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# Women's preferences for masculinity in male faces are highest during reproductive age range and lower around puberty and post-menopause

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**Summary** Masculinity in male faces is thought to be a sign of mate quality and is associated with measures of long-term health. Previous studies have demonstrated that women's masculinity preferences change across the menstrual cycle with women preferring more masculine men during phases of the menstrual cycle where fertility is highest (i.e. the late follicular phase). Given the hormonal correlates of such preferences and that these hormones change across the life span, we tested for differences in female masculinity preferences at different ages. We compared the masculinity preferences of peri-pubescent girls and young adult women (Study 1), circummenopausal women reporting to either be pre- or post-menopause (Study 2), and a large sample of women across a wide range of ages (Study 3). In all three studies, preferences for masculinity in male faces were highest in women who were at a reproductively active age. Preferences for masculinity were lower when females were peri-pubescent, post-menopausal, or at ages corresponding to these groups. These data support the notion that masculinity in male faces is an important trait for reproductively relevant mate choice decisions. These data also highlight a shift in female visual preferences for men that is associated with important stages of the lifespan. Visual preferences appear to track important hormonal changes associated with age; as women pass puberty their preferences shift towards facial traits associated with mate quality and as women undergo menopause their preferences for such facial traits decrease. Overall, these

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results demonstrate the important role of reproductive status and support the notion that preferences for male faces are tied to reproductively relevant hormones.

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## 1. Preferences for masculinity in male faces are highest during reproductive age range in women

Masculine facial characteristics in men are positively associated with measures of long-term health (Rhodes et al., 2003; Thornhill and Gangestad, 2006), but are also associated with an increased interest in pursuing short-term relationships (Rhodes et al., 2005; Boothroyd et al., 2008). This means masculinity in male faces is associated with a trade-off between health and investment and one aspect of this trade-off means benefits of mating with masculine- or feminine-faced men will change according to women's fertility (see Gangestad and Thornhill, 2008; Jones et al., 2008 for recent reviews).

Many studies have demonstrated that women's preferences for male traits change across the menstrual cycle. For example, studies have reported increased preferences for facial masculinity (Frost, 1994; Penton-Voak et al., 1999; Penton-Voak and Perrett, 2000; Johnston et al., 2001; Jones et al., 2005; Little et al., 2008), vocal masculinity (Puts, 2005; Feinberg et al., 2006), video clips of dominant behaviour (Gangestad et al., 2004), taller men (Pawłowski and Jasienska, 2005) and masculine body shapes (Little et al., 2007) during the late follicular menstrual cycle phase when women are most fertile. Moreover, these changes in preferences for masculine men are potentially adaptive as they may function to increase offspring health by promoting mating with masculine men around ovulation (Penton-Voak et al., 1999; Penton-Voak and Perrett, 2000; Johnston et al., 2001; Jones et al., 2005; Little et al., 2008).

Preferences for masculinity in faces are also affected by other factors relating to potentially adaptive strategic mate choices. For example, because an increased preference for potential good-gene health benefits to offspring over signs of parental investment would be expected in extra-pair copulations when a woman has already acquired a long-term partner, women's partnership status should affect their face preferences. Indeed, Little et al. (2002) have shown that women who have partners prefer masculine male faces more than those without a partner. In a similar manner, women also report having stronger preferences for masculine-faced men when judging for short-term relationships than when judging for long-term relationships (Little et al., 2002) and women who report more interest in short-term mating also prefer more masculine faces (Waynforth et al., 2005; Smith et al., 2009).

The strategic preferences and cyclic shifts evident in women's preferences for masculinity in male faces are evident in adult women who were generally selected for having natural cycles (i.e. not pregnant or using hormonal contraceptives). Since cyclic shifts and strategic preferences for masculine men do not appear to occur in women who do not have natural menstrual cycles (Penton-Voak et al., 1999; Little et al., 2002), women who are pre-pubescent and post-menopausal are also typically excluded from studies

of masculinity preferences. There are good reasons, however, to predict that women's preferences for facial masculinity may change during the transitions between different phases of a woman's reproductive lifespan. Because women are not able to reproduce either pre-puberty or post-menopause, we might see a shift away from mating psychology at these times. Similarly, attention to cues important in choosing partners that may benefit offspring via genetic inheritance may be diminished relative to women within their reproductive years (Hawkes et al., 1998; Vukovic et al., 2009). Both puberty and menopause are associated with shifts in hormonal profile in women and it is these hormones that may help determine preferences for traits such as masculinity in men.

The transition through puberty represents the move from a juvenile to an adult state and involves significant changes in behaviour as well as hormonal profile (such as gonadotropins and sex steroids). Puberty is known to affect many types of psychological processes (Buchanan et al., 1992), although broad similarities between judgments of facial attractiveness by children and by adults are generally found (Cross and Cross, 1971; Cavior and Lombardi, 1973; Dion, 1973; for review see Langlois et al., 2000). Indeed, even infants appear to prefer looking at faces that adults deem as attractive compared to those deemed unattractive (Langlois et al., 1991; Slater et al., 1998) although certain face traits preferred by adults, such as symmetry and averageness, do not appear to be preferred by infants (Rhodes et al., 2002).

As social interaction is relevant across the entire lifetime it might be expected that individuals attend to attractiveness broadly in choosing social partners. Studies demonstrating agreement between children and adults have generally not focussed on specific traits that may be more relevant for mate choice—traits that are more likely to show differences pre- and post-puberty. Several studies have demonstrated interesting differences in ratings that might reflect pubertal development. For example, young children do not show preferences for the waist-to-hip ratio that is found most attractive by adults, but teenagers do (Connolly et al., 2004). Another study has shown that while children's judgments are in agreement with adults' judgments in their perceptions of facial attractiveness there is less agreement about vocal attractiveness (Saxton et al., 2006). Also in the vocal domain, older girls have been found to select lower-pitched boys' voices as more attractive than younger girls do and this appears related to pubertal development (Saxton et al., 2009). Most closely related to the current studies, Saxton et al. (2009) have also demonstrated that pubertal development is related to preferences for several important face traits. They found that in a cross-sectional sample of children aged 11–15, while both the younger and older groups of children preferred more average, symmetric and feminine faces, older children were significantly more likely than younger children to select the average, symmetric and, when judged by girls but not boys, feminine male faces as more attractive (Saxton et al., 2009).

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