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Oral contraceptive use in women changes preferences for male facial masculinity and is associated with partner facial masculinity

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Summary Millions of women use hormonal contraception and it has been suggested that such use may alter mate preferences. To examine the impact of oral contraceptive (pill) use on preferences, we tested for within-subject changes in preferences for masculine faces in women initiating pill use. Between two sessions, initiation of pill use significantly decreased women's preferences for male facial masculinity but did not influence preferences for same-sex faces. To test whether altered preference during pill use influences actual partner choice, we examined facial characteristics in 170 age-matched male partners of women who reported having either been using or not using the pill when the partnership was formed. Both facial measurements and perceptual judgements demonstrated that partners of women who used the pill during mate choice have less masculine faces than partners of women who did not use hormonal contraception at this time. Our data (A) provide the first experimental evidence that initiation of pill use in women causes changes in facial preferences and (B) documents downstream effects of these changes on real-life partner selection. Given that hormonal contraceptive use is widespread, effects of pill use on the processes of partner formation have important implications for relationship stability and may have other biologically relevant consequences.

1. Introduction

Biological approaches to human attractiveness have documented several traits linked to mate preferences (Roberts and Little, 2008). These include preferences for visible facial and body traits, such as symmetry and sexually dimorphic cues (Thornhill and Gangestad, 1999; Little et al., 2011),

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vocal cues, such as pitch (Feinberg et al., 2006, 2008), and odour cues, such as those associated with genetic profiles (Wedekind et al., 1995; Roberts et al., 2008). Sexually dimorphic traits, relative masculinity/femininity, in faces have received much attention from those interested in evolutionary approaches to human preferences and perception (see e.g., Thornhill and Gangestad, 1999). This is because masculinity in male faces has been proposed to relate to both inter-sexual selection (Thornhill and Gangestad, 1999; Little et al., 2011), influencing attraction to the opposite-sex, and intra-sexual selection (Swaddle and Reierson, 2003), relating to competition between members of the same sex. In terms of attractiveness to the opposite-sex, there are benefits that could be associated with sexual dimorphism: (1) indirect benefits, genetic benefits that are passed to offspring such as genes associated with strong immune systems, and (2) direct benefits, benefits that are directly passed to mates or offspring, such as resources or avoidance of disease. In line with links to both types of benefit, masculine-faced men are perceived as dominant (Perrett et al., 1998), report better health (Thornhill and Gangestad, 2006) and are physically stronger (Fink et al., 2007). However, masculine faced men also receive negative attributions, such as being seen as poor parents (Perrett et al., 1998), and have more short-term partners (Boothroyd et al., 2008) which suggests low investment in relationships. Facial masculinity in men then appears to be associated with a trade-off between investment and quality (Perrett et al., 1998). For example, masculinity may be negatively linked to levels of investment (direct benefit) but also positively to quality in terms of genes for health/dominance (indirect benefits) as well as current health/resources (direct benefits). Such a trade-off is consistent with variation in masculinity preferences, such as increased preferences for masculinity in short-term contexts (Little et al., 2002).

Multiple studies have demonstrated that women's preferences for various traits in various domains shift across the menstrual cycle (Rikowski and Grammer, 1999; Puts, 2005; Feinberg et al., 2006; Little et al., 2011). One of the most well-documented phenomena in studies examining cyclical preference shifts is a greater attraction to masculine faces at peak fertility in the menstrual cycle (Penton-Voak et al., 1999; Johnston et al., 2001; Little et al., 2007; Jones et al., 2008; Little and Jones, 2012), a within-individual shift driven by variation in hormone levels across the cycle. This shift has been proposed to be adaptive in changing the preferences of women when they are most likely to become pregnant towards preferring high quality males or in leading to attraction to more cooperative men when not likely to become pregnant (Penton-Voak et al., 1999; Johnston et al., 2001; Little et al., 2007; Jones et al., 2008; Little and Jones, 2012).

In view of hormonal differences between users and non-users of hormonal contraception, we might expect hormonal contraceptive use to influence these cyclical shifts in preferences. Indeed, studies of cycle effects have demonstrated a lack of (or weaker) shifts in preference among women using hormonal contraceptives (Penton-Voak et al., 1999; Alvergne and Lummaa, 2010). Hormonal contraception also has the potential to change preferences across several different domains (Wedekind et al., 1995; Alvergne and Lummaa, 2010). For example, in the auditory domain preferences for masculinity in male vocal traits also appear to be weaker in pill users than non-users (Feinberg et al., 2008). Other research has examined preferences for the odour of genetically similar and dissimilar men. Some studies have found that preferences for men who are dissimilar at the major histocompatibility complex (MHC, a suite of genes coding for immune response), move towards preferences for genetically similar men in pill users (Wedekind et al., 1995; Roberts et al., 2008), indicating that pill use may change preferences in the smell domain.

Given that the pill and other hormonal contraceptives are used by 12.5% of partnered women of reproductive age worldwide (United Nations, 2011), and that the proportion of US women, for example, who have ever used the contraceptive pill stands at 82% (Mosher and Jones, 2010), any alteration of preferences caused by hormonal contraceptive use is likely to be widespread. It is therefore important to examine how preferences and partner choice are affected by contraceptive pill use. Past research on the effects of the pill on preferences has generally examined only between-group comparisons, comparing different groups of pill users and non-users. This means that there may exist other differences between users and non-users that account for variation in preference beyond hormonal changes associated with the pill (Roberts et al., 2008), such as differences in sexual behaviour (Little et al., 2002). Whether potential shifts in preference due to pill use lead to measurable differences in partner choices also remains to be addressed, and this is important because such differences could impact on the benefits and costs associated with preferring and partnering with masculine-faced men. We therefore examined the effect of pill use on preferences experimentally in Study 1 and measured the potential downstream influence of any altered preferences on partner choice in Study 2.

1.1. Study 1: experimental test of preference change after initiation of pill use

Previous studies of visual preferences for masculine traits documenting differences between women using and not using hormonal contraceptives have not been experimental in design, and have therefore been unable to demonstrate causative links between hormonal contraception and altered mate preferences. In our first study we experimentally examined change in preferences following initiation of pill use. We recruited an experimental group and a control group of women who completed two facial masculinity preference tests with an interval of approximately three months. Tests incorporated opposite-sex and same-sex faces manipulated using computer graphics techniques to appear more or less masculine (see Fig. 1). Opposite-sex faces were judged for attractiveness as both a long-term and short-term partner, since relationship term is known to influence preferences (Penton-Voak et al., 1999; Little et al., 2002). The experimental group commenced pill use after the first test while the control group did not. If pill use affects preferences we expected that our experimental group would demonstrate a change in preference while our control group would not. We additionally predicted that if changes in preferences for sex-typicality reflect adaptation for mate choice then any change in preference for facial masculinity in the experimental group would be restricted to opposite-sex faces.