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Full Length Research Paper

Voices of Leadership: The Effects of Voice Pitch on Perceived Leadership Capabilities

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Previous research shows that voice pitch plays a significant role in leadership selection (Mayew et al., 2013) and that more masculine traits, including voice pitch, are typically associated with successful individuals in leadership roles. The present study extended prior research by examining how sex and gender characteristics of voices influence the perception of leadership qualities within a military environment. Specifically, the design of the study was a 2 (sex of voice: male, female) × 2 (gender of voice: masculinized, feminized) × 2 (sex of participant; man, woman) mixed model design, with the sex and gender of voice serving as the within subjects factors, sex of participant as a between subjects factor, and ratings of military leadership potential serving as the dependent variable. Results from an analysis of variance showed that participants rated men's voices significantly higher than women's voices for leadership potential. However, feminine voices were rated significantly higher than masculine voices. Additionally, there was a significant interaction between sex of voice and gender of voice that showed that the masculine female voice received the lowest ratings of leadership potential. Male participants also provided lower ratings on average to all voices when compared to female participants. We discuss these findings in terms of gender role congruity and the influence of androgyny and gender norms on perceptions of women's leadership potential in a male-dominated, hierarchical environment.

Keywords: Military Leadership, Voice, Gender, Sexual Dimorphism, Gender Role Congruity

Leadership is an essential component of any organization, and the quality of leaders plays a significant role in the success of the organization. Perceivers rely on various sources of information to determine the efficacy of a leader, including visible characteristics like face and body and invisible characteristics like voice. The timbre and sex of the voice can influence the perception of leadership efficacy. This paper will examine the impact of voice pitch on perceptions of military leadership potential for men and women. Pitch is an important voice characteristic that can influence the perception of an individual's level of status or power. We will also explore how gender biases and stereotypes in male-dominated institutions, such as the military, may be related to perceptions of leadership potential based on both a person's sex and voice pitch.

Literature Review

When determining the quality of leaders, perceivers rely on several sources of information, which include visible characteristics, such as body and face (Antonakis & Eubanks, 2017; Korenman et al., 2019; Nana et al., 2010; Re et al., 2013),

as well as less visible characteristics, such as voice. There are significant, distinguishable differences in every person's voice depending on their age (Klofstad et al., 2015), ethnicity (Podesva & Callier, 2015; Thomas & Reaser, 2004), and sex (Aung & Puts, 2020; Mendoza et al., 1996; O'Connor & Barclay, 2017; Zhang et al., 2016), and these specific characteristics serve as the basis for judgments of the target's leadership efficacy. This suggests that people can (and will) judge a leader based on the timbre and sex of their voice before they have physically seen or interacted with them.

Pitch difference is a quality present in all voices and is determined by physiological differences whereby men have lower pitched voices than women. To that end, research has investigated the influence of pitch on judgments of ability and found voices that are lower in pitch are typically perceived to be more capable or qualified for leadership roles (Anderson & Klofstad, 2012; Mahrholz et al., 2018; Puts et al., 2007; Tsantani et al., 2016). In order to see the effect of pitch differentiations on social and physical dominance, Puts et al. (2012) manipulated men's voice pitch to be either lower or higher and asked

participants to rate the voices. They discovered that recordings of men with voices that were lower in pitch were perceived as being more dominant compared to the recordings that were higher in pitch. Given that dominance is a quality valued in leaders, those voices with a lower, or more masculine voice pitch, may be viewed as more effective leaders (Puts et al., 2012).

Status and power, two additional qualities typically valued in leaders, may also be influenced by voice pitch. Ko et al. (2015) examined the relationship between hierarchy and vocal acoustic cues, exploring how hierarchical rank affects the acoustic properties of a speaker's voice and how these hierarchy-based acoustic cues affect perceivers' inferences of a speaker's rank. They found that listeners use pitch, loudness, and loudness variability when making inferences about a speaker's rank and discovered that people use voice pitch to reflect and identify a hierarchy for categorization. Similarly, Tigue et al. (2012) determined that lower pitch voices are associated with more favorable qualities, such as trustworthiness, honesty, intelligence, dominance, physical prowess, and integrity when compared to higher pitch voices. Taken together, these findings strengthen the link between voice pitch and leadership perception, in that lower pitch voices are often preferred and associated with higher positions within a hierarchy and greater leadership capabilities.

An individual's willingness to follow those appointed to lead them has the potential to be influenced by voice regardless of the leader's sex. Previous research conducted in military settings supports the notion that voice pitch impacts perceptions of ordering of hierarchies, influence, trustworthiness, dominance, and a variety of other attributes linked to leadership (Cheng et al., 2016; O'Connor & Barclay, 2018). The influence of voice pitch on perceptions of leadership effectiveness is consistent across different social contexts and domains of leadership. Both male and female leaders with lower-pitched voices (i.e., masculine pitch) tend to be preferred by men and women (Anderson & Klostad, 2012). This suggests that both male and female participants favor men and women with lower-pitched voices and believe they may be more successful in obtaining positions of leadership. Thus, the mere fact that women typically have higher pitched voices than men may be a component that contributes to fewer women holding leadership roles compared to men (Klostad et al., 2012). This implication has led researchers to investigate how gender of voice and sex of voice are perceived, as well as how sex of the perceiver moderates those perceptions (Ko et al., 2015; Puts et al., 2007; Tigue et al., 2012; Tsantani et al., 2016).

To comprehensively evaluate the impact of voice pitch on leadership and to understand why masculine or lower-pitch voices may be perceived most favorably, we should consider sex and gender components in leadership-based institutions such as the military. Heilman et al. (2004) explored the existence of gender biases and stereotypes in the military and discovered that when women were more successful than men, and subsequently

recognized for this success, they were viewed more negatively than their equally successful male counterparts. These gender-based biases affected women's job placement and promotion rates (Heilman et al., 2004). In a predominantly male environment, such as the military, merit and performance are purportedly assessed to determine job placement and promotion rates, rather than gender, sex, or voice pitch. However, the less obvious characteristic of vocal pitch may be playing more of a role in creating the archetypal leader than we think.

Leadership roles are created within hierarchies to add order and manage direction and productivity. Hierarchies are social structures where high-ranking individuals have greater influence, deference, attention, and valued resources than those who are lower ranking. Although the literature has documented a wide range of attributes and behaviors that influence rank attainment and positions of leadership, these findings lack a coherent, unifying framework integrating the various points into a comprehensive and theoretically supported understanding of rank differentiation (Cheng et al., 2016). To address this, Cheng et al. (2016) created an empirically supported evolutionary model, the Dominance-Prestige Account, which may be used to unify the extant diverse findings. Their account proposes that differences in hierarchical rank within human communal groups are the result of both: (a) coerced deference to dominant individuals who induce fear through their ability to inflict physical or psychological harm and (b) openly recognized regard of others who possess valued skills and abilities. This finding links dominance and strength, commonly associated with masculinity, to the prevalence in preference and respect for masculinity and the male figure within leadership roles.

Another essential component of leadership within the military is trust, specifically the level of trust that subordinates place in their leaders (O'Connor & Barclay, 2017). Perceptions of trustworthiness are an important predictor of social outcomes, especially regarding the attainment of leadership roles. O'Connor and Barclay (2017) measured the influence of voice pitch on perceptions of trustworthiness across general, economic, and mating-related contexts. They found that in the context of trust, voice pitch and the sex of the speaker both influenced perceived trustworthiness. All listeners were more trusting of higher pitched male and female voices in economic and mating-related contexts, but lower-pitched women's and men's voices were perceived as more trustworthy in general (O'Connor & Barclay, 2017). These findings provide evidence that while voice pitch alone is sufficient to influence trust-related perceptions and demonstrates that listeners use voice pitch as a cue for trustworthiness and ultimately the decision to place trust in a leader, the sex of a leader also remains relevant.

To understand why characteristics defining leadership are aligned more closely with men, and quite possibly leading to the disapproval faced by women occupying positions of leadership, we consider role congruity theory (Eagly & Karau, 2002; Eagly, 2007; Heilman et al., 2004). Gender role congruity refers to the degree to which an individual's gender identity and behavior

align with societal expectations for their gender. These societal expectations are often informed by traditional gender roles that have been reinforced over time through cultural norms, media, and institutions. Gender role congruity has been shown to have a significant impact on various aspects of individuals' lives, including their mental health, career aspirations, and relationships.

The concept of gender role congruity is rooted in the social constructivist perspective, which posits that gender is a product of socialization and cultural norms rather than inherent biological differences (Eagly & Wood, 2012). According to this perspective, individuals learn about gender roles and expectations through various socialization agents such as parents, peers, media, and schools. These gender roles and expectations inform individuals' behavior and attitudes, creating gendered behaviors and expectations. Gender role congruity theory posits that when individuals' gender identity and behavior align with societal expectations for their gender, they experience a sense of congruity, which can lead to positive outcomes such as increased self-esteem, sense of belonging, and reduced anxiety (Eagly & Wood, 2012). However, when individuals' gender identity and behavior deviate from societal expectations for their gender, they may experience incongruity, which can lead to negative outcomes such as decreased self-esteem, feelings of isolation, and increased anxiety.

One area in which gender role congruity has a significant impact is in individuals' career aspirations and choices. Studies have found that women who conform to traditional gender roles are less likely to pursue careers in male-dominated fields such as science, technology, engineering, and mathematics (STEM) (Diekmann et al., 2010; Stout et al., 2011). This is because these fields are often associated with masculine qualities, such as competitiveness, assertiveness, and independence, which are not traditionally associated with femininity. As a result, women who value achieving communal goals, such as helping others, may perceive a poor fit between their goals and work in STEM fields, which may discourage them from pursuing STEM careers.

Examples of this theory at play in a military environment can be seen in results from studies using service academy cadets or other military students as participants (Boldry et al., 2001; Boyce & Herd, 2003; Looney et al., 2004). Research conducted with cadets at Texas A&M revealed that men are believed to possess greater motivation and leadership qualities necessary for effective military performance than women (Boldry et al., 2001). Instead, women were believed to possess more feminine attributes that would interfere with their ability to adequately execute duties and excel within the environment. It is relevant that the sex-differentiated appraisals by participants reflected the impact of gender stereotypes rather than performance differences between sexes.

Similarly, Boyce and Herd (2003) reported that there is still a disparity in men's perceptions of the similarities that exist between women and leaders. Women, more than men, were able to recognize similarities between women and leaders, though

senior military students possessed stronger masculine gender role stereotypes of successful officers. Experience with being led by women did not affect men's masculine gender stereotypes of leaders. However, successful women cadet leaders perceived effective officers as having attributes that are common in both men and women. Women recognize their own sex's potential as leaders whereas men do not typically associate effective leadership attributes with women (Boyce & Herd, 2003). The results of these studies may explain underlying constructs revealed by the effect of participant sex on perceived leadership qualities varying in sex and gender.

Gender role congruity also may play a role in perceptions of promotability. Midshipmen from the United States Naval Academy perceived male and female leaders as having attributes that would be both positive and negative with respect to promotion, but only female leaders were associated with characteristics having emotional bases, supporting these attributes as stereotypically female (Looney et al., 2004). Moreover, individuals displaying more masculine traits were considered equal in terms of leadership potential, but those displaying more stereotypical feminine traits were perceived as weak, regardless of their sex (Looney et al., 2004).

Women are often seen as lacking in the masculine attributes needed to be successful in the military and relative leadership roles when compared to men (Boldry et al., 2001). This less than favorable perception of women in the military is echoed across the branches to include the Army, where it was discovered that United States Military Academy cadets were the least approving of women serving when compared to rankings made by civilians and ROTC cadets (Matthews et al., 2009). Furthermore, findings have indicated that students at the United States Military Academy prefer individuals with gender congruent faces, which may reflect a preference for physical prowess and abilities (Korenman et al., 2019). Gender biases and gender-role stereotypes appear to influence the perception of men and women comparatively as leaders. Role congruity and the impact that it has on individuals' perceptions of leadership based in the masculinity or femininity of a man's or woman's voice has direct implications to leadership in the military. This is particularly relevant within the context of this study as the judgments made based on voice may influence an individual's willingness to work with or to follow those placed in command.

Thus, voice pitch appears to play a crucial role in the perception of leadership efficacy and may influence how individuals are perceived as leaders across various social contexts and domains. Lower pitch voices are often associated with higher positions within a hierarchy and greater leadership capabilities, while higher pitch voices are associated with more negative qualities. These effects are consistent across both male and female leaders, suggesting that voice pitch may be a contributing factor to the gender disparities in leadership positions. Further research is needed to explore the extent to which gender biases and stereotypes influence the perception of leadership based on voice

pitch and how these biases can be addressed to promote greater diversity and inclusivity in leadership positions.

Research Question and Hypotheses

The following research question and hypotheses were used to guide this study.

Research Question

How do sex and gender characteristics of voices influence perceptions of leadership potential within a military environment?

Hypothesis 1

Participants will give higher leadership potential ratings to the voices of men than they will to the voices of women.

Hypothesis 2

Participants will give higher leadership potential ratings to masculine voices than they will to feminine voices.

Hypothesis 3

Both male and female participants will give higher leadership potential ratings to congruent voices (masculine-men and feminine-women) than they will to incongruent voices (feminine-men and masculine-women).

Method

Research Design

This quantitative study was conducted using a quasi-experimental design with three independent variables (sex of voice, gender of voice, and sex of participant) and one dependent variable (leadership potential ratings). The independent variables of sex of voice and gender of voice were manipulated and controlled by the experimenters and were within subjects variables: all participants experienced all conditions and the order of presentation of the voices used for each condition was completely randomized. Sex of the participant served as a quasi-experimental independent variable. The dependent variable was a composite rating of leadership potential. This design allowed us to analyze the data statistically using a mixed model analysis of variance (ANOVA) to test the hypotheses that there would be main effects of both sex of voice and gender of voice on perceptions of leadership potential, as well as a higher-order interaction between sex of voice and gender of voice. The resulting design of the study was a 2 (sex of voice: male, female) \times 2 (gender of voice: masculinized, feminized) \times 2 (sex of participant: man, woman) quasi-experimental design, with the sex and gender of voice serving as two within subjects factors and sex of participant as the between subjects factor. More details on participants, materials, the data collection procedure, and our planned analytic strategy are provided below.

Participants

Participants included 70 male and 75 female cadets from the United States Military Academy. The average age was 22.82 years ($SD = 1.04$). Approximately 72% of the participants were Caucasian, 10% African American, 8% Asian, 6% Hispanic/Latino, and 4% from other backgrounds or more than one category. All participants were enrolled in psychology courses and received extra credit in exchange for participation.

Materials

The primary materials for this study consisted of a total of 32 audio clips, each 6-8 seconds in length, specifically constructed for this research. The 32 clips underwent pilot testing and those verified to be moderate for the average man or woman's voice, respectively, were used, resulting in 16 clips. The resulting 16 clips were divided: 8 clips were spoken by a man and 8 spoken by a woman, both of whom were cadets at the United States Military Academy. Each voice clip was recorded under controlled conditions in an otherwise silent room, using a Dell laptop computer and a basic external microphone. The gender variations were created by artificially increasing the male voice pitch by four fundamental frequencies and lowering the female voice pitch by four fundamental frequencies. The male voice was left unaltered at the recorded pitch for its relative "masculine" quality and was artificially raised 4 fundamental frequencies from the recorded pitch to simulate the "feminine" male voice. The same approach was used for the female voice wherein the original recorded voice was not edited and remained the "feminine" voice and then was artificially lowered to reflect a "masculine" female voice. The voices were evaluated and normed to ensure all variations sounded natural. Each of the voice recordings were made to portray a military setting of a superior speaking to a subordinate. The 8 different messages recorded by each sex were non-threatening and equally communal in nature, as opposed to agentic, malicious, or disciplinary messages. For example, one message was "PVT Smith, it seems you've been down lately. I don't mean to pry, but I want you to know that I'm here to talk if you need me" (See Appendix A for all statements).

For determining leadership ability, we employed the 14-item leadership questionnaire used by Korenman et al. (2019) (See Appendix B for questionnaire). This questionnaire bases the definition of a competent leader on qualities identified in the Army's Leader Development Manual (Department of the Army, 2012). The questions ranged from professionalism, well-being, trustworthiness, ability to develop oneself and others, and social competence. Based on the voice sample, participants rated leadership capabilities using a 7-point Likert scale, with 7 options ranging from "Strongly Agree" to "Strongly Disagree". The perceived leadership capabilities were determined by calculating an average of the rankings from the 7-point Likert scale, across the 14 leadership qualities, to arrive at an overall leadership score.

Presentation order for the voices was randomized, and participants were able to listen to each voice clip repeatedly if necessary. Participants listened to the voices via headphones and all responses were collected electronically via Qualtrics.

Data Collection Procedure

Upon arrival at the research site, participants were briefed on the process of the experiment and given an overview of the intent of the study. No more than 15 participants were present in the experimental area at any time. Each participant was given a set of Bose headphones to connect to their school issued computer to listen to the stimuli. By doing so, we hoped to normalize the quality of the voices across participants. Once connectivity to the internet was established, participants were given a link to the Qualtrics site to begin the study. Each participant was presented with the 16 voices, eight male and eight female, each in its masculine and feminine forms, and thus rated all voices. Voices were presented as pairs, for an unlimited amount of time. These pairs consisted of the feminine and masculine forms of the voice, so that direct comparison between the voices could be made. Participants were asked to listen to the voices and determine the extent to which that voice represented each of the 14 leadership statements located below the recordings. They were allowed to listen to the recordings as many times as they liked. Once the participant rated the voices on all 14 qualities, they could move on to the next voice pair, continuing this process for all 16 voices in the experiment. Neither the presentation order of the voices nor the time that participants spent listening to each voice was known to the experimenters. After rating all 16 voices, participants were asked to complete a short demographics survey and allowed to leave the research area.

Analytic Strategy

We used a 2 × 2 × 2 (gender of voice × sex of voice × sex of participant) mixed model ANOVA to analyze the effects of gender of voice and sex of voice on men’s and women’s ratings of leadership capability. Sex of voice and gender of the voice served as within-subjects variables and the sex of the participant as the between-subjects variable. This analysis allowed us to test both main effects of sex of voice and gender of voice, which corresponded with Hypotheses 1 and 2, along with the sex of voice by gender of voice interaction, which corresponded with Hypothesis 3. Post hoc simple effects tests were chosen because they allowed us to determine what specific differences among the group means were driving any observed interaction to further evaluate support for Hypothesis 3. We used an alpha level of .05 for all statistical tests.

Results

Results from the mixed model ANOVA showed a main effect for sex of voice, $F(1, 143) = 6.081, p = .02$, with male voices ($M = 5.34$) receiving higher ratings than female voices ($M = 5.23$), thus supporting Hypothesis 1. Contrary to Hypothesis 2, results from the ANOVA showed a main effect for gender of voice, $F(1, 143) = 15.787, p < 0.01$, with feminine voices ($M = 5.35$) receiving higher ratings than masculine voices ($M = 5.22$).

Additionally, there was a significant interaction between sex and gender of the voice, $F(1, 143) = 21.736, p < .01$, partially supporting Hypothesis 3. Post hoc simple effects tests revealed that participants differed significantly in their ratings of incongruent and congruent women’s voices, but not incongruent and congruent men’s voices. Women with masculine voices received lower ratings than women with feminine voices ($M = 5.10$ and $M = 5.37$, respectively), whereas the masculine male voices and the feminine male voices received similar ratings ($M = 5.35$ and $M = 5.34$, respectively).

We found that male and female participants differed in their ratings of voices, $F(1, 143) = 10.91, p = .001$, with men rating leadership potential lower than women ($M = 5.08$ and 5.49 , respectively). However, there was no difference between men and women when rating voices based on sex of voice, $F(1, 143) = .575, p = .450$, or gender of voice, $F(1, 143) = .541, p = .463$. In addition, there was no significant three-way interaction between sex of voice, gender of voice, and participant sex, $F(1, 143) = .588, p = .450$. All means and standard deviations may be found in Table 1.

Table 1

Means and Standard Deviations for Male and Female Participants’ Leadership Ratings of Voices as a Function of Sex of Voice and Gender of Voice

Voice Type	Participant Sex		
	Man	Woman	Overall
Male Voices			
Masculine	5.16 (.85)	5.53 (.66)	5.35 (.78)
Feminine	5.14 (.83)	5.52 (.66)	5.34 (.77)
Total	5.14 (.83)	5.52 (.66)	5.34 (.77)*
Female Voices			
Masculine	4.85 (.98)	5.34 (.93)	5.10 (.99)*
Feminine	5.16 (.93)	5.56 (.75)	5.37 (.86)*
Total	5.01 (.92)	5.45 (.78)	5.23 (.88)*
Masculine Voices	5.01 (.86)	5.44 (.70)	5.23 (.81)*
Feminine Voices	5.15 (.82)	5.54 (.67)	5.35 (.77)*

* Significant at the $p < .05$ level

Discussion

The purpose of this study was to investigate how the masculinity or femininity of male and female voices affected perceptions of their military leadership potential. Consistent with Hypothesis 1 results showed that men rather than women tended to be perceived as well suited for leadership positions, especially in

masculine domains (Boldry et al., 2001; Heilman et al., 2004; Yukl, 2012). We also detected a significant main effect of sex of voice; participants' ratings of leadership potential for male voices were significantly higher than for female voices, regardless of whether they were masculine or feminine. This finding is also consistent with prior research in a similar military context that used sexually dimorphic faces as stimulus materials (Korenman et al., 2019). Inconsistent with Hypothesis 2, we detected a main effect of gender of voice with participants rating feminine voices as having higher leadership potential than masculine voices. This finding is contrary to previous literature that found masculine voices to be rated highest in terms of leadership and hierarchical dominance (Anderson & Klofstad, 2012; Cheng & Tracy, 2014; O'Connor & Barclay, 2017; Puts et al., 2007; Tsantani et al., 2016). Most important, and in partial support of Hypothesis 3, these two main effects were qualified by a significant interaction that involved sex of voice and gender of voice, where participants gave women with masculine voices lower ratings than all other groups. In short, participants appeared to reject the leadership potential of women with masculine voices. In this context, the masculinity of her voice did not equate to perceptions that she would be well suited for military leadership.

Preference for Gender Role Congruity

Participants in the current study displayed a distinct preference for gender congruity in female voices, with feminine-female voices rated much more favorably than masculine-female voices. This disparity and lower ratings for masculine-female voices likely pulled the overall average masculine voice rating below the average feminine voice rating. We suggest this might be driven both by role congruity and the masculine environment of the military academy. Judgments of one's ability based on physical traits, such as voice pitch, may be partially influenced by biased beliefs regarding gender roles, with the intersection between voice pitch and role congruity reflected in masculine male voices and feminine female voices. Role congruity theory suggests that characteristics associated with leadership are aligned more closely with men, leading to more disapproval of women in leadership positions (Eagly, 2007; Eagly & Karau, 2002). Gender stereotyping and perceived leadership ability appear to be tied to gender role congruity and the expectation that behavior aligns with societal expectations for gender.

Eagly and Karau (2002) describe biases regarding female leaders wherein the perceived incompatibility between the female gender role and leadership roles leads to two forms of prejudice: perceiving women less favorably than men as potential occupants of leadership roles and evaluating behavior that fulfills the prescriptions of a leader role less favorably when it is enacted by a woman. Ultimately this may make it more difficult for women to obtain and succeed in leadership roles. Evidence validates that these consequences occur, particularly in situations that intensify perceptions of incongruity between the female gender role and leadership roles (Eagly et al., 2002). Within both military and civilian samples, Matthews et al. (2009) and

Looney et al. (2004) found negative attitudes toward women in the military and lower approval ratings for women in military leadership roles. Despite considerable progress in the advancement of women in the military and the opening of combat arms roles to women, women likely still face gender bias when serving as or striving to become military leaders; recent studies examining role congruity and other factors affecting perceptions of women's leadership ability in military samples support this notion (e.g., Balraj, 2019; Korenman et al., 2019). This may be especially true for women whose physical characteristics, such as voice pitch, appear less feminine.

Challenges in Evaluating Leadership Potential

People who favor role congruity also may find it difficult to evaluate leader potential when considering individuals with androgynous traits or who appear to violate traditional gender roles. They may assume that the masculine or feminine qualities of voice pitch correspond to the overall masculinity or femininity of the individual (Kark et al., 2012). Even military uniform standards blur the line between masculine and feminine appearances. Cadets of both sexes wear the same uniform (with minor adjustments), take the same classes, participate in the same athletic activities, and undergo the same rigorous summer training together. Moreover, androgynous individuals are characterized by both masculine and feminine traits.

Androgynous men are equally as masculine as masculine men, but they are also higher in feminine traits, and androgynous women are equally as feminine as feminine women, but they are higher in masculine traits. Androgyny and leadership theories predict that the most effective leader is an individual who possesses high levels of both instrumentality and expressiveness (Korabik, 1990). Bem (1974) contends that androgynous people will be more effective than sex-typed individuals because of their broader repertoire of expression of behaviors and greater flexibility.

Previous research supports that women and men behaving in traditional social roles as well as taking on expected leadership styles are perceived more favorably (Bartol & Butterfield, 1976; Petty & Miles, 1976). Perhaps as women integrate into any predominantly male culture, maintaining the social expectation of femininity and having an accompanying feminine voice pitch leads to more positive perceptions of leadership (Kark et al., 2012). Additionally, military roles have evolved in recent decades to include both peacekeeping and warfighting, which suggests that women may be viewed as better suited for leadership in the more gender-congruent peacekeeper role (Ferguson et al., 2019). This notion is supported by research findings that masculine features are preferred for leaders when participants have been primed with a need for conflict resolution from their leader versus the preference for feminine features for a leader when participants are primed with the need for leader cooperativeness (Little et al., 2012). In other words, masculine men may be perceived as most ideal for warfighting, while feminine women may be viewed as most suitable for cooperative tasks and peacekeeping, also reflecting role congruity.

Limitations and Future Directions

There are several limitations to the study, which also indicate possible directions for future research. To begin, the recorded voice samples reflected primarily communal messages. However, authentic leader communications consist of a mixture of positive and negative messages. The possibility that participants would respond differently to voice samples that were more agentic or that included more critical or disciplinary content was not examined in the current study, although it could be the focus of future research. Additionally, participants' attitudes and beliefs also may have affected how they rated leadership potential. Specifically, ambivalent sexist beliefs (Glick & Fiske, 1996) may account for some of the variability observed in participants' ratings because high levels of hostile antipathy toward women who are perceived to be pushing themselves where they do not belong (i.e., in the military) may be associated with rejection of their leadership potential. A study is underway to evaluate the role of hostile and benevolent sexism in perceptions of military leadership potential for men and women with both masculine and feminine physical characteristics. Additionally, a comparison of civilian participants' ratings of military leadership potential for men and women with masculine and feminine voices would help clarify whether the pattern of results observed in the current study would also be detected in a non-military sample. Finally, these findings may generalize more to how people view the leadership potential of women with masculine voices in other male-dominated professions, such as law or medicine, as opposed to domains such as education or office administration.

Conclusions

The current study provides evidence that the masculinity and femininity of male and female voices affect ratings of leadership potential in a military context. Although both types of male voices, as well as female voices that were feminine, were rated as similarly high, women with masculine voices were rated as showing the least leadership potential. At least within this context, voice masculinity for women was not associated with high military leadership potential ratings.

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