Attractiveness of Men's Faces in Relation to Women's Phase of Menstrual Cycle

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A B S T R A C T

In between-subjects studies on two groups of women of the same age, we show that women assess male's facial attractiveness differently in the follicular (F) and luteal (L) phases. In the high conception risk phase (F), women tended to give higher scores to male faces than when they were in the luteal phase. During the five first days of the cycle, i.e. when the estrogen level is still low, women assessed men's facial attractiveness relatively highly. We suggest that it is progesterone in the luteal phase that is responsible for lower attractiveness assigned then to male faces. We also tested which anthropometric facial traits or indices influence male attractiveness. We found that assessments of attractiveness were correlated only with mouth height (positively) and the angle between the middle of the mouth and the middle of the eyes (negatively). The results are compared with those from other studies and discussed in the light of evolutionary biology.

Key words: *women's preferences, menstrual cycle, eye-mouth-eye angle, face masculinity, face attractiveness*

Introduction

There are many morphological traits that influence human mate preferences[1–10]. Faces are among the most important physical features on the human mate market in Western culture. Women's faces convey valuable signals related to their reproductive potential, namely age[11], health[12], longevity[13], fertility[14] or developmental stability and therefore genetic quality[15]. Although man's face is not as important signal of reproductive potentials as a woman's face for men (age related cues), it was shown that it conveys also signals which may influence women's choices. Male's facial attractiveness has been shown to be related particularly to its relative masculinity[16–18] and symmetry[18–20] (but see also Noor and Evans[21] who did not find symmetry-attractiveness relationship). Furthermore, the assessment of male's facial attractiveness was found to be dependent on the phase of menstrual cycle[17,18,22,23] and therefore on the rhythmical changes of hormone levels secreted during the menstrual cycle. In the fertile phase, women seem to prefer more masculine faces than in the non-fertile phase[16–18] A question which has not yet been addressed is whether women perceive men's faces as generally more attractive in their high conception risk phase (F) of their cycle or in the non-fertile one (L).

There were at least a few studies on the morphological traits which were in some way related to a man's facial attractiveness[16,24–29]. Here, we also check, whether there is some correlation between attractiveness and a number of anthropometric traits, when analyzed separately for women in the relatively fertile (F) and non-fertile (L) groups.

Materials and Methods

We used black and white digital photographs of 135 male faces, who were cadets of the Tadeusz Kosciuszko Military Academy in Wroclaw, Poland. All cadets were photographed under standard conditions of artificial lighting and using a built-in flash. They were asked to have a neutral expression on their faces. Subjects sat on a stool, facing the camera about 1.5 m from a tripod in front of a white background. Two pictures (resolution 1280x960 pixels; 2x optical zoom) of each individual were taken. The best of the two images of each subject, with the best sharpness, brightness and natural expression of the face were selected and cropped (using Adobe Photoshop 6.0 CE) to 10x15 cm size. Framing removed auricles and the upper part of head (just above hair line), which were not part of the face and could influence the attractiveness assessment. Black and white colors eliminated (partially or totally) such traits as pigmentation of skin, eyes and hair. Short hair length and the obligation to

shave daily during military service facilitated material standardizations (similar hairstyle, no beard, no moustache). Out of these 135 photos, only 45 were selected. This exercise was performed by two professionals using standards proposed by Frackiewicz[30]. Faces with explicit head rotation in horizontal and/or vertical planes were excluded. The mean age for the 44 selected males (the age of one male was missing) was 22.64 (SD 1.04). These 45 photographs were then assessed by 112 women (majority were students of the University of Wroclaw). The photographs were arranged in a random order, each time different for all studied subjects. The judges were asked how many days had passed from the onset of their last menstruation. Taking into account the fact that the production of estradiol by ripening ovarian blisters increases and reaches the concentration peak in the middle phase of menstrual cycle just before ovulation (approximately on the 13th day)[31–34], the menstrual cycle was divided into two phases: from the first to the thirteenth day of previous menses and the second embracing the period from the 14th until the 28th day (we used a standard 28 days menstrual cycle model proposed by Penton-Voak and Perrett[17]. Although this division is not a perfect one (it is only an approximation of women's fertility), it is quite obvious that the probability of conception in the first 14 days of a menstrual cycle is much higher than in second part of the cycle (this is true even for the first 5 days of the cycle)[35]. Women who did not respond to all questions in the questionnaire (23), or who were not heterosexual (1), used contraceptive pills (20) or had menstrual cycles longer than 28 days (1) were excluded from further analysis. Out of those 67 (mean age = 23.2, SD=1.48, Min.=20, Max.=28) who were taken into further analysis, 36 women were in the first, relatively more fertile phase of menstrual cycle (F group), and 31 in the second »non-fertile« phase (L group).

To assess male's facial attractiveness, a seven point scale was used (from 1 – completely unattractive to the 7 – very attractive). Each face was assessed by judges from two »menstruation groups« and characterized by two mean values. The obtained means allowed to distinguish one »series« of attractiveness for each group.

We also measured all faces. The following anthropometric traits were collected: minimum frontal breadth (ft-ft), morphological upper facial height (n-sto), physiognomic facial height (tr-gn), bizygomatic breadth (zy-zy), height of forehead (n-tr), interocular breadth (en-en), external binocular breadth (ex-ex), mouth height (ls-li), mouth breadth (ch-ch), bigonial breadth (go-go), mentum height (sm-gn), mentum breadth, nose breadth (al-al), nose height (n-sn), eye-mouth-eye angle (angle between the middle of mouth and two pupils, after Frackiewicz 2001). On the basis of these measurements, the following indexes were calculated: fronto-zygomatic index (ft-ft:zy-zy), morphological face index (n-gn:zy-zy), physiognomic face index (tr-gn:zy-zy), the width of eye-gap »eye size« ((ex-ex)–(en-en))/2, lips index (ls-li:ch-ch), mandible face width index (go-go:zy-zy), height–width index of the nose (al-al:n-sn), nose – face width index

(al-al:zy-zy). Definitions, descriptions, ratios and measurements procedure were taken from[24,30,36–39]. Figure 1 presents all anthropometrical points, which were used in this study.
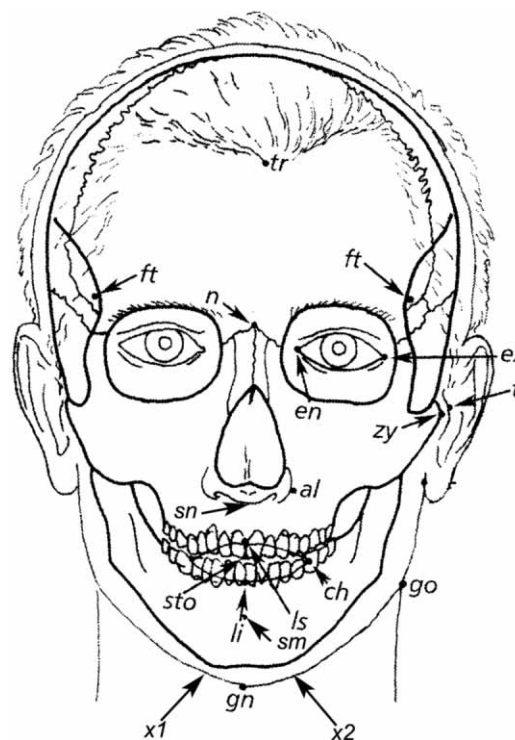

Fig. 1. Anthropometrical points. (Malinowski, Bozilow 1997 – modified).

The variables we used in the analysis were first tested for normality by Shapiro–Wilk tests and only when they had normal distributions and did not differ in variations (what was tested by F Fisher-Snedecor test) we used Student's t-test to check for differences between means. For testing relationships between continuous variables, Pearson correlation was used. All statistical analyses were performed with StatSoft, Inc. (2001). »Statistica« (data analysis software system), version 6. www.statsoft.com.

Results

There was no difference in the mean age between F and L group of women (22.9 vs 23.5 years of age, $t(65)=1.77$, $p=0.08$). A Student's t-test showed that there was a significant difference between mean assessments of male's facial attractiveness by the F and L group (2.64 vs. 2.33, $t(88)=2.12$, $p=0.037$). The range of means by all F women was 4.47–1.42, and for L women it was 3.71–1.26. We could use this test, because both F group (W=0.98, $p=0.68$, N=45) and L group (W=0.97, $p=0.29$, N=45) had normal distribution and did not differ in variations (F=1.34, $p=0.33$, N=45). Out of 45 men's faces only 4 of them were higher ranked by L group.

We have also tested whether the same results emerge when a different method of cycle division is used. Penton-Voak and Perrett[17] have suggested that only the late follicular and ovulatory phase i.e. between 6th and 14th day of the cycle, should be used in relation to »the conception risk across the cycle«[17]. When we compared relatively small sample of 25 women who were in such narrow window of fertility with other women, we found no significant difference (U=940.0, p=0.56) in assessing male faces attractiveness by these two groups of women. We obtained a similar negative results when menstrual cycle was divided for three periods (namely 5th (N=14), 6th–14th (N=25) and 15th–28th (N=28) day of the cycle) (ANOVA – Kruskal-Wallis test: (H(2)=3.85, p=0.14).

In the second stage of the analysis we checked whether there was any correlation between the anthropometric traits and attractiveness assessment separately for F and L group. There were only two traits significant (both for F group); it was mouth height (ls-li) (r=0.30, p=0.05, N=45) and eye-mouth-eye angle (r=–0.32, p=0.03, N=45).

Since some authors claim that it is mean[2,24,25,40,41] and not the extremes of metric traits which are the most attractive, we have also checked whether any quadratic function explains more than the linear relationship. Although it increased the part of the attractiveness variation that could have been explained, all determination coefficients remained very small (lower than 0.1).

Discussion

The results indicate that when they are in the higher conception risk phase of a cycle i.e. when having relatively higher level of gonadotropins and estrogens[31–34,42], young women assess male faces as more attractive (this could be called the »rose-tinted spectacles« effect). However, when we compared women that were between 5th and 13th day of their cycle with all the rest, there was no significant difference. This result could be related to the much smaller sample size of women being in this narrow window of the menstrual cycle. The fact that only women who were in the luteal phase of their cycle gave less favorable assessments than all the rest (including those being in the very first days of the cycle), may indicate that the crucial role in lower assessments is related instead to the higher level of progesterone (P) in the second part of the cycle rather than to estrogen level fluctuations in the cycle. P is considered as an antisexual hormone and was found to negatively affect sexual interest not only in humans[32,43–47]. It can be suggested then that the proximal mechanism related to the different assessment of male attractiveness by women being in different phase of menstrual cycle can be influenced by P levels. Moreover, the impact of progesterone on lowering preferences for facial masculinity, what might have the substantial role in the assessment of cadets' attractiveness, who are probably more masculinized, was also found by Jones et al.[48]
In general, women taking part in this study were rather critical. As for the scale from 1 to 7, the means for F and

L group were rather low (less than 3). In our opinion, this only accentuates the obtained results. It is possible that if the faces were very attractive, this effect would be smaller or even unnoticeable. This perceptual reaction has a possible biological explanation. Changing the attitude towards men's facial appearance, when assessing a men's facial attractiveness in the first, generally more fertile part of women cycle, increases the chance of conception. Furthermore, if in the first part of a cycle, a woman perceives men's attractiveness higher, then more men could be motivated to compete over her and she would have a chance to choose a mate with relatively higher quality. In evolutionary terms this effect must have been particularly important in relatively small groups, where the choice of potential partners was not large. In that case, very stringent demands for male facial attractiveness in all parts of a menstrual cycle could have decreased a woman reproductive success. There is however also another possible explanation of our results. It is known that in the first part of a cycle women prefer more masculinized faces[16–18]. Since the faces women assessed were the faces of cadets of the military academy, they could have been relatively masculinized and therefore assessed higher by women in F that in L phase of the cycle (the latter prefer less masculinized faces). Women in their more fertile period are also more prone to purse short-term relationship strategy and pay more attention to a potential mate physical attractiveness indicating gene quality. It is possible then that their assessments are more perceptive (or precise) and possibly closer to the objective assessments, than in the case of women who due to their infertile phases are not so much interested in a potential mate physical appearance.

Here we have shown the effect for visual cues of a potential partner but there are studies in which this effect has also been shown for olfactory signals[49] (see review in Pawlowski[50]). In the fertile phase of a cycle (in mid-cycle) women were much more tolerant and sensitive of a man's body odour [51,52]. Although in both groups (F and L) our subjects were different, they were from the same groups of students and did not differ in age. We can treat the division according to menstrual phase as a random and therefore with no biased selection. It is of course also possible to compare assessments of faces by the same subjects when in F and L phases (within-subjects studies). There is however some risk that they can remember their own judgments between sessions (particularly if it was only two weeks earlier) and try to be consistent in the second part of the studies.

The analysis showed that only mouth height (ls-li) (positively) and eye-mouth-eye angle i.e. the angle between middle of mouth and the middle of eyes (negatively), were related to men's facial attractiveness. The result for the former trait is not consistent with the opinion that fuller lips are more attractive only for female faces, as an estrogen-dependent marker[2,16,18,53]. Some other studies also show lack of or opposite (as a marker of female facial sex-hormone marker) correlations[24,25] between mouth height and attractiveness. The eye-mouth-

eye angle which has not been the trait widely used in the literature indicates that the relative position of the eyes in relation to the middle of lips might play some role in assessing a men's facial attractiveness. Since higher values of this angle can be perceived as infantile characteristics[30], the negative relationship between this trait and attractiveness means that women prefer rather mature and masculine faces.

We failed to show the correlation of attractiveness with other traits (e.g. wider mandible[18], longer lower facial bones[29], eye size[16], which are considered as testosterone, (both prenatal and adult) dependent[54] and related with men's facial attractiveness. It appears that other factors not studied here, for example fluctuating asymmetry[15,18–20,29] and skin condition[55–58], both of which influence attractiveness' assessments and are well documented, may be much more important for a men's facial attractiveness than these anthropometric traits. In the light of the universal canons of face attractiveness in different ethnic groups[18,27,28,39,40,59] our results are in fact not unexpected. If facial attractiveness was strongly related to some anthropometric traits (within some normal species range) the universality of perceiving face attractiveness would be less likely.

Acknowledgments

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PRIVLAČNOST MUŠKIH LICA U ODNOSU NA FAZE MENSTRUALNOG CIKLUSA ŽENA

S A Ž E T A K

Istraživanjem dvije grupe žena iste starosne dobi, pokazali smo da žene različito ocjenjuju privlačnost muških lica u folikularnoj (F) i lutealnoj (L) fazi ciklusa. U plodnoj fazi (F), žene su sklonije ocijeniti muška lica privlačnijima nego kada su u lutealnoj fazi. Tijekom prvih pet dana ciklusa, kada je razina estrogena još uvijek niska, žene ocjenjuju privlačnost muških lica relativno visoko. Mi smatramo da je progesteron u lutealnoj fazi odgovoran za manju privlačnost muških lica u ovoj fazi. Ispitali smo i koje su antropometrijske značajke ili indeksi lica utjecali na privlačnost muškaraca. Utvrdili smo da procjena privlačnosti korelira samo s visinom usta (pozitivno) i s kutom između sredine usta i sredine očiju (negativno). Rezultati su uspoređeni i s drugim istraživanjima te raspravljeni u svjetlu evolucijske biologije.