



Perceptions of infidelity risk predict women's preferences for low male voice pitch in short-term over long-term relationship contexts



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ABSTRACT

Women typically rate lower-pitched men's voices as more attractive than they rate higher-pitched men's voices, yet women also perceive men with lower-pitched voices as relatively less likely to be sexually faithful. This disparity between women's preferences for voice pitch and perceptions of fidelity may be due to the differences in the characteristics women desire in long-term versus short-term mates. Male fidelity is likely an important characteristic within long-term relationships, but may be less important if women are seeking short-term relationships. Here we tested for associations between women's preferences for male voice pitch in short-term versus long-term relationships and their perceptions of infidelity risk. We found that the more often women rated men with lower-pitched voices as likely to commit infidelity, the greater their preference for lower-pitched men's voices in a short-term relative to a long-term relationship context. Therefore, the extent to which women select masculine men as short-term partners appears to be tied to the increased risk of infidelity associated with male masculinity.

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1. Introduction

Sexual fidelity is a highly desired trait in potential long-term mates (Minervini & McAndrew, 2006; Thiessen, Young, & Burroughs, 1993) because extra-pair sex is potentially costly (Geary & Byrd-Craven, 2004). Males with unfaithful mates may be subject to fitness costs in the form of cuckoldry (Geary & Byrd-Craven, 2004). A female whose mate engages in extra-pair sex may lose her mate's resources and/or protection to the extra-pair female and any resultant offspring (Anderson, Kaplan, & Lancaster, 1999, 2007; Pillsworth & Haselton, 2006). Either sex may experience other infidelity-related fitness costs resulting from sexually transmitted infections, retaliation from an in-pair partner and/or their kin group, or reduced mate value (Daly & Wilson, 1988; Daly, Wilson, & Weghorst, 1982). Hence, strategies that reduce the probability of experiencing infidelity are likely to be adaptive.

Prior research suggests that women may use men's physiological traits to gauge the likelihood of future fidelity. For instance, women perceive lower-pitched men's voices as presenting a greater future risk of infidelity than higher-pitched men's voices (O'Connor, Re, & Feinberg, 2011). Voice pitch (the perceptual correlate of fundamental frequency and/or corresponding harmonics) is tied to the rate of vocal fold vibration. Thicker and longer vo-

cal folds are capable of producing lower frequencies than are thinner vocal folds (Titze, 1994). Pubertal testosterone levels cause an increase in vocal fold mass that results in lower voice pitch (Harries, Hawkins, Hacking, & Hughes, 1998). Owing to relatively higher-levels of pubertal testosterone among males, adult male voice pitch is on average half that of the average adult female voice pitch (Childers & Wu, 1991). Voice pitch continues to be negatively related to men's testosterone levels in adulthood (Dabbs & Mallinger, 1999; Evans, Neave, Wakelin, & Hamilton, 2008; Puts, Apicella, & Cárdenas, 2012).

Women perceive men with lower-pitched voices as more likely to commit infidelity than men with higher-pitched voices (O'Connor et al., 2011). This may be due to the associations among men's voice pitch, testosterone levels, and mating effort. Men with relatively higher levels of testosterone are less likely to invest in relationships and offspring (Booth & Dabbs, 1993; Gray, Parkin, & Sammsvaughan, 2007; Roney, Hanson, Durante, & Maestriperi, 2006; van Anders & Goldey, 2010; van Anders, Hamilton, & Watson, 2007). When men with relatively higher levels of testosterone are in relationships, they report lower levels of relationship commitment (Caldwell Hooper, Gangestad, Emery Thompson, & Bryan, 2011), sustained interest in extra-pair sex (McIntyre et al., 2006), and a higher number of extra-marital affairs (Booth & Dabbs, 1993; Fisher et al., 2009, 2012). Therefore, women's perceptions of heightened infidelity risk amongst men possessing relatively masculinized testosterone-dependent traits may be due to the relationship between men's testosterone levels and mating effort.

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Women generally prefer lower-pitched over higher-pitched men's voices (Collins, 2000; Feinberg, Jones, Little, Burt, & Perrett, 2005; Feinberg et al., 2012; Hodges-Simeon, Gaulin, & Puts, 2010; Jones, Feinberg, DeBruine, Little, & Vukovic, 2010; Simmons, Peters, & Rhodes, 2011). An adaptive function of women's preferences for lower-pitched men's voices may be to gain fitness benefits in the form of heritable health for offspring in times when immunity may supersede the need for parental investment (Feinberg et al., 2012; Jones et al., 2013). Women's preferences for vocal masculinity are greater in the fertile phase of the menstrual cycle (Feinberg et al., 2006), particularly when rating men's voices for short-term relationships (Puts, 2005). Regardless of menstrual cycle phase, women tend to prefer lower-pitched men's voices more in the context of a short-term relationship than a long-term relationship (Feinberg et al., 2012; Little, Connely, Feinberg, Jones, & Roberts, 2011). Men with lower-pitched voices tend to report higher numbers of past sex partners (Puts, Gaulin, & Verdolini, 2006) and report significantly more surviving offspring than do men with higher-pitched voices (Apicella, Feinberg, & Marlowe, 2007). However, researchers have failed to find a link between voice pitch and sperm quality (Simmons et al., 2011), suggesting that increased reproductive success among men with lower-pitched voices may be due in-part to differential access to fertile female sex partners.

Despite women's preferences for lower male voice pitch, women also generally perceive men with masculine traits as relatively less suitable long-term mates. For example, women perceive men with lower-pitched voices as less likely to invest time and effort into romantic relationships and as less likely to be financially generous with their romantic partners (O'Connor, Fraccaro, & Feinberg, 2012). However, women who prefer lower-pitched men's voices as long-term mates also rate men with lower-pitched voices as relatively more investing, generous, and trustworthy mates (O'Connor et al., 2012; Vukovic et al., 2011). Thus, individual variation in preferences for low-pitched men's voices across long- and short-term mating contexts seems to be tied to the perceived risk of infidelity to individual women. Despite this, O'Connor et al. (2011) found no relationship between how much women associate infidelity with lower male voice pitch and their preferences for those voices, but did not test preferences across long-term and short-term relationship contexts. One reason for this null result could be that infidelity risk may be less important if women are seeking short-term mates and may therefore neither desire nor expect fidelity from these men. Here, we test whether women who perceive lower pitched men's voices as indicating a higher infidelity risk also prefer men with lower pitched voices as better short-term than long-term partners.

2. Materials and methods

2.1. Participants

Protocols for this study were approved by the McMaster Research Ethics Board. Heterosexual women ($N = 87$; mean age = 18.45 years, $SD = 0.83$ years) were recruited from McMaster University, Canada, and compensated with partial course credit for participation. Participant age and sexual orientation were self-reported. All participants were heterosexual as quantified by a score of 1 or 2 on a scale from 1 (completely heterosexual) to 7 (completely homosexual). Participants self-reported relationship status by answering "yes" ($n = 49$) or "no" ($n = 38$) to the question "are you currently in a steady relationship?"

2.2. Stimuli

Voice stimuli were collected and manipulated in the same manner as Feinberg et al. (2006) and Feinberg, DeBruine, Jones,

and Little (2008). Male undergraduates aged 18–22 ($N = 6$) were recorded speaking the English monophong vowels; 'ah', 'ee', 'eh', 'oh', 'oo'. Single channel recordings were made at the University of St. Andrews, Scotland, in a quiet room with an Audio-Technica (www.audio-technica.com) AT4041 cardioid condenser microphone at a 44.1 kHz sampling rate with 16-bit amplitude quantization in Sound Forge software (Sony Creative). Research using 4–6 voice identities (Feinberg et al., 2005, 2006, 2008, 2012; Jones et al., 2010; O'Connor et al., 2011, 2012) has found similar effects of voice pitch on attractiveness judgments as those studies that used many more voice identities (Collins, 2000; Feinberg et al., 2008; Puts, 2005), or fewer voice identities (Re, O'Connor, Bennett, & Feinberg, 2012), indicating that small numbers of systematically manipulated stimuli produce results that generalize to larger stimulus sets.

Voice pitch was raised and lowered by adding or subtracting (respectively) 0.5 equivalent rectangular bandwidths (ERBs) of the baseline frequency. The ERB scale accounts for the difference between pitch perception and natural frequencies more accurately than do alternative scales (Tranmüller, 1990). This manipulation is approximately equivalent to a 20 Hz manipulation for an average male voice pitch of 120 Hz (Childers & Wu, 1991). This degree of pitch manipulation has been successful in previous research on perceptions of voice pitch (Feinberg et al., 2005, 2008; Jones et al., 2010) and influences perceptions of masculinity (Feinberg et al., 2005) and infidelity (O'Connor et al., 2011). The resulting frequencies of manipulated voices were within and account for a large amount of variation in the normal range of adult male voice pitch (100.0–139.7 Hz).

2.3. Procedure

Voice pairs were presented in three separate, randomized blocks representing three different rating contexts (infidelity, short-term relationship, long-term relationship). Similar to O'Connor et al. (2011), in the infidelity rating context participants were instructed to "choose the voice that is more likely to cheat on you if you were their romantic partner." Participants' voice preferences were measured under both short-term and long-term relationship contexts. Following Little, Jones, Penton-Voak, Burt, and Perrett (2002) and Penton-Voak et al. (2003) participants were instructed as follows:

Short-term: Choose the person you think is more attractive for a short-term relationship. Short-term implies that the relationship may not last a long time. Examples of this type of relationship would include a single date accepted on the spur of the moment, an affair within a long-term relationship, and the possibility of a one-night stand.

Long-term: Choose the person you think is more attractive for a long-term relationship. Examples of this type of relationship would include someone you may want to move in with, someone you may consider leaving a current partner to be with, and someone you may, at some point, wish to marry (or enter into a relationship on similar grounds as marriage).

Listeners heard pairs of voices of the same identity that were lowered and raised in pitch in a two-alternative forced-choice paradigm. Stimulus pairs were randomized for order and side of screen presentation within blocks, and blocks were interspersed with unrelated auditory and visual distracter tasks in order to disguise the manipulation and hypotheses. Voices were played consecutively, prompted by the participant selecting the 'play' button for the individual file. Participants could replay the voices *ad libitum*. Participant responses automatically loaded the next trial.

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