



Original Article

Social dialect and men's voice pitch influence women's mate preferences



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ABSTRACT

Low male voice pitch may communicate potential benefits for offspring in the form of heritable health and/or dominance, whereas access to resources may be indicated by correlates of socioeconomic status, such as sociolinguistic features. Here, we examine if voice pitch and social dialect influence women's perceptions of men's socioeconomic status and attractiveness. In Study 1, women perceived lower pitched male voices as higher in socioeconomic status than higher pitched male voices. In Study 2, women independently perceived lower pitched voices and higher status sociolinguistic dialects as higher in socioeconomic status and attractiveness. We also found a significant interaction wherein women preferred lower pitched men's voices more often when dialects were lower in sociolinguistic status than when they were higher in sociolinguistic status. Women also perceived lower pitched voices as higher in socioeconomic status more often when dialects were higher in sociolinguistic status than when lower in sociolinguistic status. Finally, women's own self-rated socioeconomic status was positively related to their preferences for voices with higher status sociolinguistic dialects, but not to their preferences for voice pitch. Hence, women's preferences for traits associated with potentially biologically heritable benefits, such as low voice pitch, are moderated by the presence of traits associated with resource accrual, such as social dialect markers. However, women's preferences for language markers of resource accrual may be functionally independent from preferences for potential biological indicators of heritable benefits, such as voice pitch.

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1. Introduction

Women's mate preferences are influenced both by cues to fitness benefits such as heritable health and/or dominance and by cues to resource provisioning and protection (Gangestad & Simpson, 2000; Geary & Byrd-Craven, 2004). Male vocal masculinity may be one cue to potential heritable benefits for offspring (Feinberg, 2008; Puts, Jones, & DeBruine, 2012). The development of a masculine, low pitched voice is dependent upon pubertal testosterone levels (Hollien, 1960). Assuming equal tension, thicker and longer vocal folds are capable of producing lower frequencies than are thinner vocal folds (Titze, 1994). Pubertal testosterone levels cause an increase in vocal fold mass, which results in lower voice pitch (Harries, Hawkins, Hacking, & Hughes, 1998). Male voice pitch continues to be inversely related to testosterone levels into adulthood (Dabbs & Mallinger, 1999; Evans, Neave, Wakelin, & Hamilton, 2008; Puts, Apicella, & Cardenas, 2012).

Testosterone-dependent traits, such as male voice pitch, may serve as indicators of health (Feinberg, 2008; Puts, Jones, & DeBruine, 2012;

Rantala et al., 2012). Men with higher testosterone report fewer illnesses (Rhodes, Chan, Zebrowitz, & Simmons, 2003; Thornhill & Gangestad, 2006) and show stronger immune responses to hepatitis B vaccinations than do men with lower testosterone (Rantala et al., 2012). Therefore, higher levels of testosterone among men are associated with indices of health which could potentially benefit offspring either directly by reducing proximate exposure to pathogens or indirectly in the form of heritable immunity (Tybur & Gangestad, 2011).

The potential fitness benefits of mating with relatively masculine men may extend beyond those of health and heritable immunity. Low male voice pitch may also communicate the ability to accrue resources, as testosterone levels are positively associated with dominant behaviour and social status (Mazur & Booth, 1998; Tremblay et al., 1998). Dominant, high status men are more likely to gain access to resources than are less dominant, lower status men (Geary & Byrd-Craven, 2004; Mazur & Booth, 1998). Furthermore, men with lower pitched voices are perceived to be relatively more threatening to rivals (Puts, Apicella, & Cardenas, 2012), better hunters (Apicella & Feinberg, 2009), and more likely to attain social positions associated with higher socioeconomic status such as political office (Klofstad, Anderson, & Peters, 2012; Tigue, Borak, O'Connor, Schandl, & Feinberg, 2012) and as a result, have increased access to resources.

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Therefore, women's preferences for lower pitched male voices may also be associated with potential fitness benefits stemming from mating with relatively dominant, high status men.

Men with higher levels of testosterone may have a greater ability to secure resources that are attractive to women, but such men are thought to be less likely to invest those resources in their mates and offspring. For instance, women perceive men with lower pitched voices as less likely to be sexually faithful (O'Connor, Re, & Feinberg, 2011), 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). Relatively masculine men are more likely to allocate efforts toward multiple mating opportunities than toward a single long-term relationship partner. For example, men with more attractive voices report higher numbers of sex partners, extra-pair partners, and frequency of acting as an extra-pair partner than do men with less attractive voices (Hughes, Dispenza, & Gallup, 2004). Men with lower pitched voices also report a higher number of sex partners than do men with higher pitched voices (Puts, 2005). Therefore, men who are likely to confer the benefits of health and dominance to offspring and have access to resources that are attractive to women may be less likely to invest such resources in their mates and offspring.

Cues to higher socioeconomic potential also appear to be particularly important in women's mate choice decisions (Buss, 1989; Scheib, 2001; Townsend & Levy, 1990; Waynforth, 2000). Within industrialized nations, socioeconomic status may be demonstrated through clothing (DeWall & Maner, 2008), luxury car ownership (Dunn & Searle, 2010), profession, income level, and level of educational attainment (Greitemeyer, 2007). Information regarding socioeconomic status is also reliably transmitted by subtle variations within local accents (Gregg, Murdoch, DeWolf, & Hasebe-Ludt, 1985; Gregg, Murdoch, Hasebe-Ludt, & DeWolf, 1981; Labov, 1972; Woods, 1979, 1999) and occurs in many different languages (Ball, 2009). While the specific acoustic features that encode socioeconomic status vary by region and language (Ball, 2009; Chambers, 1991), language markers of socioeconomic status are prevalent and identifiable from short segments of speech (Ellis, 1967; Moe, 1972). Speech therefore contains cues to two aspects of mate quality: sociolinguistic features, which may indicate the ability to accrue material resources via social status, and voice pitch, which may indicate resource sharing potential via the relationship between testosterone levels and investment in relationships and offspring.

The strength of women's preferences for both male voice pitch and cues to socioeconomic status varies between individuals. While women generally prefer lower pitched men's voices over higher pitched men's voices (Collins, 2000; Jones, Feinberg, DeBruine, Little, & Vukovic, 2010; O'Connor et al., 2012; O'Connor, Fraccaro, & Feinberg, 2012; O'Connor et al., 2011; Simmons, Peters, & Rhodes, 2011), such preferences are stronger during times of increased conception risk. For instance, women's preferences for lower pitched men's voices are relatively greater during the fertile phase of the menstrual cycle (Feinberg et al., 2006; Puts, 2005), or when women indicate preferences for short-term sexual partners (Feinberg et al., 2012; Little, Connely, Feinberg, Roberts, & Jones, 2011; Puts, 2005). Women's preferences for lower pitched men's voices are weaker among women who are using hormonal birth control (Feinberg, DeBruine, Jones, & Little, 2008), or who are breastfeeding (Apicella & Feinberg, 2009), than among other women. Therefore, masculinity preferences are strongest among women who are more likely to reap the fitness benefits of heritable health and/or dominance associated with mating with relatively masculine men.

There is also variation in women's preferences for cues to resource accrual. Women who are rated by others as more attractive, and who have more feminine bodies, have stronger preferences for resources in potential mates than do other women (Buss & Shackelford, 2008; Pawlowski & Jasienska, 2008). Furthermore, women with higher incomes tend to rank good financial prospects as more important than physical attractiveness. Conversely, women who have direct control

over their own finances (who may not necessarily have high incomes) rank physical attractiveness as more important than a potential mate's financial prospects (Moore, Cassidy, Lawsmith, & Perrett, 2006). Beyond hypothetical trade-offs between a potential mate's physical attractiveness and resource accrual ability, it is unclear how women's socioeconomic position relates to variation in preferences for indicators of heritable benefits or resources.

In Study 1, we investigate whether voice pitch influences perceptions of socioeconomic status. If men with lower pitched voices are better able to achieve high status social positions via increased dominance, then lowering the pitch of men's voices may increase ratings of socioeconomic status when compared to raising the pitch of men's voices. We also investigate whether women's own socioeconomic status is associated with their preferences for voice pitch.

In Study 2, we investigate whether or not voice pitch and sociolinguistic dialect interact to influence mate preferences. If male voice pitch is a cue to heritable health and/or dominance and thus resource accrual potential, then men's voices manipulated to be lower rather than higher in pitch may be perceived as both more attractive and as higher in socioeconomic status. If women's mate preferences are positively influenced by cues to resources, then voices manipulated to be higher in apparent socioeconomic status may also be perceived as relatively more attractive. Furthermore, we test whether women's own socioeconomic status is also associated with their preferences for men's voices manipulated in pitch and/or apparent socioeconomic status.

2. Study 1

2.1. Methods

2.1.1. Participants

Protocols for this study were approved by the McMaster Research Ethics Board. Female participants ($N = 46$; mean age \pm SD = 19.04 years \pm 1.63) were recruited from McMaster University in Canada and compensated with course credit for participation. All participants were heterosexual as quantified by a score of 1 or 2 on a scale from 1 (completely heterosexual) to 7 (completely homosexual).

2.1.2. Stimuli

2.1.2.1. Voice stimuli for socioeconomic status attributions. Voice stimuli were collected at the University of St. Andrews in Scotland from men aged 19–23 ($N = 6$). Men were recorded speaking the first sentence of the rainbow passage, "When the sunlight strikes raindrops in the air, they act as a prism and form a rainbow" (Fairbanks, 1960). Single channel recordings were made in a quiet room with an Audio-Technica AT4041 microphone at a 44.1 kHz sampling rate, with 16-bit amplitude quantization in Sound Forge software (Sony Creative, 2003). These stimuli were randomly selected from a sample of pre-recorded utterances.

2.1.2.2. Voice stimuli for attractiveness judgments. To disguise the nature of the task and reduce experimental demand, male participants who provided vocal samples for attractiveness judgments were different from those who provided vocal samples for socioeconomic status attributions. Recordings were conducted exactly as described for socioeconomic status judgments, except that men were recorded speaking the English vowels sounds "ah," "ee," "eh," "oh," and "oo." Here, accents were a broad mixture of Scottish and English accents typically found in an undergraduate population.

2.1.2.3. Pitch manipulations. Voice pitch was modified in the same manner for both socioeconomic status attributions and attractiveness judgments using the pitch-synchronous overlap add (PSOLA™ France Telecom) method in Praat software (Boersma & Weenink, 2013). The PSOLA method is a standard technique of voice

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