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# Does talking the talk help walking the walk? An examination of the effect of vocal attractiveness in leader effectiveness

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A common saying in linguistics, marketing, and politics, “the medium is the message,” points to the difficulty of separating the content of a message from the form in which the message is communicated. Leaders use their voices to convey leadership in speeches, announcements, and everyday face-to-face interactions with subordinates and stakeholders. For instance, Lee Iaccoca’s perceived success in turning Chrysler around in the 1980s has been attributed in part to his ability to “turn a phrase” (Tolley 1987) with his strong and confident voice, even in the face of objective evidence that Chrysler produced vehicles with more than twice as many defects as other manufacturers (Main 1987). Previous work has shown that perceived leadership attributes such as motivation, charisma, and intelligence explain leader emergence and performance (House, Spangler, & Woycke 1991; Judge, Colbert, & Ilies 2004; Winter 1987), but leaders’ vocal attributes have been neglected in this research. The purpose of this study is to extend research on perceived leadership attributes by examining the relationship between leaders’ vocal attractiveness and performance after accounting for their motivation, charisma, and intelligence.

Alfred Schultz (1967) emphasized that individuals categorize others and respond to them as *ideal types* or representatives of a category. People’s naïve conceptions of leadership, or implicit leadership theories (ILTs), are theories that people develop informally out of personal experience about what leaders should be (Engle & Lord 1997; Lord, Foti, & De Vader 1984). The ILT literature suggests that people develop prototypes specifying the traits and abilities that characterize an ideal leader. This literature is central to research on perceived leadership attributes (e.g., Epitropaki & Martin 2004, 2005; Lord 1985; Lord & Maher 1993; Offermann, Kennedy, & Wirtz 1994). Research on perceived leadership attributes is built on ILTs and rooted in social information processing theorizing, which suggests that people make summary judgments of suitability for leadership based on observations of prototypical attributes (Hollander & Offermann 1993; Lord 1985) using both social cues and their implicit leadership theories.

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Verbal communication through speeches, announcements, and everyday face-to-face interaction is an important means through which subordinates perceive leader attributes because subordinates generate expectations about how a leader should talk based on the prototypical attributes of an ideal leader (Gregory 1994, 1999). They expect leaders' vocal attributes to be consistent with the vocal attributes of the implicit ideal leader. When these expectations are not met, leaders violate categories and make people feel awkward and unsure of how to react (Turner 2002). When these expectations are met, leaders who are high on the vocal attributes that are expected of an ideal leader are more likely to be considered better leaders by their followers, as expected by ILTs (Offermann et al. 1994). Important vocal attributes include the back channel of auditory frequency and information as represented by pitch, sound frequency, and amplitude. We define vocal attractiveness as a voice that reveals confidence and lacks tension (Zuckerman & Driver 1989) and that results from a combination of specific vocal attributes (i.e., pitch, pitch variability, amplitude variability, pauses, and speech rate) that combine to form a voice that results in a favorable impression on others (DeGroot & Motowidlo 1999). We argue that a person's vocal attractiveness is a relevant aspect of the leader prototype. Previous research on leaders' communication has shown that the use of images conveyed in words strongly influences follower perceptions (Emrich, Brower, Feldman, & Garland 2001) and that the manner in which images are conveyed in political speeches can have impacts on attributions of leadership quality through follower reactions such as trust in the leader (Conger, Kanungo, & Menon 2000). However, to the best of our knowledge, no research has investigated the effects of vocal attractiveness on perceptions of leadership effectiveness.

Kaiser, Hogan, and Craig (2008) state that "much leadership research concerns how leaders are perceived and therefore provides limited insight into leadership effectiveness" (p. 107). Their argument is that the focus should be on outcomes, especially outcomes at the group or organizational level. While this seems like a wonderful insight, it is naïve and somewhat misguided. Psychologists examine leader emergence and perceptions because most organizational outcomes are tainted with so many factors outside of a leader's control that the measure becomes somewhat useless when examining true leader effectiveness. For instance, profitability measures (i.e., return on investment) are the type of variables suggested by this line of thinking, but profitability is driven by many things outside of a leader's control. The rich literature on leader emergence and links to follower perceptions of the leader shows that when a leader induces positive perceptions from followers, those people work harder for the leader and make him or her more successful as a result (e.g., Johnson 2008). To be sure, perceptions of leader effectiveness influence the organizational success factors suggested by Kaiser et al. (2008). Thus, the study of what drives these perceptions is much more important than the outcomes themselves since we want to learn *how* leaders are perceived as effective in addition to whether or not they are effective.

In line with implicit leadership theory, we argue that vocal attractiveness will cue followers about a leader's ability. We argue further that this relationship between a leader's vocal attractiveness and that leader's performance will be mediated by the personal reactions of subordinates to their leader's voice (e.g., trust, compliance, and liking). We report two studies designed to test these arguments. Study 1 uses vocal spectral analysis on a sample of U.S. presidents and Canadian prime ministers to examine whether vocal attractiveness accounted for significant variance in perceptions of leadership effectiveness. Study 2 is a laboratory study that uses vocal spectral analysis to examine the mediating effect of personal reactions in the relationship between vocal attractiveness and perceptions of leadership effectiveness. Study 2 serves three purposes. First, it provides a rigorous replication of the main findings of Study 1 in a controlled setting and with a larger sample. Second, it allows us to extend the goals of our paper by considering mediation mechanisms. Finally, the approach in Study 2 allows us to test the suggestion in the literature that leadership effectiveness outcomes differ in important ways from perceptions of leadership effectiveness (Kaiser et al. 2008).

## Hypotheses development

Research on perceived leadership attributes shows that follower perceptions of the degree to which the leader possesses the requisite characteristics necessary to lead will predict leadership effectiveness. Prevailing accounts imply that leadership effectiveness is driven by perceived intelligence (Judge et al. 2004), charisma (Bass 1988; Conger & Kanungo 1987, 1998; House et al. 1991), and perceptions of McClelland's leadership motivation pattern (i.e., a high need for power, a low need for affiliation with others, and a high degree of self control) (House et al. 1991; McClelland 1985; McClelland & Boyatzis 1982). The contribution of these accounts to the leader prototype pattern that underlies implicit leadership theories has been important to the understanding of leader effectiveness.

Individuals typically have constraints in their time or ability to access relevant information about an individual's leadership capacity and therefore resort to comparisons between a leader's perceived attributes and a leader prototype when evaluating leader effectiveness. It may be difficult for followers to provide an unambiguous interpretation of past acts (Podolny 2005) or to evaluate actual intelligence in assessing a leader's ability, but perceptions of attributes such as intelligence that are typically associated with leadership may cause people to seem leader-like in the eyes of others (Judge et al. 2004). Furthermore, it has been suggested that positive comparisons to leader prototypes will be more pronounced when leaders are able to alter their implicit leader characteristics rather than simply activating existing self-schemas (Lord, Brown, & Freiberg 1999). In the current study, we extend the examination of perceived attributes that form leadership prototypes and that may make some leaders seem more leader-like than others by studying the influence of a leader's vocal attractiveness.

### *Vocal attractiveness and leader effectiveness*

Vocally attractive people have been found to receive higher favorability ratings, among other valued outcomes (Zuckerman & Driver 1989). As previously stated, vocal attractiveness is defined as a voice that reveals confidence and lacks tension (Zuckerman

& Driver 1989). It is a combination of specific vocal cues (pitch, pitch variability, amplitude variability, pauses, and speech rate) that combine to form a voice that results in favorable impressions on others (DeGroot & Motowidlo 1999). Previous research on vocal attributes shows evidence of a strong link between the five stable and well-researched vocal cues that define vocal attractiveness and perceptions of desired leadership characteristics. First, research on “pitch,” defined as how deep a voice sounds, shows a strong positive relationship to perceptions of competence, dominance, and assertiveness (Scherer, London, & Wolf 1973). Given that there is a physiological difference in pitch between women and men, this variable must be standardized to allow comparison across gender to allow the potential stereotype that deeper voices are more leader-like to work for women also. Second, “pitch variability” has been found to be positively related to dynamism (Scherer 1979) and is generally thought to lead to positive favorability ratings. Third, amplitude variability, defined as the variability of loudness within a person's voice, was found to be negatively related to rating favorability given that amplitude is an important cue for negative emotions such as anger (Frick 1985) and negative voice quality perceptions such as hoarseness (Baken 1987). Finally, both speech rate (the average length of constant levels of pitch) (Street 1984) and pauses (number of voice breaks per period) (Feldman & Rime 1991) have been shown to influence perceptions of competence. A combination of these cues forms an individual's vocal attractiveness (DeGroot & Motowidlo 1999), which is an observable characteristic. To the degree that this observable characteristic forms part of the leadership prototype underlying implicit leadership theories, people who are high on that characteristic or cue should be more likely to be considered better leaders (Offermann et al. 1994). We argue that vocal attractiveness is an important but missing component of implicit leadership theory. The cognitions required to make the categorical inference that it belongs in the leadership prototype are rooted in both perceptual and motor structures, as indicated by embodiment theories (Niedenthal, Barsalou, Winkelman, Krauth-Gruber, & Ric 2005). Consistent with this approach, we hypothesize the following:

**H<sub>1</sub>.** Leaders' vocal attractiveness will be positively related to perceptions of leader effectiveness.

#### *The mediating effect of personal reactions*

If H<sub>1</sub> is supported, it is also important to understand the mechanisms through which vocal attractiveness affects perceptions of leader effectiveness. Previous research on vocal attractiveness has shown that personal reactions such as liking and trust mediate the relationship between vocal attractiveness and job performance evaluations of subordinates (DeGroot & Motowidlo 1999). Similarly, those personal reactions of followers have been studied in the leadership literature as follower effects (Conger et al. 2000; Kirkpatrick & Locke 1996; Podsakoff, MacKenzie, Moorman, & Fetter 1990) and as mediating mechanisms in the relationship between leadership and followers' evaluations of leaders (Yukl 1989).

We argue that similar mediating mechanisms are present in the relationship between vocal attractiveness and perceptions of leader effectiveness. Leadership ties imply strong relationships between followers' self-concepts and the leader (Kark & Shamir 2002; Shamir, House, & Arthur 1993), which are pragmatically relevant because they help people establish workable agreements about their relationship (Goffman 1959; Swann, Polzer, Conor Seyle, & Ko 2004; Turner 1968). Vocal attractiveness provides social cues that help engage followers' implicit leadership theories. When cues like vocal attractiveness make leaders seem “leader-like” in the eyes of others, followers verify their role identities as followers, leading to greater trust, commitment, and emotional attachment to the leader (Burke & Stets 1999; Swann, De La Ronde and Hixon, 1994; Swann & Ely 1984; Turner 1968). Therefore vocal attractiveness should elicit personal reactions that reflect trust, commitment (willingness to accept influence, compliance, persuasion), and emotional attachment (liking). On the other side of the mediation, there is a long tradition of research in support of the relationship between these personal reactions and perceptions of leader effectiveness (e.g., Brown & Keeping 2005; Yukl 1989). Overall, a follower hears the voice of a leader, makes implicit leader attributions based on the sound of the voice, and reacts both affectively and cognitively toward the leader. Through these “personal reactions,” the effects of vocal attractiveness on perceptions of leader effectiveness can be partly explained. Thus, we hypothesize the following.

**H<sub>2</sub>.** Personal reactions mediate the relationship between vocal attractiveness and perceptions of leader effectiveness.

We conducted two studies to examine the impact of leader vocal attractiveness on perceptions of leader effectiveness. The first study examines H<sub>1</sub> on a sample of U.S. presidents and Canadian prime ministers. If vocal attractiveness explains unique variance in leadership effectiveness, we will have a further understanding of the leader prototype predicted by implicit leadership theory. Study 2 is a laboratory study that supports the internal validity of the findings of Study 1 and examines the mechanism by which the effect of vocal attractiveness on perceptions of leadership effectiveness occurs. If personal reactions act as a mediator, this will enhance understanding of the process by which vocal attractiveness impacts leadership.

## **Study 1**

### *Method*

#### *Subjects*

All United States and Canadian political leaders who presided since the invention of vocal recording devices and who left office by December 2005 are included as subjects in this study (see Appendix A). The sample is constrained by the need to perform vocal analysis on our subjects, which requires a sample of recorded speech. Therefore, our sample included 19 U.S. presidents, beginning

with Grover Cleveland and including each president up to and including Bill Clinton, and 9 Canadian prime ministers (PMs), beginning with Mackenzie King and including each prime minister up to and including Jean Chretien. Thus, the final sample includes 28 U.S. and Canadian political leaders who were no longer in office and for whom tape recorded samples of speech were available at the time of the study. Vocal recordings for each leader were located in various libraries, but most were found through Michigan State University's Vincent Voice Library.

### Measures

To measure "vocal attractiveness," we used an index that combined measures of pitch, pauses, pitch variability, amplitude variability, and speech rate (DeGroot & Motowidlo 1999). Our definitions for vocal cues follow directly from DeGroot and Motowidlo (1999). "Pitch" is the average fundamental frequency over an entire speech sample, and it represents how high or low a voice is. Our measure of pitch was standardized by the gender of the subject (Boone 1977). "Pitch variability" is the standard deviation from the fundamental frequency within each voice sample. "Speech rate" is the average length of the pitch period, or how long speakers hold a constant level of pitch. "Pauses" are a count of the voice breaks, or pauses, in a speech sample. "Amplitude variability" is assessed by the variability of the short-term, peak-to-peak amplitude, or loudness, within the voice sample (i.e., how much the speaker varies his or her volume level). Specifically, the index was created by summing the standard scores for pitch, pauses, and pitch variability and subtracting standardized scores for speech rate and amplitude variability. Recordings of political leader speeches were analyzed by computer using a Kay Elemetrics Multi-Speech signal analysis workstation (Model 3700). In this system, voice recordings are input into a computer and the software analyzes the voice to provide objective measurements of the five vocal cues that compose our vocal attractiveness index. Reliability was estimated for the two measurements on each of the vocal cues by adjusting the correlation between them with the Spearman-Brown prophecy formula to yield a reliability estimate for the two measurements combined. The diagonal in Table 1 presents the reliability estimates for the five vocal cues. Examples of vocal attractiveness scores for illustrative purposes: Joe Clark was a PM low on VA while Lester Pearson was a PM high on VA. For presidents, George H.W. Bush was low on VA and Bill Clinton was high on VA.

### Perceptions of leadership effectiveness

To measure leadership effectiveness, the focus of Study 1, we use a measure of presidential performance provided by House et al. (1991) called "greatness." Their published data was used whenever possible and made current or extended to Canadian prime ministers as described below. Five Ph.D.-holding U.S. historians were surveyed to gather data on U.S. presidents subsequent to the House et al. (1991) analysis, and five Ph.D.-holding Canadian historians were surveyed to gather the data on Canadian PMs. In both instances, the survey was designed to replicate the information published in House et al. (1991). In all, data for 15 U.S. presidents was used from House et al. (1991) and new data was gathered for the remaining 13 North American political leaders. Interrater reliability was very high among the new study's raters (.93). All scores were standardized to make comparisons equivalent.

### Control variables

We controlled for motivation and charisma because these constructs could potentially account for variance in leadership effectiveness (House et al. 1991). "Motivation" was measured using archival measures of presidential affiliation, achievement, and power motives taken from Winter (1987); activity inhibition was taken from House et al. (1991). This data was made current or extended to Canadian prime ministers with additional data gathered from historians for subsequent U.S. presidents (Ford, Bush Sr., Reagan, and Clinton) and all Canadian prime ministers. Though content analyses of presidents' first-term inaugural addresses were used by Winter (1987), additional data for subsequent political leaders was gathered by surveying historians. Activity inhibition, affiliation, achievement, and power motives were each measured with a two-item, five-point Likert-type scale. Context was provided for each president/prime minister. This is a sample item for need for power: "Degree to which one desires to be in charge or in control." Interrater reliability estimates were calculated with intraclass correlations and adjusted with the Spearman-Brown formula. Reliability on these four measures was found to be adequate (activity inhibition = .84, affiliation = .79, achievement = .69, power = .88).

"Charisma" data for 15 presidents studied in House et al. (1991) was taken from Simonton (1988). The remaining 13 political leaders' data on behavioral charisma was gathered through the survey of expert historians. Again, a five-point Likert-type scale was used with five items such as "ability to command devotion and loyalty." Scale anchors range from 1 = weak to 5 = strong. Internal consistency reliability for the five-item charisma scale was reasonably high ( $\alpha = .76$ ). Interrater reliability, again represented by the intraclass correlation across the five raters' scores corrected by the Spearman-Brown formula, was very good (.89).

**Table 1**  
Study 1: Correlations among voice variables.

Variable	1	2	3	4	5	6
1. Pitch	<b>.90</b>					
2. Pitch variation	.35*	<b>.65</b>				
3. Amplitude variation	-.29	.19	<b>.89</b>			
4. Voice breaks	.48*	.40*	-.12	<b>.68</b>		
5. Speech rate	-.85*	-.19	.48*	-.46*	<b>.91</b>	
6. Vocal attractiveness	.86*	.51*	-.49*	.71*	-.86*	<b>.88</b>

Notes:  $n = 28$ ; \* $p < .05$ , one-tailed test; reliability estimate on the diagonal in bold; all measures standardized for vocal attractiveness index combination (means = 0, SDs = 1).

The decision to include U.S. presidents and Canadian prime ministers was made to provide some additional generalizability to our study, and it also creates the need to evaluate the potential differences between the U.S. presidents and Canadian prime ministers. These differences were scrutinized by first examining means and correlations for each variable, then by regressing performance on all study variables with a dummy variable coded for country. No differences were found as none of the means or correlations showed even marginally significant differences, and the dummy variable was insignificant in the regression equation ( $\beta = .061, t = .346, n.s.$ ).

### Study 1 results

Table 1 presents the intercorrelations among vocal characteristic variables. Given sufficiently high levels of reliability (ranging from .65 to .91), these five variables were combined to form an overall vocal attractiveness index measure (DeGroot & Motowidlo 1999). Descriptive statistics and correlations among the study's variables are shown in Table 2. All measures are standardized. Results for Study 1 are presented in Table 3.

In  $H_1$ , we predicted that vocal attractiveness would be positively related to perceptions of leadership effectiveness. Inspection of Table 3 reveals a significant relationship between vocal attractiveness and perceptions of leadership effectiveness ( $\beta = .36, p < .05$ ), offering support for  $H_1$ . Moreover, the two-step hierarchical regression analysis reported in Table 3 shows that the addition of vocal attractiveness ( $\beta = .35, p < .05$ ) to the equation explains an additional 12% of the variance above that previously shown for motives and charisma (House et al. 1991).

### Study 1 discussion

This study shows that vocal attractiveness accounts for a sizable amount of performance in high-level leaders over and above that explained in previous studies. What it doesn't do is examine mechanisms to help explain how and why vocal attractiveness predicts performance. Performance in this study was measured with ratings from historians. Thus, the relationship with vocal attractiveness could be predicated upon the pleasantness of the voice and how it makes followers (and raters) feel about them in many ways. It does not examine relationships with a more objective measure of performance. This is not to say that the raters of prime minister and president performance were not objective, since they are clearly in positions to be more objective than most people, but to say that the measure is perceptual regardless of the fact that there is a lack of bias from these the raters. Study 2 is designed to examine the impact of vocal attractiveness on objectively derived performance. It is suspected that other predictor variables will become more relevant for objectively measured performance than what Study 1 shows for subjectively measured performance.

## Study 2

### Method

Leaders in Study 2 come from student teams working on a Human Resources Management computer simulation. Each team ( $n = 85$ ) takes the role of an HR department in a moderate-sized company making the types of operating decisions required of a typical HR department such as pay increases, hiring, and training for their employees, all within a budget (see Smith & Golden 1994 for more details). Teams make these decisions in each decision period; they are then processed using a computer algorithm to evaluate their decisions against their competition and against their budgets. Each decision period represents one-quarter of a year. In this study, there were eight decision periods encompassing a two-year period for each team's firm. The first four weeks of the study were used to train the students for the task they were about to undertake, and a leader emerged from each team. Beginning at Week 5, the leaders submitted decisions from each team that were evaluated by the computer program, and these evaluations were ranked against their competition—the other teams. At Week 12, final competitive positions were derived that comprised a cumulative ranking of their performances. This performance measure was free from subjective rater bias.

**Table 2**  
Study 1: Descriptive statistics.

Variable	1	2	3	4	5	6	7
1. Leadership effectiveness	<b>.93</b>						
2. Achievement	.18	<b>.79</b>					
3. Affiliation	-.21	.30	<b>.60</b>				
4. Activity inhibition	.13	.47*	.12	<b>.82</b>			
5. Power	.27	.41*	.54*	.07	<b>.88</b>		
6. Charisma	.51*	.24	.12	.14	.19	<b>.87</b>	
7. Vocal attractiveness	.28	-.07	-.10	-.07	-.21	-.03	-

Notes:  $n = 28$ ; \* $p < .05$ , one-tailed test; interrater reliability estimate on the diagonal in bold. All measures are standardized (means = 0, SDs = 1).

**Table 3**

Study 1: Results of hierarchical regression analysis for leadership effectiveness.

Variable	Step 1	Step 2
Vocal attractiveness		.36*
Charisma	.47*	.46*
Achievement	-.01	-.03
Affiliation	-.52*	-.53*
Activity inhibition	.10	.13
Power	.47*	.55*
R <sup>2</sup>	.49*	.61*
$\Delta R^2$		.12

\* Statistically significant ( $p < .05$ ) (standardized betas).

### Participants

Three-hundred eight students at a mid-sized university participated in a team project for course credit. Students were randomly assigned to three-member teams that worked together for 13 weeks on an HR simulation worth 30% of their final grade. Due to missing data and a few students dropping the course after teams were put together, complete data were available for 85 teams that specifically stated, via survey, that a leader had emerged in the team. Gender distribution of the leaders is 42 females and 43 males. Teams met each week during a one-hour class period to finalize their decisions before team leaders submitted them. They were expected to become experts in one decision-making area and bring their work with them to class for finalizing with their teammates. The leaders who emerged for each team are the subjects for this study.

### Measures

“Leader effectiveness”—following Campbell (1990) and Campbell, McCloy, Oppler, and Sager (1993) discussions of the distinction between performance as behavior and performance as outcome, two measures of leadership effectiveness were used as dependant variables in this study. First, “leadership effectiveness behavior” was the team members' evaluation of actions or behaviors of leaders relevant to team performance (Beal, Cohen, & Burke 2003; Campbell et al. 1993). Following Campbell et al. (1993), we included measures of actions (such as problem solving) that were the result of unobservable cognitive behaviors. Therefore, the behaviors outlined by Stevens and Campion (1994) as requirements for team performance (i.e., communication, goal setting, conflict resolution, problem solving, and planning) were used to assess leadership effectiveness behaviors. Two items were written for each of these five behaviors that are relevant to performance. Participants were asked to rate their leaders on the extent to which they engaged in the described behaviors while working on the team project. An example item for “planning” behavior was “helped coordinate and synchronize the team's activities.” This and the other nine items were rated using five-point Likert scales with anchors ranging from 1 = never to 5 = always. To estimate reliability for each two-item measure, we corrected the correlations with the Spearman–Brown prophesy formula. Reliability estimates for these behaviors are as follows: conflict resolution,  $\alpha = .73$ ; problem solving,  $\alpha = .74$ ; communication,  $\alpha = .80$ ; goal setting,  $\alpha = .75$ ; and planning,  $\alpha = .84$ . All measures were then summed to form the perceptions of leadership effectiveness behaviors measure. Considering these five behaviors with two items each as a 10-item scale revealed an internal consistency estimate of  $\alpha = .80$ . Multiple group members used this scale to rate the leader's behaviors, and interrater reliability among the group members was very high (.92).

Second, “leadership effectiveness outcome” was an objective measure of performance on the simulation. The computer algorithm provided an unbiased assessment of team performance on the task, as described above.

We measured “vocal attractiveness” with the same vocal attractiveness index we discussed in Study 1 (DeGroot & Motowidlo 1999). The vocal attractiveness index is a composite of five vocal characteristics that were obtained for each leader in this study: pitch, pitch variability, speech rate, pausing, and amplitude variability. Each participant was required to read a statement of consent to participate in the study, and this statement was tape-recorded from a distance of approximately three feet. Average duration of each statement was 20 s. These recorded utterances were analyzed by computer in the manner described in DeGroot and Motowidlo (1999) using a Kay Elemetrics Multi-Speech signal analysis workstation (Model 3700). In order to examine reliability of these measures, two approximately 10-second samples of each speech were examined to obtain scores for the five vocal characteristics. Reliability estimates were as follows: pitch,  $\alpha = .88$ ; pitch variability,  $\alpha = .68$ ; speech rate,  $\alpha = .87$ ; pauses,  $\alpha = .68$ ; and amplitude variability,  $\alpha = .82$ . For theoretical reasons that are supported by the literature, these five vocal characteristics were combined to form the vocal attractiveness index ( $\alpha = .86$ ).

“Personal reactions”—each team member was asked to fill out a questionnaire that measured their personal reactions toward their leader (see DeGroot & Motowidlo 1999) in Week 8 of the study. These personal reactions included how much they liked their leaders, trusted them, would help them, felt they were competent, felt they were dominant, were persuaded by them, and complied with their influence attempts. Two items were written for each of these dimensions. A factor analysis was conducted and “dominance” loaded separately while all the other items loaded together on one factor. Thus, we dropped the dominance items and since Cronbach's alpha was sufficiently high ( $\alpha = .89$ ) for the remaining 12 items, we summed them for each rater to give a total score for personal reactions attributed to the individual. Since each team leader had two teammates providing personal reaction ratings, interrater reliability was also assessed using the intraclass correlation corrected by the Spearman–Brown formula. This estimate is .87 for a single rater and .93 for the two raters combined.

“Cognitive ability” was measured using the Wonderlic Personnel Test (Form V) (Wonderlic, E.F., & Associates 1998). This test is one of the most widely used cognitive ability tests across a range of occupations and it is particularly useful when predicting job performance. The validity of such tests is established in the literature (Murphy, Cronin, & Tam 2003). It was administered at the beginning of the study.

### Study 2 results

Table 4 presents the means, standard deviations, and intercorrelations of the variables included in the study. Consistent with previous research, cognitive ability is significantly related to leadership outcomes but not to leadership behaviors (Judge et al. 2004). This indicates that leaders who are higher in cognitive ability achieve higher leadership effectiveness outcomes, but their cognitive ability is not related to the perceptions of leadership effectiveness behaviors perceived by their followers. Table 4 also shows that vocal attractiveness is significantly related to both perceptions of leadership effectiveness behaviors and personal reactions. Finally, personal reactions are significantly related to perceptions of leadership effectiveness behaviors.

In  $H_2$ , we predicted that personal reactions would mediate the relationship between vocal attractiveness and perceptions of leader effectiveness.  $H_2$  was tested with the hierarchical regression results shown in Table 5. After including control variables in step 1, vocal attractiveness was added to the equations in step 2, and it significantly predicted leadership effectiveness behaviors ( $\beta = .25, p < .05$ ), adding 6% to the explanation of variance. However, vocal attractiveness has no significant effect on leadership effectiveness outcomes. These results confirm the findings of Study 1 for leadership effectiveness behaviors, but clarify that this relationship does not carry over to leadership effectiveness outcomes. In Step 3, personal reactions were added to the equations. Inspection of Table 5 reveals that personal reactions have a positive significant effect on leadership effectiveness behaviors ( $\beta = .23, p < .05$ ), explaining an additional 5% of the variance in leadership effectiveness behaviors. Also, Table 5 shows that with the addition of personal reactions to the equation for leadership effectiveness behaviors, the effects of vocal attractiveness diminish and become statistically insignificant ( $\beta = .19, n.s.$ ), which shows personal reactions is a partial mediator in the relationship between vocal attractiveness and leadership effectiveness behaviors. A Sobel test also shows that the indirect effect of vocal attractiveness on perceptions of leader effectiveness behaviors via personal reactions is significantly different from zero ( $z = 1.95, p < .05$ ), thus confirming the predicted mediation. This pattern of relationships is, however, not significant for the leadership effectiveness outcomes. Therefore  $H_2$  is supported for leadership effectiveness behaviors but not for leadership effectiveness outcomes. Finally, a comparison of the two regressions shown in the two columns of Table 5 shows that vocal attractiveness and personal reactions explain the same amount of variance in leadership effectiveness behaviors that cognitive ability explains in leadership effectiveness outcomes.

## Discussion

### Theoretical implications

The objective of this research was to extend the examination of perceived attributes that form leadership prototypes and that may make some leaders seem more leader-like than others by studying the influence of a leader’s vocal attractiveness on leadership effectiveness. The findings of Study 1 revealed that in a sample of U.S. presidents and Canadian prime ministers, vocal attractiveness was significantly related to perceptions of leadership effectiveness.

Study 2 replicates the main relationship of Study 1 in a laboratory setting to provide a controlled estimate of the relationship and extends the goals of Study 1 in two ways. First, it presents two alternative measures of effectiveness by testing the relationship of vocal attractiveness to both leadership effectiveness behaviors (a follower rating of perceived leadership behaviors on the part of the leader) and leadership effectiveness outcomes (a measure of actual performance). Consistent with the findings presented in Study 1, results from Study 2 confirmed the positive significant relationship between vocal attractiveness and perceptions of leadership effectiveness behaviors in a laboratory setting. These two findings, together with the large changes in variance explained attributed to vocal attractiveness in each of the studies (12% and 6%, respectively), reveal the importance of vocal attractiveness as a leadership characteristic. To the best of our knowledge, this study is the first to investigate the effects of vocal attractiveness on perceptions of leadership effectiveness.

Study 2 also explored the effects of vocal attractiveness on leadership effectiveness outcomes. The relationship between vocal attractiveness and leadership effectiveness outcomes was not significant. One potential explanation for this finding derived from

**Table 4**  
Study 2: Descriptive statistics.

Variable	Mean	SD	1	2	3	4	5
1. Leaders' effectiveness behaviors	3.90	.36	.86				
2. Leaders' effectiveness outcomes	141.1	20.2	.03	–			
3. Personal reactions	20.1	1.9	.29*	.11	.77		
4. Vocal attractiveness	.49	2.5	.21*	–.10	.24*	.86	
5. Cognitive ability	27.97	5.68	–.01	.33*	–.06	–.23*	–

Notes:  $n = 85$ ; \*statistically significant ( $p < .05$ , 1-tailed test); reliability estimate on the diagonal.



**Table 5**  
Study 2: Hierarchical regression results.

Model	Leadership	
	Performance	Outcomes
	Beta	Beta
Step 1		
Cognitive ability	-.01	.33*
R <sup>2</sup>	.00	.11*
Step 2		
Cognitive ability	.04	.33*
Vocal attractiveness	.25*	-.02
R <sup>2</sup>	.06	.11*
Step 3		
Cognitive ability	.04	.33*
Vocal attractiveness	.19	-.04
Personal reactions	.23*	.09
R <sup>2</sup>	.11*	.12*

Notes:  $n = 85$ ; \* $p < .05$ .

implicit theories of leadership (e.g., Lord 1985) is that the effect of vocal attractiveness on leadership effectiveness should pertain only to leadership perceptions and not to leadership outcomes because traits that predict perceptions are not necessarily those that predict “the performance of a leader's work group or organization” (Lord, De Vader, & Alliger, 1986, p. 408). Therefore, like other implicit leadership traits, vocal attractiveness should be a good predictor of leadership effectiveness behaviors and not of leadership effectiveness outcomes, which does not take into account the many potential impediments to performance that are beyond the effects of perceived leadership behaviors (Beal et al. 2003; Campbell 1990; Campbell et al. 1993). It is important to note that also in Study 2, our control for cognitive ability, a paper and pencil measure of intelligence, was not significantly related to leadership effectiveness behaviors, but was significantly and positively related to leadership effectiveness outcomes. This finding is consistent with meta-analytical results that show that objective measures of cognitive ability are significantly related to leadership effectiveness outcomes but not to perceived leadership effectiveness criterions (Judge et al. 2004). In line with our previous reasoning, objective cognitive ability of leaders may be effective in controlling the many potential impediments to objective performance that are outside the effects of perceived traits and may cause people to be perceived as leaders.

Another way in which Study 2 extends the goals of Study 1 is by exploring the mediating mechanisms that may explain the effects of voice attractiveness on perceptions of leadership effectiveness. Study 2 also shows that consistent with findings about the mechanisms through which charisma affects perceptions of leadership effectiveness (Conger et al. 2000; Yukl 1989), personal reactions mediate the relationship between vocal attractiveness and leadership effectiveness behaviors. This helps our understanding of the mechanisms that are at play when adding vocal attractiveness as a predictor of leadership effectiveness and clarifies the follower effects that are related to vocal attractiveness.

Taken together, these findings have important implications for leadership literature. Voice attractiveness adds important explanatory power to previous implicit theories of leadership and does so by explaining much of the additional variance through similar mechanisms (i.e., personal reactions) as in previously studied explanations (e.g., charisma). It is therefore important to include vocal attractiveness in future studies of performance and to revisit implicit theories of leadership to consider other easily observable and objective characteristics of leaders. This may provide a more complete set of explanations about people's perceptions of leadership effectiveness.

### Practical implications and limitations

So, does talking the talk help walking the walk? Our results suggest that it does. Leaders' vocal attractiveness can help them be perceived as leaders and enhance their leadership effectiveness. When *The New Yorker* points out that Barack Obama “draws attention to himself” and “doesn't strive for an everyman quality” in part because “his voice is so consistent and well-pitched” (Macfarquhar 2007) or when *The American Spectator* points out that Fred Thompson's “basso profundo voice is as reassuring as his conservative worldview” (Fund 2007), they only add to the anecdotal evidence that vocal attractiveness is an important aspect of leadership that has been neglected in management research.

This suggests that it is important for leaders and for organizations to understand the implications of vocal attractiveness for leadership and deal with them in selection and training of leaders. Howell and Frost (1989) suggested that individuals can be trained to exhibit charismatic behavior through the successful use of professional actors. Similarly, the results of this study suggest that it may benefit leaders and their organizations to obtain training to express themselves in an attractive vocal manner. With training, the unconscious process of accommodating one's voice to appear more dominant (Gregory & Webster 1996) may be enhanced, and individuals could practice speaking to enhance their vocal attractiveness. Another implication for leaders and organizations is the choice of media given the vocal attributes of their leaders. John Chambers, CEO of Cisco Systems, says “the e-mail became very effective... but I'm a voice person. I'll leave 40 or 50 voicemails per day...The newest thing for me is video on

demand, which is my primary communication vehicle today” (Lashinsky 2006). He is referring to a media choice that could well be driven by the vocal attractiveness of leaders in an organization.

The current paper has four main strengths. First, field and laboratory studies were combined, thereby providing evidence of internal and external validity for our findings. Second, the study related leadership effectiveness to an explanatory variable (vocal attractiveness) that heretofore has not been investigated in the leadership literature. Third, the controlled laboratory version of the study allowed us to expand the field study to contrast two alternative measures of leadership effectiveness and, finally, to evaluate the mechanisms through which vocal attractiveness affects leadership effectiveness. Thus, we have tried to provide a rigorous but relevant test of a new construct in an under-researched area of the leadership literature.

These strengths notwithstanding, the current study do have potential weaknesses. First, because the model included a relatively small set of variables, future research should include a larger group of variables to explore how the current constructs fit in a larger nomological network. This study is a first application of vocal attractiveness in the leadership literature and is therefore incomplete. A second potential weakness of this study is the relatively small sample size of Study 1. However, this sample comprises all the subjects that could be examined without changing the level of leadership in the analysis, and the presence of statistically significant results with little power to detect an effect size quiets this limitation. Furthermore, Study 2 provides additional support for the relationship between vocal attractiveness and leadership effectiveness behaviors.

## Conclusion

In summary, we tested the relationship between vocal attractiveness and leadership effectiveness using both field and laboratory samples. Our results provide compelling evidence for the expected relationship explaining variance beyond that explained by charisma and motivation. We also tested the mediating effect of personal reactions on this relationship. These findings not only enhance our understanding of the construct domains of vocal attractiveness and leadership effectiveness, but also add to our knowledge about the mechanisms implied in the implicit leadership theories domain.

## Appendix A

List of leaders in Study 1.

U.S. presidents	Canadian prime ministers
Grover Cleveland	Mackenzie King
William McKinley	John Diefenbaker
Theodore Roosevelt	Lester Pearson
William Taft	Pierre Trudeau
Woodrow Wilson	Joe Clark
Warren Harding	John Turner
Calvin Coolidge	Brian Mulroney
Herbert Hoover	Kim Campbell
Franklin Roosevelt	Jean Chretien
Harry Truman	
Dwight Eisenhower	
John Kennedy	
Lyndon Johnson	
Richard Nixon	
Gerald Ford	
Jimmy Carter	
Ronald Reagan	
George H.W. Bush	
Bill Clinton	

Note: Listed in chronological order.

## References

- Baken, R. (1987). *Clinical measurement of speech and voice*. London: Taylor & Francis.
- Bass, B. M. (1988). Evolving perspectives on charismatic leadership. In J. A. Conger & R.N. Kanungo (Eds.), *Charismatic leadership: The elusive factor in organizational effectiveness*. San Francisco: Jossey-Bass.
- Beal, D. J., Cohen, R. R., & Burke, M. J. (2003). Cohesion and performance in groups: A meta-analytic clarification of construct relations. *Journal of Applied Psychology*, 88, 989–1004.
- Boone, D. R. (1977). *The voice and voice therapy* (2nd ed). London: Prentice-Hall.
- Brown, D. W., & Keeping, L. M. (2005). Elaborating the construct of transformational leadership: The role of affect. *Leadership Quarterly*, 16, 245–272.
- Burke, P. J., & Stets, J. E. (1999). Trust and commitment through self-verification. *Social Psychology Quarterly*, 62, 347–360.
- Campbell, J. P. (1990). Modeling the performance prediction problem in industrial and organizational psychology. In M. D. Dunnette & L.M. Hough (Eds.), (2nd ed). *Handbook of industrial and organizational psychology, Vol. 1*. (pp. 687–732). Palo Alto, CA: Consulting Psychologists Press.
- Campbell, J. P., McCloy, R. A., Oppler, S. H., & Sager, C. E. (1993). A theory of performance. In N. Schmitt & W.C. Borman (Eds.), *Personnel selection in organizations* (pp. 35–70). San Francisco: Jossey-Bass.
- Conger, J. A., & Kanungo, R. N. (1987). Toward a behavioral theory of charismatic leadership in organizational settings. *Academy of Management Review*, 12, 637–647.
- Conger, J. A., & Kanungo, R. N. (1998). *Charismatic leadership in organizations*. Thousand Oaks, CA: Sage.

- Conger, J. A., Kanungo, R. N., & Menon, S. T. (2000). Charismatic leadership and follower effects. *Journal of Organizational Behavior, 21*, 747–767.
- DeGroot, T., & Motowidlo, S. (1999). Why visual and vocal interview cues can affect interviewers' judgments and predict job performance. *Journal of Applied Psychology, 84*, 986–993.
- Emrich, C. G., Brower, H. H., Feldman, J. M., & Garland, H. (2001). Images in words: Presidential rhetoric, charisma, and greatness. *Administrative Science Quarterly, 46*, 527–561.
- Engle, E. M., & Lord, R. G. (1997). Implicit theories, self-schemas, and leader–member exchange. *Academy of Management Journal, 40*, 988–1010.
- Epitropaki, O., & Martin, R. (2004). Implicit leadership theories in applied settings: Factor structure, generalizability, and stability over time. *Journal of Applied Psychology, 89*, 293–310.
- Epitropaki, O., & Martin, R. (2005). From ideal to real: A longitudinal study of the role of implicit leadership theories on leader–member exchanges and employee outcomes. *Journal of Applied Psychology, 90*, 659–676.
- Feldman, R. S., & Rime, B. (1991). *Fundamentals of nonverbal behavior*. New York: Cambridge University Press.
- Frick, R. W. (1985). Communicating emotion: The role of prosodic features. *Psychological Bulletin, 97*, 412–429.
- Fund, J. H. (2007). Star power. *The American Spectator, 40*, 1620.
- Goffman, E. (1959). *The presentation of self in everyday life*. Garden City, NY: Anchor Books.
- Gregory, S. W., Jr. (1994). Sounds of power and deference: Acoustic analysis of macro social constraints on micro interaction. *Sociological Perspectives, 37*, 497–526.
- Gregory, S. W., Jr. (1999). Navigating the sound stream of human social interaction. In D. D. Franks & T.S. Smith (Eds.), *Mind, brain, and society: Toward a neurosociology of emotions*. Greenwich, CT: JAI Press.
- Gregory, S., & Webster, S. (1996). A nonverbal signal in voices of interview partners effectively predicts communication accommodation and social status perceptions. *Journal of Personality and Social Psychology, 70*, 1231–1240.
- Hollander, E. P., & Offermann, L. R. (1993). Power and leadership in organizations. In W. E. Rosenbach & R.L. Taylor (Eds.), *Contemporary issues in leadership* (pp. 62–86). (3rd ed.). Boulder, CO: Westview Press.
- House, R. J., Spangler, W. D., & Woycke, J. D. (1991). Personality and charisma in the U.S. presidency: A psychological theory of leader effectiveness. *Administrative Science Quarterly, 36*, 364–396.
- Howell, J. M., & Frost, R. J. (1989). A laboratory study of charismatic leadership. *Organizational Behavior and Human Decision Processes, 43*, 243–269.
- Johnson, S. K. (2008). I second that emotion: Effects of emotional contagion and affect at work on leader and follower outcomes. *Leadership Quarterly, 19*, 1–19.
- Judge, T. A., Colbert, A. E., & Ilies, R. (2004). Intelligence and leadership: A quantitative review and test of theoretical propositions. *Journal of Applied Psychology, 89*, 542–552.
- Kaiser, R. B., Hogan, R., & Craig, S. B. (2008). Leadership and the fate of organizations. *American Psychologist, 63*, 96–110.
- Kark, R., & Shamir, B. (2002). The dual effect of transformational leadership: Priming relational and collective selves and further effects on followers. In B. J. Avolio & F.J. Yammarino (Eds.), *Transformational and charismatic leadership: The road ahead* (pp. 67–91). Oxford: Elsevier Science.
- Kirkpatrick, S. A., & Locke, E. A. (1996). Direct and indirect effects of three core charismatic leadership components on performance and attitudes. *Journal of Applied Psychology, 81*, 36–51.
- Lashinsky, A. (2006). Lights! Camera! Cue the CEO! *Fortune, 154*, 27.
- Lord, R. G. (1985). An information processing approach to social perceptions, leadership perceptions and behavioral measurement in organizational settings. In B. M. Staw & L.L. Cummings (Eds.), *Research in organizational behavior, Vol. 7*. (pp. 85–128). Greenwich, CT: JAI Press.
- Lord, R. G., Brown, D. J., & Freiberg, S. J. (1999). Understanding the dynamics of leadership: The role of follower self-concepts in the leader/follower relationship. *Organizational Behavior and Human Decision Processes, 78*, 167–203.
- Lord, R. G., De Vader, C. L., & Alliger, G. M. (1986). A meta-analysis of the relation between personality traits and leadership perceptions: An application of validity generalization procedures. *Journal of Applied Psychology, 71*(3), 402–410.
- Lord, R. G., Foti, R. J., & De Vader, C. L. (1984). A test of leadership categorization theory: Internal structure, information processing, and leadership perceptions. *Organizational Behavior and Human Performance, 34*, 343–378.
- Lord, R. G., & Maher, K. J. (1993). *Leadership and information processing: Linking perceptions and performance*. London: Routledge.
- Macfarquhar, L. (2007). The conciliator; profiles. *The New Yorker, 83*, 48.
- Main, J. (1987). Detroit's cars really are getting better. *Fortune, 115*, 90–99.
- McClelland, D. C. (1985). *Human motivation*. Glenview, IL: Scott, Foresman.
- McClelland, D., & Boyatzis, R. (1982). Leadership motive pattern and long-term success in management. *Journal of Applied Psychology, 67*, 737–743.
- Murphy, K. R., Cronin, B. E., & Tam, A. P. (2003). Controversy and consensus regarding the use of cognitive ability testing in organizations. *Journal of Applied Psychology, 88*, 660–671.
- Niedenthal, P. M., Barsalou, L. W., Winkielman, P., Krauth-Gruber, S., & Ric, F. (2005). Embodiment in attitudes, social perception, and emotion. *Personality and Social Psychology Review, 9*, 184–211.
- Offermann, L. R., Kennedy, J. K., Jr., & Wirtz, P. W. (1994). Implicit leadership theories: Content, structure and generalizability. *Leadership Quarterly, 5*, 43–58.
- Podolny, J. M. (2005). *Status signals*. Princeton, NJ: Princeton University Press.
- Podsakoff, P. M., MacKenzie, S. B., Moorman, R. H., & Fetter, R. (1990). Transformational leader behaviors and their effects on followers' trust in leader, satisfaction, and organizational citizenship behaviors. *Leadership Quarterly, 1*, 107–142.
- Scherer, K. R. (1979). Personality markers in speech. In K. R. Scherer & H. Giles (Eds.), *Social markers in speech*. Cambridge: Cambridge University Press.
- Scherer, K. R., London, H., & Wolf, J. J. (1973). The voice of confidence: Paralinguistic cues and audience evaluation. *Journal of Research in Personality, 7*, 31–44.
- Schultz, A. (1967). *The phenomenology of the social world*. Evanston, IL: Northwestern University Press.
- Shamir, B., House, R. J., & Arthur, M. B. (1993). The motivational effects of charismatic leadership: A self-concept based theory. *Organization Science, 4*, 577–594.
- Simonton, D. K. (1988). Presidential style: Personality, biography, and performance. *Journal of Personality and Social Psychology, 55*, 928–936.
- Smith, J., & Golden, P. (1994). *Human resources management simulation*. Englewood Cliffs, NJ: Prentice Hall.
- Stevens, M. J., & Campion, M. A. (1994). The knowledge, skill, and ability requirements for teamwork: Implications for human resource management. *Journal of Management, 20*, 503–530.
- Street, R. L. (1984). Speech convergence and speech evaluation in fact-finding interviews. *Human Communication Research, 11*, 139–169.
- Swann, W. B., Jr., De La Ronde, C., & Hixon, J. G. (1994). Authenticity and positivity strivings in marriage and courtship. *Journal of Personality and Social Psychology, 66*, 857–869.
- Swann, W. B., & Ely, R. J. (1984). A battle of wills: Self-verification versus behavioral confirmation. *Journal of Personality and Social Psychology, 46*, 1287–1302.
- Swann, W. B., Jr., Polzer, J. T., Conroy Seyle, D., & Ko, S. J. (2004). Finding value in diversity: Verification of personal and social self-views in diverse groups. *Academy of Management Review, 29*, 9–27.
- Tolley, J. L. (1987). Iacocca still charms the media. *Communication World, 4*, 21–23.
- Turner, J. H. (1968). *Roles: Sociological aspects*. New York: McMillan.
- Turner, J. H. (2002). *Face to face: Toward a sociological theory of interpersonal behavior*. Stanford, CA: Stanford University Press.
- Winter, D. (1987). Leader appeal, leader performance, and the motive profiles of leaders and followers: A study of American presidents and elections. *Journal of Personality and Social Psychology, 52*, 196–202.
- Wonderlic, E.F., & Associates (1998). *Wonderlic personnel test and scholastic level exam: User's manual*. Libertyville, IL: Wonderlic and Associates, Inc.
- Yukl, G. A. (1989). Managerial leadership: A review of theory and research. *Journal of Management, 15*, 251–289.
- Zuckerman, M., & Driver, R. (1989). What sounds beautiful is good: The vocal attractiveness stereotype. *Journal of Nonverbal Behavior, 17*, 67–82.