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Original Article

Vocal characteristics of presidential candidates can predict the outcome of actual elections☆

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ABSTRACT

During political elections, voters rely on various cues that signal good social leadership, such as indicators of physical strength and masculinity. In adult men, masculine traits are related to testosterone levels, and one of those traits is low-pitched voice. Hence, lower pitch in a presidential candidate may be related to the election's outcome. This prediction is supported by experimental evidence showing that people prefer to vote for a candidate with a low-pitched voice. The aim of this study was to investigate the relationship between presidential candidates' vocal characteristics and actual election outcomes in 51 presidential elections held across the world. After analysis of the voices of opposing candidates, results showed that winners had lower-pitched voices with less pitch variability. Moreover, regression analysis revealed an interaction effect of voice pitch and voice pitch variability on the election outcome. Candidates with lower-pitched voices had greater likelihood of winning the election if they had higher pitch variability. This study extends previous findings, shows the importance of assessing vocal characteristics other than voice pitch, and offers external validity for the experimental evidence that candidates' vocal characteristics are related to the election outcome.

1. Introduction

It is assumed that human political behavior emerged in evolutionary history as an adaptation to problems of coordinating individuals living in a group, achieving group goals, and distributing resources within the group (Fowler & Schreiber, 2008; Petersen, 2015). It is possible that choosing a group leader could have solved these problems (van Vugt, 2006). Petersen (2015) argues that, when choosing a quality leader, human ancestors relied on various cues that signaled social leadership skills and abilities to solve group problems successfully. In an ancestral environment, important leadership activities might have included coordinating group hunting and warfare. Indicators of physical strength and masculinity, like someone's height, weight, and/or general health, were cues that might have signaled success in these activities (van Vugt, Johnson, Kaiser, & O'Gorman, 2008). Given that modern mass politics is an evolutionary novelty, modern political voters could also rely on cues that might have signaled good leadership qualities under ancestral conditions (Petersen, 2015). Specifically, voters' perceptions of leadership qualities might be under the influence of physical appearance.

Results of previous studies are in line with this assumption. Researchers have used visual stimuli of political candidates and looked for the differences in perceived dominance, competence, leadership, etc. Certain facial features were found to be associated with the perception of a woman as a preferable political leader (e.g. almond-shaped eyes or short hair) (Rosenberg, Kahn, & Tran, 1991). Little, Burriss, Jones, and Roberts (2007) reported that facial shape in politicians could predict who would win elections. Body weight was also found to be related to the perception of a given candidate (Elmore, Vonnahame, Thompson, Filion, & Lundgren, 2015). In addition, inferences of competence based only on a brief view of a candidate's photograph were related to election outcome (Todorov, Mandisodza, Goren, & Hall, 2005). Furthermore, people who knew little about politics, but were often exposed to images of candidates via television, were more likely to vote for more appealing candidates (Lenz & Lawson, 2011).

Besides relying on the physical appearance of a given candidate when making inferences about his/her competences, voters might rely on other characteristics as well. For example, Gregory and Gallagher (2002) predicted voting patterns in U.S. presidential elections from 1960 to 2000 based on the candidates' voices. It seems that the acoustic characteristics of politicians' voices might influence voters' perceptions of candidates' leadership qualities. Given that voters prefer candidates

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with characteristics that signal physical strength and masculinity (van Vugt et al., 2008), fundamental frequency of phonation (F_0), which is perceived as pitch, might be related to the election outcome.

F_0 is based on the rate of vocal-fold vibration, which depends on the size, thickness and length of the vocal folds (Abitbol, Abitbol, & Abitbol, 1999). Longer, bigger and thicker vocal folds vibrate at lower frequencies, which are perceived as deeper voice (Abitbol et al., 1999). With the increase of testosterone levels during puberty, men's vocal folds become larger and thicker, and their F_0 becomes lower (Hollien & Shipp, 1972). It is noteworthy that a negative correlation between F_0 and testosterone levels was found in adult men as well (Dabbs & Mallinger, 1999; Puts, Apicella, & Cárdenas, 2011). Since testosterone levels are an indicator of dominance and social influence (Mazur & Booth, 1998), lower F_0 could be related to perceived dominance and higher social status. This implies that lower-pitched voices in men might be related to evolutionary success, which could be achieved through attracting potential mates and displaying dominance in intrasexual competition. Regarding the influence of the voice on attracting mates, previous studies have shown that men with lower-pitched voices were perceived as more attractive (Feinberg, DeBruine, Jones, & Little, 2008; Feinberg, Jones, Little, Burt, & Perrett, 2005) and that they were associated with favorable personality traits more often than men with higher-pitched voices (Tigue, Borak, O'Connor, Schandl, & Feinberg, 2012). Women also showed greater preference for men with lower-pitched voices in the fertile phase of the menstrual cycle (Feinberg et al., 2006; Pisanski et al., 2014; Puts, 2005), when they display general masculinity preference (Gildersleeve, Haselton, & Fales, 2014a, 2014b; but see also Wood, Kressel, Joshi, & Louie, 2014 and Gangestad et al., 2016 for further discussion). Conversely, lower preference for lower-pitched voice was related to higher progesterone levels, which occur after ovulation (Puts, 2006). Moreover, F_0 was negatively associated with men's reproductive success (Apicella, Feinberg, & Marlowe, 2007).

Regarding the role of the voice in intrasexual competition, Puts, Gaulin, and Verdolini (2006) found that lower-pitched voices were related to higher ratings of physical and social dominance, which might be important in intimidating a rival. Men with lower-pitched voices are perceived as older and larger (Collins, 2000), and more physically and socially dominant (Borkowska & Pawlowski, 2011; Sell et al., 2010). Puts et al. (2006) found that men spoke in a lower voice when addressing a man they found subordinate, and vice versa. This advantage of dominant voice might be found in hierarchically organized social structures. Mayew, Parsons, and Venkatachalam (2013) found that Chief Executive Officers with lower-pitched voices managed larger companies and had longer tenures. To sum up, a growing body of literature suggests that F_0 might serve as a source of biologically important information, both in the mating context to attract potential mates, and in the context of intrasexual competition to signal social dominance. In both contexts, lower F_0 predicts greater success.

In contexts relevant to voting, Tigue et al. (2012) reported that subjects, when choosing between two male candidates based on their voices, preferred to vote for a man with a lower F_0. Similarly, other studies have found that men and women preferred voices manipulated to a lower F_0 when they were asked to choose a leader (Anderson & Klofstad, 2012; Klofstad, Anderson, & Peters, 2012). It was shown that men with lower-pitched voices were perceived as stronger and more competent. These traits could be related to the perception of leadership capacity. Indeed, Klofstad, Anderson, and Nowicki (2015) recently reported that voters preferred low-pitched candidates' voices because they were perceived as stronger and more competent. Previous studies have mostly used manipulated voices, instead of real voice samples of political candidates, and assessed subjects' ratings of attractiveness, dominance or voting preferences (e.g. Anderson & Klofstad, 2012; Apicella et al., 2007; Feinberg et al., 2008; Klofstad et al., 2012; Puts et al., 2006; Tigue et al., 2012). To our knowledge, only a few studies so far have investigated the association between real presidential candidates' voices and actual voting outcomes. In a recently published study (Klofstad, 2015), the recorded voices of candidates for the 2012 U.S. House of Representatives were analyzed. The results showed that the F_0 of winning candidates was lower than the F_0 of losing candidates.

Furthermore, most studies so far have focused on F_0 as the main acoustic characteristic that could influence masculinity perception and voting behavior. As pointed out by Klofstad (2015), investigating the influence of candidates' F_0 on election outcomes is a reasonable starting point, given that it might serve as a dominance cue. However, other vocal characteristics might influence the perception of politicians as well (Klofstad, 2015). It was suggested that researchers should test whether the influence of voice pitch could be modulated by other vocal characteristics. For example, variability of voice pitch (F_{0SD}) might also be an indicator of dominant behavior and good leadership qualities. This acoustic characteristic refers to the fluctuation of F_0 over an utterance. Voices with lower values of F_{0SD} are perceived as more monotone, while higher values can have a sing-song character and might be perceived as more friendly (Hodges-Simeon, Gaulin, & Puts, 2010). For example, higher F_{0SD} values can be observed in speech directed towards infants (Trainor, Austin, & Desjardins, 2000; Trainor & Desjardins, 2002). Hence, Hodges-Simeon et al. (2010) argue that higher F_{0SD} is associated with affiliation, and lower F_{0SD} with intimidation. Furthermore, Daly and Warren (2001) reported lower F_{0SD} in male voices than in female, which suggests that lower F_{0SD} could imply greater masculinity. Puts et al. (2011) found negative correlation between F_{0SD} and self-reported physical aggression, and marginally significant negative correlation between F_{0SD} and arm strength. When investigating independent contributions of F_0 and F_{0SD} to physical-dominance ratings, Hodges-Simeon et al. (2010) found that only F_{0SD} was a significant predictor. These authors noted that F_0 might be an important correlate of men's attractiveness and might play a great role in mate selection. However, when it comes to intrasexual male competition, F_{0SD} might play a more important role because it could signal self-confidence or threatening behavior (Hodges-Simeon et al., 2010). Hodges-Simeon, Gaulin, and Puts (2011) also propose a proximate mechanism underlying the relationship between F_{0SD} and dominance perception. Higher F_{0SD} might be associated with negative emotional arousal, such as fear (Banse & Scherer, 1996; Pihan, Tabert, Assuras, & Borod, 2008) or tension (Park et al., 2011), and it could signal nervousness. Voices that signal lack of negative emotional arousal (lower F_{0SD}) may imply greater dominance in social interactions (Hodges-Simeon et al., 2011), while greater dominance might imply greater leadership qualities. In view of the above-mentioned findings, F_{0SD} might also play an important role in a political voting context, since it might signal preferable traits for a group leader.

Since there are, to our knowledge, only a few studies investigating voices of politicians and their shares of the vote in actual elections (which have all been based on U.S. elections), the aim of this study is to extend previous findings, regarding the relationship between candidates' voices and election outcomes, by analyzing the voices of political candidates in real presidential elections held across the world. To test whether additional acoustic characteristics might modulate the relationship between F_0 and election outcome, we measured F_{0SD} as well. The main hypothesis was that candidates with lower F_0 and F_{0SD} had greater probability of winning the election.

2. Method

2.1. Recordings of the presidential candidates

To test the hypothesis, we collected voice samples of presidential candidates. The procedure was as follows. First, by using the database at www.electionguide.org, we searched for presidential elections held across the world in the period of eleven years from January 2006 to March 2016. We only included direct elections where presidents were elected by popular vote, and not by any other type of election (e.g. in Greece, where the president was elected by Parliament). Due to the