



## Tattooed man: Could menstrual cycle phase and contraceptive use change female preferences towards bad boys?



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### ABSTRACT

Studies have reported that tattooing may increase women's ratings of masculinity and dominance of men. Simultaneously, women's preferences for men's masculinity may alter due to the hormonal changes associated with menstrual cycle phase and use of hormonal oral contraceptives (OC). Here we present the results of the first study exploring whether women's perceptions of tattooed men may be influenced by female reproductive state. Pictures of men with and without a tattoo were rated in seven categories by 2437 females divided into groups (1) in fertile and non-fertile cycle phase and (2) using and not using oral hormonal contraceptives. We failed to demonstrate any significant effect of fertility status of a woman on her assessment of tattooed men in any category (attractiveness, health, masculinization, dominance, aggressiveness, potential of being a good father and a good partner).

### 1. Introduction

Several studies have reported that women's preferences for men's characteristics change across the menstrual cycle (e.g. Jones, Little, Boothroyd, DeBruine, Feinberg, Smith, et al., 2005; Penton-Voak & Perrett, 2000; Thornhill et al., 2003) possibly due to fluctuations in fertility and concentrations of sex steroids such as estradiol and progesterone (Bobst, Sauter, Foppa, & Lobmaier, 2014; Little, 2013). For instance, regularly menstruating women near the expected day of ovulation are particularly attracted to the characteristics associated with high biological quality, such as symmetry and masculinity (e.g. Gangestad & Thornhill, 1998; Penton-Voak et al., 1999; Penton-Voak & Perrett, 2000; Rikowski & Grammer, 1999; Thornhill et al., 2003). These changes have been suggested to be an evidence of evolved strategies to mate with the most genetically fit men. On the one hand more masculine man may be characterized by better genes, but also by other less desirable traits. For instance Perrett et al. (1998) demonstrated that increased facial masculinity is associated with decreased warmth, emotionality, cooperativeness, and quality as a partner. These characteristics might compromise long-term reproductive interests of women and present them with a trade-off between choosing less masculine, more agreeable and investing, long-term partners and more masculine, short-term partners with better genetic make-up and sets of undesirable social traits (Penton-Voak et al., 1999). Thus, due to the trade-off hypothesis, women would benefit the most from employing

conditional mate strategy choosing for long-term partners men who have less masculine features, and looking for short-term sexual relations with men characterized by more masculine features when the risk of conception is the highest (Penton-Voak & Perrett, 2000).

Moreover, some studies indicate use of hormonal contraceptives is also associated with significant shifts in sex hormone levels and may alter a female's perception of men (e.g. Alvergne & Lummaa, 2010; Feinberg, DeBruine, Jones, & Little, 2008; Limoncin et al., 2015). However, a recent study of Jones et al. (2017) has shown no evidence that preferences for facial masculinity were related to changes in women's salivary steroid hormone levels or that oral contraceptive use decreased masculinity preferences. Therefore, still it is unclear how specific reproductive and hormonal states may alter women's perceptions of men in general.

It has been suggested that if women tend to show higher preferences towards masculinization or symmetry in men (information about good health and good genes), the preferences towards such characteristics may depend on the female reproductive status (e.g. Ditzen, Palm-Fischbacher, Gossweiler, Stucky, & Ehlert, 2017; Johnston, Hagel, Franklin, Fink, & Grammer, 2001; Little & Jones, 2012; Penton-Voak et al., 1999; Penton-Voak & Perrett, 2000; Roney & Simmons, 2008; Roney, Simmons, & Gray, 2011; Welling et al., 2007). We hypothesize that tattoos in men may be this kind of feature. Tattooing involves inserting a pigment into the skin with a needle, needles or other sharp tools and has been practiced in many cultures for many centuries (De

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Fig. 1. Two versions of one of stimulus pictures, original (A) and manipulated (B).

Cuyper & Pérez-Cotapos, 2010). The procedure involves significant discomfort and the risk of many complications such as acute inflammatory reactions, erythema and edema (Islam et al., 2016; Piérard-Franchimont, Hermanns, & Piérard, 2011). It has been hypothesized that only individuals of high biological quality can afford the risk of tattooing (Wohlrab, Fink, Kappeler, & Brewer, 2009) and due to handicap principle (sensu Zahavi, 1975) having a tattoo may influence how the owner of the tattoo is perceived (Singh & Bronstad, 1997). It has been suggested that tattoos honestly signal genetic and phenotypic quality (Singh & Bronstad, 1997), including good health and immunocompetence. Wohlrab et al. (2009) have shown that tattooed male figures had been assessed as healthier by women than by men, and more dominant both by men and women. Moreover, our recent study has indicated that women rated photographs of tattooed men as healthier, but not more or less attractive than photos of non-tattooed men. Women also perceived pictures of men with a tattoo as more masculine, dominant and aggressive and as worse potential partners and parents (Galbarczyk & Ziomkiewicz, 2017).

Indeed, some evidence has indicated better biological quality of tattoo bearer. For instance, a recent study has found that individuals with multiple tattoos had boosted immunological response. This effect might be due to stimulating effect of multiple tattooing on immunological response (Lynn, Dominguez, & DeCaro, 2016). Results of another study have suggested however that this effect might be due to better immunological and genetic quality of tattoo bearer – men with tattoos and/or piercings (other than piercing ears) were more symmetrical than men without such body modifications (Koziel, Kretschmer, & Pawlowski, 2010).

We conducted a study aimed to identify whether perception towards tattooed men may be influenced by (1) phase of the menstrual cycle and (2) use of oral contraceptive. Based on the existing observations we hypothesized that perception of tattooed men will differ according to woman's reproductive status. Specifically, we predicted that only women in fertile phase of the menstrual cycle will assess tattooed men as more attractive, healthy and masculine. Additionally, we predicted

that women in non-fertile phase will rate men with tattoos as more dominant, aggressive, and as worse potential partners and parents. This effect should be due to expected direct benefits associated with transmission of good genes to the offspring or indirect advantages associated with better care (e.g. Finney & Miller, 1999; Marlowe, 2000) and higher provisioning (Roberts & Little, 2008) delivered by tattooed men (a process that does not need to be conscious). Being in a relationship can influence changes in females preferences, e.g. Little, Jones, and DeBruine (2008) have shown that general preference shifts occurred only for women who were in a committed relationship. Hence we predicted that those differences between women in fertile and non-fertile phase should be greater among women with partners. Due to lack of the ovulatory shift in levels of reproductive hormones in women on oral contraceptives we predicted that differences in the assessment of tattooed vs. non-tattooed men will be more pronounced in regularly menstruating women than in women on oral contraceptives. Similarly, we predicted that differences between hormonal oral contraceptive users and non-users should be greater among women with partners.

## 2. Methods

### 2.1. Internet survey

Data were collected by an online survey announced in social media (e.g. Facebook) as a “study on male attractiveness”. Each participant provided information about the age, relationship state (single or in relationship), average length of menstrual cycles, cycle regularity, day of the menstrual cycle during which she took part in the survey, and whether she was pregnant or using oral hormonal contraceptives (other form of hormonal contraception is rarely used in Poland (Colleran & Mace, 2015)). Total number of exclusively heterosexual women who participated in study was 2437. Because of the small sample size ( $n = 79$ ) pregnant women were excluded from the analysis. Additionally, due to the lack of information or reporting of irregular menstrual cycle, responses from 470 women were excluded. This

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