three different waist-to-hip ratios (WHRs) changed by the waist size (0.6, 0.7, 0.8) and 3 photos with WHRs changed by hip size (0.6, 0.7, 0.8)—the pictures were taken from Rozmus-Wrzesinska and Pawlowski (2005). Stimuli were created electronically from two black-and-white photographs of one woman. In one of the original pictures the woman was presented from the front, and in other one from the back [all details, including pictures of stimuli, are in Rozmus-Wrzesinska and Pawlowski (2005)].

(ii) 5 photos of female breasts of different size: A (the smallest), B, C, D, and DD (the biggest). The breast pictures were taken from internet pages from different plastic surgery clinics. We have chosen similar breasts (all coloured pictures) that differed only in size. In these pictures there were only breasts.

(iii) 3 photos of average-looking faces of young women. The face pictures were also coloured and were chosen from 40 pictures of students' faces. The chosen faces were assessed by three judges as very average faces in terms of attractiveness.

In order to minimise the effect of anchoring (Tversky and Kahneman 1974) and the influence of the background, ie the influence of an earlier photo on the physical attractiveness assessment of the subsequent photo, the stimuli were presented randomly. The attractiveness of each stimulus was assessed on Likert 9-point scale (1 = very unattractive; 9 = very attractive). The subjects were also asked to assess their own and their sexual partner's attractiveness on the same scale. These two questions were asked before the subjects were exposed to the stimuli. We analysed partner's attractiveness assessments only for those men who had the same partner in the five studied seasons (42 men had no partner in at least one of the studied seasons and 28 men had at least two different partners in that time).

Owing to possible variation in preferences for different body shape, different breast size, or female face, we combined the scores given to stimuli belonging to the same category and divided the result by the number of stimuli in each category for

each studied season. In this way we obtained the average attractiveness ratings in each category (body shape adjusted by waist, body shape adjusted by hip, breast, face, partner, self-attractiveness) for each man across each of the five measurement times (figure 1). We included winter 2005 to check whether the changes across seasons were not related just to the subjects' reaction to multiple exposures to the same stimuli over the year and not to the seasonality.

Because Kolmogorov–Smirnov tests showed lack of normality for the majority of variables (in all attractiveness categories for all seasons), to test for seasonal effects we used the Friedman test which is a non-parametric alternative to the one-way repeated-measures analysis of variance (ANOVA). However, to check the pairwise comparison we also used one-way repeated-measures ANOVAs, but only for categories where the sample size was bigger than 100 cases. To compensate for the violation of normality assumption, we used a more stringent α level (0.01) for assessing the significance of differences.

3 Results

Since the results for body shape with different WHRs alternating either by waist or hip size did not differ significantly (neither for winter 04: $t = 1.17$, $p = 0.25$; spring: $t = 1.35$, $p = 0.18$; summer: $t = 0.64$, $p = 0.52$; autumn: $t = 1.97$, $p = 0.051$; nor for winter 05: $t = 0.45$, $p = 0.65$), in all analyses we used only the better-known from the literature assessments for body shape with WHR adjusted waist size. Friedman's test for the four seasons of 2004 ($N = 114$) revealed significant variation in the average rating of body shape ($\chi^2_3 = 100.7$, $p < 0.001$) and breasts ($\chi^2 = 87.4$, $p < 0.001$) across the seasons but no change for faces ($\chi^2 = 2.44$, $p = 0.5$) (figure 1). As predicted according to the 'contrast effect', ratings of body and breast attractiveness were lower in summer than in winter (Wilcoxon $T > 3.17$, $p = 0.002$). A posteriori tests with Bonferroni adjustment for multiple comparisons revealed that out of the 10 pairwise comparisons for body shape there were 7 significant differences ie with $p < 0.01$ (winter 04–spring; winter 04–summer; winter 04–autumn; spring–summer; spring–autumn; summer–winter 05, and autumn–winter 05), for breast there were also 7 significant differences (winter 04–spring; winter 04–summer; winter 04–autumn; spring–summer; summer–autumn; summer–winter 05; and autumn–winter 05), but for face all 10 pairwise comparisons were not significant.

The observed relationship holds true for the whole sample and also separately for rural and urban men. When we divided men into two groups with relatively large and similar number of subjects, those younger than 26 years ($N = 66$) and those older than 25 years ($N = 48$), we found that although the older men assessed the attractiveness of the

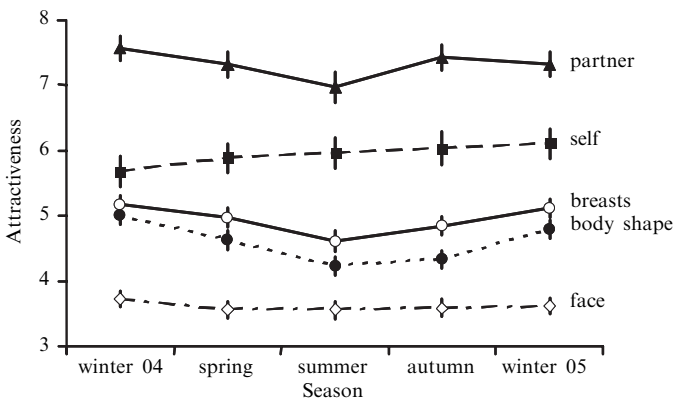

Figure 1. Mean attractiveness assessments (on Lickert scale) by men in five studied seasons.

stimuli higher than the younger ones in all seasons and for all stimulus categories, the general pattern of changes in perceiving the attractiveness across the seasons was the same for these two age groups. Partner's attractiveness assessment by those who had the same partner throughout all seasons ($N = 44$) fluctuated ($\chi^2 = 25.46$, $p < 0.001$) in the same way as body or breast assessments. There was no change in own attractiveness assessment across the year ($\chi^2 = 4.22$, $p = 0.24$).

4 Discussion

The results indicate that there is some seasonality in women's body shape and breast attractiveness assessments by men. The highest scores were given in winter and the lowest in summer. In Poland, seasonal temperature fluctuation is marked and clothing changes accordingly. Higher ambient temperature in warmer seasons is related with higher levels of exposure to sexually dimorphic traits. According to the 'contrast effect' hypothesis, one would expect that attractiveness assessments of stimuli to which subjects are more exposed in some seasons (eg female body shape in a swimming suit or partly covered breasts or tightly fitting T-shirts in the warmer seasons), would be relatively lower. As predicted by this hypothesis, we found a negative relationship between the putative time exposure to real-life stimuli and attractiveness scores for body shape and breasts. Since exposure to female faces does not change across seasons, one would expect assessment of facial attractiveness to be constant over the year. Furthermore, when a man is exposed to more female bodies (among which there can be very attractive ones), this may negatively influence the assessment of his partner's attractiveness (as found in our studies). There is also another line of evidence that could support the 'contrast effect' hypothesis. We found also a significant difference between partner's attractiveness assessment by men from rural and urban areas (for instance in winter 04: 8.1 versus 6.9, Mann–Whitney U test $Z = -2.94$, $p = 0.003$). Although significant for all seasons, this difference diminished in spring ($Z = -2.45$, $p = 0.014$), became marginally significant in summer ($Z = -2.03$, $p = 0.042$) and again increased in autumn ($Z = -2.14$, $p = 0.033$), and more so in winter 05 ($Z = -3.87$, $p < 0.0001$). Irrespective of the season of the year, men living in the village gave higher scores to their partners than men from the city. This is what one would expect from the 'contrast effect' hypothesis. In real-life, men living in urban areas are more often exposed to many unknown, attractive women. Kenrick et al (1989) showed that men exposed to photos of attractive women rated their partners as less attractive.

It is unlikely that our results could have represented the effect of the order of seasons (winter–spring–summer–autumn) in which our subjects were studied and therefore stemmed from the 'exposure effect'. According to classical psychological research (eg Moreland and Zajonc 1982; Zajonc 1968) the perceived attractiveness should increase with time and with multiple exposure, yet in our case it decreased in the first three seasons and increased only in autumn and the following winter. This indicates that there was no constant trend (either increase or decrease) resulting from the number of exposures to the same stimuli.

There are, however, at least two other possible explanations of our results that should also be considered. The first one is that the changes in assessing female attractiveness in relation to the season of the year could be related to the seasonal mood change of the studied men. Since mood may influence judgments about other people (Feshbach and Singer 1957; Gouaux 1971), it is possible that our results could be explained by the seasonal mood-change effect. There are, however, a few reasons why this is rather unlikely. Kenrick et al (1993) showed that mood fluctuations are not related to judgments of the facial attractiveness of women. Apart from the results of Kenrick et al, we can also advance some arguments based on our results that would deny that the effect we found is mood-dependent. First, we found no change in

own attractiveness assessment across the year. Second, we found no within-season significant relationship between own attractiveness assessment and ratings of any stimulus categories ($-0.12 \leqslant r \leqslant 0.15$). Third, there was no effect of circannual changes for face assessment and these changes were found only for sexually dimorphic traits that are covered by clothes to different extents across seasons. These three arguments are, however, not sufficient to exclude this mechanism as a potential explanation of our results. It is possible that self-ratings and ratings by others are not affected in the same way by mood change. Winter may signal scarcity of resources (including mates), possibly triggering a depressed, energy-conservation state. While self-evaluations are unlikely to be affected, this state could lead men to boost their evaluations of romantic opportunities along with their willingness to acquire them. Such a response may be specific to body/breast assessments because of their relative visual scarcity.

The second possible explanation is that the changes in assessing female attractiveness in relation to the season of the year are related to the seasonal fluctuations in testosterone level (T). There is some line of evidences indicating that hormones may influence attractiveness assessments. For instance, the assessment of males' facial attractiveness was found to be dependent on the phase of menstrual cycle (eg Danel and Pawlowski 2006; Johnston et al 2001; Macrae et al 2002). In the fertile phase (high level of estrogens and low level of progesterone) women seem to prefer more masculine faces than in the non-fertile phase (Penton-Voak and Perrett 2000; Thornhill and Gangestad 1999). It seems therefore conceivable that in the case of men it could be testosterone level that might influence men's assessment of women's attractiveness in different seasons of the year. It is possible that in the seasons when men have higher T level, they can give higher or lower notes for female attractiveness. There are a few studies in which some seasonal T fluctuations were found. For instance, in probably the biggest study on T changes during one year (for 4462 men from USA) Dabbs (1990) showed the peak of T in December (for men in their early 30s the peak was in November). This result was also confirmed in Norway by Svartberg et al (2003) who showed that the lowest level of free T is during summer months (with nadir in August). However, the data on T level in relation to season are not conclusive (see also Svartberg et al 2003). In a few studies (eg Andersson et al 2003; Smals et al 1976) the T level was found to be highest in summer months or did not differ seasonally (Maes et al 1997; Tancredi et al 2005). There are also other lines of evidence indicating that the influence of T level on seasonal differences of female attractiveness assessment by men is doubtful. First, we found no seasonal effect for face index. Second, independently of season, all the indices of the older men were higher, and it is known that T level declines with age (Dabbs 1990; Feldman et al 2002). This, however, could also be explained by the fact that the older men rated the stimuli more attractive not because of their own lower T level but because the stimuli they assessed were from relatively younger (and therefore more attractive) women (the younger men's group assessed in fact their age-mates). But in our sample age was unrelated to seasonality in evaluation of body shape and breast (season $\times$ age group interactions $F < 0.59$, $p > 0.62$). This means that although younger men (ie those with higher T level) were more critical in their attractiveness judgments, they did not differ from the older group in terms of seasonality. Since seasonal shifts in T would presumably affect young and old men alike, the same seasonality effects in the two groups might be in favour of a T-mediated effect.

Although these two other possibilities are rather unlikely explanations of the obtained results, we cannot completely rule them out.

The suggested psychological influence on attractiveness judgments, and therefore some seasonality in assessing attractiveness of sexually dimorphic traits by men, has been completely neglected by biologists in interpreting behavioural seasonal changes.

Apart from the direct influences of temperature fluctuations, hormonal level changes (*T*, melatonin, luteinising hormone, or others) or fertility seasonality, the 'contrast effect' may also contribute to observed behavioural fluctuations related to human male – female interactions. The effect we found might cause seasonally different levels of male assessment of female attractiveness or affect males' mate choice decisions. It is also possible that such seasonality might be related to some circannual fluctuations in sexual activity (Smolensky et al 1981) and therefore might be related, for example, to some yearly fluctuations of adulterous behaviour. Unfortunately we are unable to indicate definitely which mechanism is responsible for the observed seasonality. The 'contrast effect' explanation seems plausible, but it is based on the conjecture that men will be exposed to sufficient numbers of women in summer who have more attractive bodies than those depicted in the stimuli in our study. Although it is possible that, complementing biological mechanisms that usually explain circannual rhythms, psychological effects of exposure could also be important for seasonality in human judgments and behaviour; to prove that we need further empirical studies that would allow us to test for each of the suggested mechanisms of the observed seasonality.

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