La donna è mobile? Lack of cyclical shifts in facial symmetry, and facial and body masculinity preferences—A hormone based study

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A B S T R A C T

Although under investigation for more than two decades, a common agreement on the occurrence of cyclical shifts in women’s masculinity and symmetry preferences is still missing. Such shifts are considered to be an important feature of sexual selection as they supposedly direct women’s attention towards cues for “good genes” (e.g. masculinity and symmetry) during times when probability of conception is the highest. Multiple studies have, however, failed to find these shifts. We attempt to address this lack of agreement analysing a sample of 110 healthy women, using intra-participant design and repeated measurements of oestradiol and LH during the cycle. To ensure the reliable detection of increased conception probability, both LH-based ovulation tests and multiple oestradiol measurements were used. We found no significant differences between women’s preferences during different cycle phases for either body or facial masculinity, or for facial symmetry. Differences remained non-significant after controlling for participants’ sexual openness, relationship status, and self-judged attractiveness. We suggest that putative cyclical shifts in preferences for cues for good genes are either very small (impossible to be tracked even with a relatively large sample) or they are far more complex than previously assumed, and further studies accounting for more confounding variables should be undertaken.

1. Introduction

Women’s masculinity preferences are intensely studied and, since the late 90s, multiple tests of the hypothesis predicting that women’s preferences change during the menstrual cycle have been conducted (Gangestad and Thornhill, 1998; Penton-Voak et al., 1999). However, a common agreement on the occurrence of such shifts is still missing as some studies found shifts in masculinity preferences (Penton-Voak et al., 1999; Puts, 2005), while other did not (Harris, 2013; Marcinkowska et al., 2016; Peters et al., 2009), and published review articles also lack a common conclusion (Gildersleeve et al., 2014; Wood et al., 2014).

1.1. Cyclical shifts in preferences and their bases

Sex hormones play an important role in sexual behaviour (Durante and Li, 2009) and it is hypothesised that overall preferences for male facial attractiveness peak around ovulation – the only time during the cycle when women can get pregnant (Danel and Pawłowski, 2006). Cyclical changes in preferences throughout menstrual cycles are considered an important feature of sexual selection as they direct women’s attention towards cues for partners’ “good genes” during times when conception probability is the highest (Thornhill and Gangestad, 1999). Some studies did find shifts in preferences but only when judging potential partners in the short-term and not in a long-term mating context (Little and Jones, 2012), or only when judgments were made by women who were currently in stable relationships (Little et al., 2008) and a number of studies did not find any evidence for cyclical preference shifts (for a review see (Gildersleeve et al., 2014; Wood et al., 2014)). It has also been suggested that such shifts, if present, should be more common among women who perceive themselves as attractive (Little and Mannion, 2006). Moreover, being sexually open, i.e. more oriented towards short-term mating contexts was shown to increase masculinity preference among women (Little and Jones, 2012). Further, the hypothesis of cyclical shifts itself – choosing individuals with cues to good genes during fertile days – has also been questioned (Havlíček et al., 2015). Moreover, it has been questioned whether facial masculinity as such can be used as a valid cue of genetic quality (based on the immunocompetence handicap theory) (Scott et al., 2013).

Apart from facial masculinity, facial symmetry was suggested to be a signal of good current and developmental somatic state (Rhodes et al., 2001) and women find more symmetrical men’s faces attractive (Scheib et al., 1999). It was also proposed that cyclical changes in symmetry preference are evolutionarily adaptive. For example, women around
ovulation were found to prefer the scent of symmetric men (Gangestad and Thornhill, 1998), however, results of other studies do not support the existence of such cyclical fluctuations (Cárdenas and Harris, 2007; Koehler et al., 2006; Peters et al., 2009). Reviewing all the published data on cyclical shifts is not in the scope of the current article, especially as in-depth and heated discussion on this matter is now in place: (Gildersleeve et al., 2014, 2013; Harris et al., 2013; Wood, 2014; Wood et al., 2014).

1.2. Defining the fertile days based on the timing of ovulation

Although fertilization can only take place if unprotected sex occurs on the day of ovulation and a maximum of 5 days prior to it (Baird et al., 1995), due to variability in the cycle length and timing of the day of ovulation it is not possible to reliably define fertile days of a particular cycle without hormonal or ultrasonographic measurements. However, even though the counting days method for defining day of ovulation has been criticised (Gangestad et al., 2016; Blake et al., 2016), and proved ineffective – almost half of women are found to misreport cycle length by 2 or more days (Small et al., 2007), due to the low costs and little effort that this method requires it is still quite commonly used (Little et al., 2008; Puts, 2005). Hormonal measurements that can provide much more reliable assessment of ovulation are luteinizing hormone (LH) surge and 17-beta oestradiol (E2) drop.

1.2.1. LH surge

Release of LH by the pituitary gland occurs, on average, 24–36 h before ovulation. LH surge is a signal to the matured follicle to release the egg, making it accessible for possible fertilisation. The majority of urine-based ovulation kits measure surge of LH, thereby allowing detecting of the occurrence of the most fertile days within the cycle. LH surge kits are easily accessible, inexpensive, and designed for home use. Up to the present time, surprisingly few within-subject design mate preference studies have based timing of the high-fertility phase and low-fertility phase on the LH surge (Burriss et al., 2015; Cantù et al., 2014; Durante et al., 2011).

1.2.2. E2 drop

Another scientifically well-grounded tool for detecting the day of ovulation is the greatest drop of E2 following the mid-cycle E2 peak (Lipson and Ellison, 1996). This method, however, is less accessible than the previously described LH-based ovulation detection. E2 levels can be measured in saliva samples provided by subjects but laboratory analysis is more time consuming than LH urine tests and cannot be facilitated independently at home. Due to advances in hormonal assays, the costs of such procedure are not very high (around 4 US Dollars per single sample measurement during conducting of this study). E2 could also be measured in serum but collection of multiple samples is not possible in most studies. In the urine, only E2 metabolites can be measured.

1.3. Aim of the study

The main aim of the study was to test the hypothesis of women’s fluctuating masculinity preference during the menstrual cycle. Although multiple studies on this topic have been published (Gildersleeve et al., 2014) some crucial pitfalls, such as between subject design or multiple hormonal measurements, have been insufficiently addressed. To account for these, and also to enhance the on-going debate on the existence of such changes, we have used detailed, robust, daily hormonal measurements and a larger than ever before sample size. Owing to a relatively large sample size we were also able to test additional hypotheses regarding conditions under which women prefer good genes, such as relationship status, sexual openness and self-judged attractiveness. With the results of this study, we have attempted to add new, methodologically well-grounded evidence to the menstrual cycle preference shifts debate, based on i) within-subject design (which proved to be more sensitive for cyclical shifts than between-subject), ii) participants who were women of peak fertility age (not only university-aged women on which the majority of up-to-date studies have been based), and iii) frequent hormonal measurements throughout the entire cycle of LH and daily measurements of E2 which, combined, give us the highest possible (without ultrasonograph examination) accuracy of the timing of ovulation.

2. Materials and methods

2.1. Participants

Participants were between 21 and 37 years of age (mean = 28.8, SD = 4.56) and were recruited from the Malopolska region of Poland, from both urban (72 participants from the city of 1 million inhabitants) and rural area (38 participants from villages of less than 5000 inhabitants, out of which only 4 had traditional farming occupation). All participants provided their written consent. To participate in the study, a woman had to comply with the following criteria: regular menstrual cycles (difference between consecutive cycles not larger than ± 5 days), no medically diagnosed health problems of the reproductive system, no diabetes, and not being pregnant, breastfeeding or taking hormonal contraception for at least 3 months prior to participation in the study. Out of 110 women recruited, 99 completed the study. Nine women scored 4 or higher on the Kinsey Sexual Orientation Scale (self-defined themselves as bi- or homosexual (Kinsey et al., 1948)) and were, therefore, excluded from analysis as sexual orientation can influence preferences towards facial features (Glassenberg et al., 2010).

2.2. Procedure

Participants collected daily saliva samples each morning, preferably immediately after waking up, starting from the first day of menstrual bleeding until the end of the cycle (one day before next menstrual bleeding). Upon agreeing to participate, all women were instructed about collecting and storing saliva samples and then given written instructions and a set of 2 mL centrifuge tubes with minimum amount of required saliva marked. During the introductory meeting, participants also received LH Ovulation Kits which consisted of sterilised urine cups, written instructions, and 10 LH ovulation tests. Urine tests were conducted from the 10th until 20th day of the cycle or until obtaining a positive result of the test (following Blake et al., 2016).

Each participant attended 3 meetings during one, entire menstrual cycle. The first meeting was scheduled well before expected ovulation (early follicular phase, not later than the 10th day of the cycle), the second meeting around ovulation (fertile, peri-ovulatory phase, for 91% of participants not later than 48 h after a positive result of the LH kit, for 9% not later than 72 h), and the third meeting approximately one week after ovulation (luteal phase). For participants who did not obtain a positive result of the ovulation test, the second meeting was scheduled around the 20th day of the cycle and the third meeting around one week later. For 15 participants, it was impossible to facilitate a luteal phase meeting before the onset of the next menses due to premature arrival of the next menses. As a consequence, for that subsample, the third meeting took place on the 1st or 2nd day of the next menses, as this time of the cycle can also be defined as a low-fertility time (Wilcox et al., 2004). Based on the results of the ovulation tests and timing of the meetings, statistical analyses were conducted in three manners: based on all women within the sample, based only on participants who obtained a positive result of the ovulation tests, and based only on women who obtained a positive result of the ovulation tests and also experienced LH rise and E2 drop in that order.

During meetings, participants completed a survey of sexual preferences; they were presented with 10 slides, each depicting a pair of male faces varying in sexual dimorphism, 4 pairs varying in facial
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