PERCEPTION OF VOICE GENDER BY MEMBERS OF THE LGBT+ COMMUNITY

by

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Research indicates that cisgender men, cisgender women, and transgender women perceive “male” and “female” voices differently between groups, when presented with audio clips and a forced-choice between the binary sexes. The purpose of this study was to determine if there are true differences between individuals’ perceptions of voice gender due to the influence of their own gender and/or sexuality. Participants were asked to rate a variety of voices on a 7-point Likert scale ranging from masculine (1) to feminine (7). Results of the study, which included 55 participants who self-identified their gender and sexuality, indicate that there is no significant difference between any group’s perception of masculine, feminine, or androgynous voices. The clinical implications of this research indicate that when speech-language pathologists (SLPs) treat transgender/nonbinary clients in voice therapy, continuum terms (masculine, feminine) should be substituted into the SLP vocabulary for the binary terms (male, female).


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CHAPTER 1

INTRODUCTION

Gender is everywhere. Almost every person has one, and even in cases where people don’t, the concept of gender is so omnipresent that most people assume one for such individuals. These assumptions may be based on a person’s height, haircut, style of dress, and often, on their voice. Voice is another facet of identity that nearly every person has. It is possible for people to estimate fairly accurately the concrete age of the speaker by hearing their voice alone; it is also true that people may assume someone’s gender from their voice, too. In fact, once a person has made a decision about someone’s gender based on only their appearance, the sound of their voice may lead them to changing that opinion and even apologizing for misgendering them.

These incidents are especially common when members of the queer and transgender community engage with the greater public; people in these communities, regardless of gender, often purposefully don’t conform to typical gender roles. Even when individuals in these communities do, they are still more likely to be exposed to a broader expression of gender from other friends and members of the spaces they inhabit. Anatomy that may be difficult to change, including voice, aren’t the sole determinant of gender, and often the first question asked at any gender and sexuality center is ‘What are your pronouns?’. But because voice is such a foundational feature of gender determination and perception by others, it is important to determine who the people are that are making these determinations, and how they are coming to those conclusions.

For the purposes of this study, the term "queer" in this paper refers to solely to sexuality, and includes any sexuality other than heterosexual. The term “transgender” specifically refers to individuals who identify as binary genders they were not assigned at birth (e.g., transgender women, transgender men). “Nonbinary” refers to any gender (or lack of gender) outside of the
gender binary of male/man and female/woman (e.g., genderfluid, agender). Finally, “cisgender” refers to individuals who identify as the gender they were assigned at birth.

While there are studies that look into cisgender heterosexual speakers identifying gender with voice audio samples alone, there are no such studies done specifically investigating how queer and transgender individuals may do so. Because of the important work speech-language pathologists (SLPs) do in collaborating with members of the nonbinary and transgender community during their transition process to focus on voice, it is important for SLPs to have more diverse knowledge about the way in which these individuals may want to sound; their ideas of how they want their gendered (or gender-neutral) voice to be perceived may be different than what a cisgender SLP would expect. Understanding how perceptions between groups are similar or different can give us a link to understanding the goals of clients. This study examined the perceptions members of the queer and transgender community have about voices that are considered gendered by the SLP research community based on pitch, and determined whether or not these individuals determine gender by voice as rigidly or in the same way as cisgender heterosexual individuals.

**Current Voice and Gender Perception Research**

Few quantitative studies have investigated the formation of transgender/nonbinary and queer identity in relation to vocal presentation, though self-report from transgender clients depicts high satisfaction among those receiving voice services with the progress they make in voice training (Davies, Papp, & Antoni, 2015). There is even less research on how transgender/nonbinary and queer folk categorize masculine and feminine speakers, and whether or not they diverge from cisgender heterosexual (cishet) speakers in how they identify voices. The only empirical study done on vocal categorization revealed that cishet men and women perceived gendered voices with
a high sensitivity, but that this sensitivity increased when listening to voices of the “opposite” sex (Junger et al., 2013). The authors attributed this sensitivity to an evolutionary relevance of voice perception in mate selection. Significance in correct identification of voice decreased when voices were morphed in 3 conditions to sound more like their “opposite”. However, only at the highest level of morphing did participants not maintain significant results--but the differences in correct answers remained significant for “opposite” sex stimuli (see Appendix B for a summary of results).

In Junger et al.’s follow-up of this study (2014), transgender male-to-female speakers, half of whom were heterosexual, and half who were homosexual, were presented with the same stimuli. In this case, their responses were more closely aligned with those of cishet women. Notably, when labeling the sexualities of these women, they were categorized based on anatomical sex, and not on gender identity (i.e., heterosexual if they were attracted to women, and homosexual if they were attracted to men, despite being women). The lack of a control group for the transgender participants’ sexualities in the cisgender group, the forced-choice test giving only “male” and “female” as options, and the insensitivity with which certain labels were assigned, leaves a wide gap in the research, as the intersection of sexuality and gender weren’t explored to the full extent (see Appendix B for summary of results).

These fMRI studies used 20 cisgender men, 19 cisgender women, and 32 male-to-female transgender women to investigate the neural correlates of voice gender perception while the individuals identified 240 trisyllabic voice stimuli. The original, natural stimuli were modified in three conditions (by 2 semitones (ST) each time) to sound closer to the “opposite” gender with each additional modification. Stimuli were presented in a pseudo-random order, so that no same word and no same speaker were heard consecutively (Junger et al., 2013, 2014).
Behavioral analysis was done, and response biases were also calculated, showing that cisgender women tended to have a bias for identifying more ambiguous voices as male; transgender women tended to identify male voices more often in the non-morphed and the first morphed condition (2ST). There was no bias for either gender seen in males. Cisgender and transgender women only differed significantly in the 4ST condition in their bias for indicating males.

Friedman tests indicated that there were significant differences in the percentage of correct answers in each group, and for all morphing conditions. Cisgender men and women both had more correct answers for members of the “opposite” sex, while this was not seen for male-to-female transgender women. However, both transgender women and cisgender women identified male voices better than cisgender men, while cisgender men identified female voices better than either transgender or cisgender women.

Participants all responded faster to women’s voices, and cisgender women reacted the fastest of all the groups, across each morphed condition. Cisgender women also reacted faster to male voices compared to transgender women. Cisgender men and transgender women did not significantly differ in reaction time.

Interaction analyses showed that cisgender men had a stronger activation of the right hemispheric area triangularis, insula, and cuneus, compared to transgender women. This activation in men was used for processing male versus female voices in their original condition. When cisgender and transgender women were compared, enhanced activation was seen in the bilateral MPFC, the right superior temporal gyrus, the precentral gyrus, cuneus, cerebellum, thalamus, and the left precuneus. In cisgender women, these areas were used for processing male and female voices in the unmorphed condition.
When voices were morphed, cisgender men had stronger activation in the right superior temporal gyrus compared to transgender women. In fact, the more voices were morphed, the more activation cisgender men attained in this region; transgender women did not imitate this pattern. Cisgender and transgender women did not undergo any contrastive changes when voices were morphed.

The authors of these studies stated that transgender individuals fall into an intermediate gender category of their own, because, unlike accuracy preferences for voices shown by cisgender women and cisgender men, transgender women did not show an accuracy preference to either gender.

The results of these studies served as a foundation for the current study, which examined how members of the LGBT+ community compare in their perceptions of masculine and feminine voices to cisgender heterosexual individuals. This study did so regardless of whether or not individuals have begun transitioning, ever plan on transitioning, or feel any sort of gender dysphoria; however, future studies may look at differences between members of the community who transition and those who do not, as well. Finally, the author chose to use continuum gender vocabulary (i.e., masculine, feminine) on a 7-point Likert scale continuum, rather than binary vocabulary (i.e., male, female) in a forced-choice test, to determine voice perceptions of each group.

“Nature or Nurture”

One of the most detrimental “proofs” that science has long debated over when it comes to gender being fixed at birth, rather than being a synthetic, manmade construct, is the idea that men and women have different brains. In fact, this is not the case, and has been shown over and over again. Cordelia Fine has an entire book devoted to the subject, with study after study depicting
“proof” that women behave a certain way because of their female brains, and men behave a certain way because of their male brains. And then, she contrasts them directly with studies that “make” each gender behave differently than their genders say they should. All sorts of environmental factors come into play in these differences, but the largest takeaway is that certain stereotypes are so insidious that even the most feminist and self-aware individuals find themselves unconsciously relying upon them. From even before the day a baby is born, they have expectations heaped upon them based on the gender they get assigned at ultrasound. A study reporting on nearly 400 birth announcements showed that parents express different emotional reactions to the birth of one gender versus the other; birth announcements for baby girls are written expressing more happiness, while those of boys are written to suggest more pride. Not only that, but another study showed that parents were more likely to place birth announcements for boys than girls (Fine, 2010).

Transgender individuals go through this process, too, almost as if growing up a second time. Cordelia Fine cites Jan Morris from her post-transition autobiography, where she admits that the more people accepted her female gender identity, and therefore the stereotypes associated with womanhood, the more she found herself becoming worse at things such as reversing cars and lifting heavy objects--activities she was assumed to now be bad at due to her gender (2010). Transgender men found the opposite results. Multiple studies and interviews with female-to-male transgender individuals have shown that these men gain “greater recognition and respect” at work due to their gender identity (Fine, 2010, p. 51). For instance, Ben Barres, a transgender man and a neurobiology professor, reported hearing another faculty member comment on how his work was so much better than his sister’s, not realizing of course that his sister was actually just him pre-transition. As Cordelia Fine states, this offers “an intriguing glimpse into the possibility that a person’s talents in the workplace are easier to recognise when that person is male” (2010, p. 51).
Other experiments looking at brain differences in male and female rats show that these differences may be partially due to a social component, too. Mothers tend to lick male rats more than their sisters, but when female rats were stimulated the same way and as often as their brothers by scientists, the penis innervating nucleus in the brain stem got larger than it did in female rats where this intervention was not applied. This suggests that sex differences in the brain are not due just to the testosterone found in male rats, but that it can be “influenced by the different maternal treatment of male and female pups”, or in other words, due to social factors outside of biology (Fine, 2010, p. 80). Once again, brain differences are shown to not be innate to human attachment to the gender binary, but malleable based on social interactions, too.

These concepts are all important because they indicate that gender stereotypes aren’t an innate, reliable feature to determine who people are and what they are capable of. With the right social motivations, human beings are able to change their perceptions of both themselves, and of others. It is on this piece of key information that certain facets of the proposed study hinge. Members of the transgender and queer community who spend time in queer spaces often find themselves in conversations where they are attempting to unlearn harmful stereotypes and deconstruct the rigidity of the gender binary so pervasive in society. As will be shown later in this paper, transgender individuals, especially on the transmasculine end of the spectrum, may find themselves purposefully hobbling their own transition so that they won’t be mistaken for cisgender men, who may be seen as embodying traits the queer and transgender community could find toxic.

Transgender Identity Formation and Competing Ideologies

The importance of social implications of transgender identity cannot be ignored or overstated. Sociolinguist Lal Zimman has spent his graduate and postgraduate career involved in interviewing members of the transgender community to learn more about their experiences in
transitioning, and much of his work can be used as a qualitative guide to transgender identity and expression. He also critiques the more quantitative work of speech-language pathologist researchers, as well as their qualitative judgements, cautioning against cisgender clinician judgement and bias in the vocal therapy field. He points out that much of the literature in the field of speech-language pathology assumes that transgender individuals “want to sound like stereotypically straight, gender-normative cis people who also embody white, middle-class, American femininity (or...masculinity)” (Zimman, 2016, p. 259). The norms against which transgender women are compared in this field are often college students, who tend to come from a background of greater privilege than many transgender clients speech-language pathologists may actually see; our idea of what gendered characteristics “all” voices possess are informed by research and subjects who in all likelihood are not representative of their gender as a whole, nor the human experience as a whole. Zimman acknowledges what many speech-language pathologists may not: “some trans women may prefer to be read as lesbians and/or masculine women, as women of color, as older women, or as working class women”, and not the normed “white college girl” to which their voices may be compared (Zimman, 2016, p. 259). Spectacularly, even when these women are explicit about the ways in which they want their voices to sound that may differ from contemporary notions of femininity, speech-language pathologists often still respond with disbelief that these women are truly happy with their voices, and assume that they “must be mistaken about how they sound” (Zimman, 2016, p. 259). This unfortunately also leads to the dangerous notion amongst speech-language pathologists that subjective reports from transgender clients may not be valid measures of how adequate services truly are (Zimman, 2016).

While transgender men aren’t seen as often as transgender women in voice training (Davies, Papp, & Antoni, 2015), possibly due to the effect testosterone has on naturally thickening
men’s vocal folds and thus deepening their pitch, much can still be learned from them about the ways in which transgender individuals want the legitimacy of being correctly gendered in society, without having to appropriate the more toxic effects of heteronormativity and gender-normativity (Zimman, 2012). In interviews with transgender men, Zimman discovered that some transgender men/transmasculine individuals “choose not to go on hormones” because “changing one’s self-presentation in order to meet dominant expectations about how men and women sound involves a kind of capitulation to non-trans norms” (Zimman, 2012, p. 113). However, these principles are a double-edged sword. While the ultimate point of the above belief is to avoid embodying toxic heteronormative standards, “trans people face delegitimation or violence when they fail to live up to normative expectations” of the gender they identify as (Zimman, 2016, p. 271). But if these individuals do “live up to those expectations [they] may be criticized for being excessively normative and hence reinforcing harmful gender stereotypes” (Zimman, 2016, p. 271). This belief isn’t unwarranted. Gagné, Tewksbury, and McGaughey wrote a paper in 1997 that states explicitly “many transgenderists believe that their actions and identities are radical challenges to the binary system of gender” but that in actuality “the majority of such individuals reinforce and reify the system they hope to change” (p. 1). The intent of the authors was not to vilify the transgender community, but rather to highlight an issue that transgender and queer individuals in the modern day are hyper-aware of, and grapple with every time they step out their door. Understanding the nuances of these competing ideologies can help explain why the research base for aiding transgender men and women in vocal therapy needs to be increased, and taken in a direction that makes it more flexible for the wants and needs of the transgender/nonbinary community.

Social Implications of Research
Speech-language pathologists currently have the most research of any field devoted to the scientific study of transgender voices. That isn’t to say it is a lot of research, but of all the fields with a stake in transgender voices and transgender lives, it leads the way. Lal Zimman again reminds researchers in the field of speech that transmasculine speakers and speech-language pathology researchers don’t always agree on the gendered characteristics of voice, or the way “awareness and control over the gendered voice is conceptualized” (2016, p. 258). Interestingly, while gendered characteristics of voice in speech-language pathology are typically framed as a product of biology and anatomy, Zimman points out that there is extensive research that actually say quite the opposite. Many “gendered phonetic traits emerge during childhood language socialization and may vary within gender groups as much as between them” (Zimman, 2016, p. 258).

Again, this pervasive idea of biology and anatomy authenticating the gender binary demonstrates its flaws. Socialization is the more likely culprit for the way in which cisgender individuals speak, if in fact any cisgender individuals truly do have any overlapping traits with one another that no individual of the “opposite” sex also has. The dilemma in speech-language pathology research is the need to categorize men and women into two distinct macro categories, thus homogenizing, but also naturalizing, the way in which the two genders speak, and thoroughly doing away with variability in the voices of cisgender individuals. This then gives way to the pathologizing of transgender voices. Looking at voices through this lens situates transgender individuals as if they must “[work] against their biology” (Zimman, 2016, p. 254). Naturalizing cisgender voices for research purposes of speech-language pathologists has an unfortunate effect on cisgender individuals, too; it erases the “variability that exists in the gendered practices of cis
women and men on the bases of class, ethnoracial identity, culture of origin, sexuality, or disability” (Zimman, 2016, p. 254).

Lastly, the research does not account for the fact that many transgender individuals may have different ideas of how they would like to sound, that they may not wish to change their voices at all, or they “might achieve a voice that allows them to ‘pass’ without any special conscious effort” (Zimman, 2016, p. 254). It is up to the researchers and the active speech-language pathologists to remain accountable for the practices and research they promote, and ensure that the goals they set for clients are relevant to the client, and not necessarily reliant upon cisgender norms.

Methods for Changing Voice

Once an individual has decided that part of their transition or coming out process will include some form of altering their voice, a speech-language pathologist may be the next person the individual sees. In practice, training a transgender individual’s voice usually requires focus on altering pitch, resonance, articulation, intensity, inflectional patterns, and some nonverbal communication behaviors in healthy ways that won’t cause damage to the vocal folds. The mentioned categories are usually divided into strictly defined masculine/male qualities, and feminine/female qualities, based on norms. For example, the feminine pitch range is typically defined as 180-220 Hz, while the masculine range is considered 100-140 Hz, with some variations among authors usually between those ranges (Davies, Papp, & Antoni, 2015). Today, progress in speech therapy is indicated by the addition of a gender neutral range, defined by Davies and colleagues as 145-170 Hz (2015). No other categories mentioned above have the addition of gender-neutral markers.

Aside from a variety of vocal exercises and education about maintaining a healthy voice, surgeries for altering pitch also exist. Phonosurgery, a general term encompassing a variety of
pitch-elevating surgical procedures, raises the speaking fundamental frequency, which is an important factor in gendered voice perceptions; however, it is also not necessarily the only factor involved in perceiving a feminine voice. There are mixed professional opinions about the efficacy and safety of such surgeries, although the option remains viable (Davies, Papp, & Antoni, 2015). Sarah Schneider and Mark Courey provide similar guidelines for vocal training techniques from the University of California, San Francisco Medical Center (2016). They state that vocal training by a specialty trained speech-language pathologist can be the best way to ensure vocal health and efficiency in voice training while targeting communication characteristics that aren’t congruent with one’s identity. Otolaryngologists who are trained in performing phonosurgeries “may act as an adjunct to voice therapy” (Schneider & Courey, 2016, p. 1).

Because speech-language pathologists are regarded as some of the best people to obtain transgender voice training from, it is important that professionals in the field certify that any research they produce and/or rely on for best evidence-based practice is respectful and appropriate. Without understanding how individual differences may impact perceptions of voice, clinicians run the risk of promoting harmful stereotypes that can filter into medical practice and have a negative impact on patients’ well beings, outcomes, and trust in their clinicians.
CHAPTER 2
RESEARCH SCOPE

Research Design

This study used a within-subject design. The independent variable was the presentation of trisyllabic words in morphed and unmorphed pitch conditions. The dependent variable was the rating individuals give each stimulus presentation on a feminine to masculine continuum. Subjects were split into three groups based on personal identification with one of the three groups, and all groups heard all stimuli. The groups were split as follows:

- Cisgender heterosexual
- Cisgender and queer
- Transgender/nonbinary and queer

Cisgender in this instance means that the individual identifies as the gender they were assigned at birth. Queer in this instance refers solely to an individual’s sexuality, and is being used as an umbrella term for any sexuality, excluding heterosexual. Transgender in this instance specifically refers to individuals who identify as transgender women, or as transgender men, regardless of whether or not they have or wish to physically transition. Nonbinary refers to any gender (or lack of gender) outside of the gender binary of male/man and female/woman (e.g., genderfluid, agender).

Specific Research Questions

Overarching Aim

Do members of the LGBT+ community have different perceptions of masculine and feminine voices in comparison to people who do not identify as part of the LGBT+ community?
1. Do queer cisgender adults have a different perception of masculine and feminine voices than cisgender heterosexual adults?

2. Do transgender/nonbinary queer adults have a different perception of masculine and feminine voices than cisgender heterosexual adults?

**Research Procedures**

**Stimuli**

The stimuli were comprised of 10 trisyllabic words that are taken from the *Peabody Picture Vocabulary Test, Fourth Edition* (PPVT-4). In revised editions of this particular test, which was normed to be representative of the population at each age range, a bias panel representing multiple racial and ethnic perspectives, as well as a female perspective, identified and removed “items that might be considered offensive or biased on the basis of sex or race/ethnicity” (Dunn & Dunn, 2007, p. 28). Therefore, using words found on the updated version of this norm-referenced test should be less likely to contain vocabulary that is associated with one gender or another. Unfortunately, there is limited research about different English words conjuring up associations with one gender or the other, though there is evidence that words meant to be neutral or generic (such as the generic ‘he’ or ‘he/she’) tend to evoke thoughts of male images (Gastil, 1990). Using stimulus words taken from standardized tests was the attempt battle with the unconscious associations of gender to neutral words.

The use of trisyllabic words followed the same format that Junger and colleagues used in their stimuli creation, due to the accuracy with which individuals can identify gender at that length of word (2013, 2014).

Eight adult speakers (4 males and 4 females), 21-35 years of age, were recorded speaking all ten words in isolation in a sound proof booth with a high quality recording system to reduce the
presence of background noise. This resulted in 80 single-word recordings. The male and female voices fell within the average range for male and female speakers. Using Praat, the recordings were manipulated by shifting the original recordings by 0-6 semitones. Male voices were shifted up, and female voices were shifted down. This resulted in 80 stimuli in each of the three conditions: 0 semitone shift, 4 semitone shift, and 6 semitone shift (240 stimuli total).

Procedures

Participants were seated at a computer with high quality headphones. They were presented with one stimuli per trial. The trials required a response: 240 trials (one trial per stimuli) required a judgement of speaker’s gender using a 7-point Likert scale. An additional 48 trials (20% of the original) had an open response format, so that the participants generated their own answer about the gender they associated with each speaker. These open-ended questions allowed the participant to type in their answers.

Data collection consisted of participant responses, as well as reaction time (RT) for categorizing/describing each stimulus.

Testing administration was 25-45 minutes. Subjects heard all variations of each of 8 voices saying a total of 10 words in 3 conditions. No presentation consisted of the same word or speaker consecutively.

Post-testing administration consisted of a participant questionnaire detailing participant information regarding self-identified gender, sexuality, and familiarity with queer/LGBT+ people and spaces, if any.

Participants

Participants included 55 adults aged 18 and older. Participants self-identified as one of the following: cisgender heterosexual, cisgender and queer, or transgender/nonbinary and queer. In
total, there were 27 cisgender heterosexual individuals, 14 cisgender queer individuals, and 14 transgender/nonbinary queer individuals who participated.

Of the cisgender participants, 11 of 41 (27%) were cisgender men, and 30 were cisgender women. Of the transgender and nonbinary participants, 1 was a transgender man, 3 were transgender women, and the remaining 10 participants (71%) identified themselves as outside of the binary, and/or as multiple genders. Out of all participants, 15 out of 55 (27%) identified a race/ethnicity other than white/Caucasian, including: Asian (6), Biracial (3), Black (2), Latinx (2), Multiracial (1), and Native American (1).

Data Analysis

For Likert responses, two tests were done: one for gender identity, and one for sexuality. None of the effects were significant.

To compare the groups, the non-parametric test Kruskal-Wallis was used. For gender identity, three separate groups were entered into the model (listed as 1, 2, and 3). For sexuality, two groups were entered. See Table 1 and Table 2 for the mean comparisons. See Appendix D for the full descriptive data.

Table 1: Mean Likert responses of participants compared by gender. No significant effects were seen on responses due to gender.
Table 2: Mean Likert responses of participants compared by sexuality. No significant effects were seen in responses based on sexuality.

A descriptive analysis was conducted to compare the vocabulary used by participants with a specific focus on how the different groups of participants generate vocabulary to describe the voices. Because enough similar vocabulary was generated within and between groups, a statistical analysis was conducted. The cisgender heterosexual group used predominantly binary vocabulary such as “male, female”, while the other groups included and combined vocabulary such as “nonbinary, genderfluid, nonbinary femme”. Often individuals outside of the cisgender heterosexual group deliberately avoided the terms “male” and “female”, substituting instead “man” and “woman”, “cisgender/transgender man” and “cisgender/transgender woman”, or distanced their vocabulary even further from the binary by using terms such as “cis masc” and “cis femme”, or “masc of center” and “femme of center”.

A Univariate ANOVA was used to determine if the number of instances of specific vocabulary differed between groups, and it was found that there is a significant effect of sexuality (F(55,1) = 7.172, p = 0.01). See Table 3 and Table 4 for results.
Table 3: Pairwise comparisons of participant sexualities and the effect on their unique vocabulary generation, where 1 means heterosexual and 2 means queer.

<table>
<thead>
<tr>
<th>(I) Sexuality</th>
<th>(J) Sexuality</th>
<th>Mean Difference (I-J)</th>
<th>Std. Error</th>
<th>Sig.</th>
<th>95% Confidence Interval for Difference²</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.00</td>
<td>2.00</td>
<td>-2.668ᵇ</td>
<td>.738</td>
<td>.001</td>
<td>-4.150 to -1.186</td>
</tr>
<tr>
<td>2.00</td>
<td>1.00</td>
<td>2.668ᶜ</td>
<td>.738</td>
<td>.001</td>
<td>1.186 to 4.150</td>
</tr>
</tbody>
</table>

Based on estimated marginal means:
* The mean difference is significant at the .05 level.
b. An estimate of the modified population marginal mean (I).
c. An estimate of the modified population marginal mean (J).
d. Adjustment for multiple comparisons: Bonferroni.

Table 4: Tests of between-subjects effects indicating that sexuality is the sole variable that had a significant effect upon unique vocabulary generation.

No effect of gender identity, nor an interaction between gender identity and sexuality, was observed (see Appendix D for results). A post hoc comparison of each of the gender groups revealed significant differences between cisgender women ("1") and transgender/nonbinary individuals ("3") in their vocabulary count ($p = 0.002$). No such differences were observed
between cisgender men (“2”) and cisgender women, or between cisgender men and transgender/nonbinary individuals. See Table 5 for results.

![Multiple Comparisons Table]

* The mean difference is significant at the .05 level.

Table 5: Post hoc comparisons revealed significant differences between group 1 (cisgender women) and group 3 (transgender/nonbinary individuals). No significant differences were observed between group 1 and group 2 (cisgender men), or between group 2 and group 3.

The results indicating no differences between cisgender men and transgender/nonbinary individuals may be due in part to the limited number of cisgender men who participated in the study. Three of the four (75%) queer cisgender men used a vocabulary count of three or more vocabulary words. Two of seven (29%) of the heterosexual cisgender men used a vocabulary count of three or more vocabulary words. In other words, 45% of the cisgender male participants used a vocabulary of three words or more. If a larger group of cisgender men had participated, these results may have looked similar to cisgender women compared to transgender/nonbinary participants, so use caution interpreting the results.

Results

Previous evidence supports the belief that cisgender heterosexual men and women identify “male” and “female” voices differently than their “opposite” sex. However, research is limited
when identifying how members of the LGBTQ+ community compare with cisgender heterosexual means of identifying masculine and feminine voices. The results of the study conclusively indicate that cisgender heterosexual individuals, cisgender queer individuals, and transgender/nonbinary queer individuals all align in their identification of voices as masculine, feminine, or gender-neutral. No statistically significant differences were found between any of the three groups. The following tables display the summary of each group’s Likert scale responses (see Appendix D for specific details).

![% of Likert Scale Responses](image)

**Figure 1:** Likert responses averaged by group. 1s & 7s indicate the most extreme answers, while 4s indicate an answer of androgynous/gender-neutral on the scale.

Though alignment on the rating scale was consistent across groups, little agreement was found in vocabulary choices in the open response portion of the study between cisgender heterosexual participants, and cisgender queer or transgender and nonbinary queer participants. The figures below display the total amount of unique vocabulary produced by each group, as well as the most and least vocabulary produced by a single individual in each group. The average amount of vocab per group is also recorded (see Appendix D for the complete list of vocabulary productions).
Discussion

Current research states that cisgender heterosexual men are better at identifying female voices than male voices, and cisgender heterosexual women are better at identifying male voices than female voices. This has been attributed to an evolutionary relevance of voice recognition in
mate selection. Transgender women also diverged from both cisgender men and cisgender women in their identification of “male/female” voices. Given past studies that have shown this disagreement within the cisgender heterosexual community, and between cisgender heterosexual individuals and transgender individuals, about the sex (i.e., male, female) a particular voice belonged to, it was important to determine if any disagreement existed in the clinical world. Often, cisgender heterosexual clinicians work with transgender clients in order to shape a voice that is congruent with their identity.

If disagreements were to exist when using continuum terminology such as masculine, feminine, and androgynous (as opposed to binary terminology), it would be important for clinicians to acknowledge potential bias in their judgements of a transgender client’s voice and the client’s desired voice. However, if agreement were to exist, that would indicate that best practice when discussing goals with clients interested in shaping their pitch should be to use continuum vocabulary terms in order to know for certain that there is alignment between the client’s expectations, and the clinician’s, for what the desired voice will sound like.

**Conclusion**

The primary purpose of this study was to determine whether or not there is agreement between members within and outside of the LGBT+ community on how to associate gender with voice alone. The study results indicate agreement by all individuals, regardless of gender or sexuality, in the identification of masculine, feminine, or androgynous/gender-neutral voices. Therefore, using continuum terms in therapy sessions is justified in therapy sessions. The binary “male/female” terms cause disagreement; continuum terms such as “masculine/feminine” do not.

The most important impact of this study on clinical work was in identifying potential areas of bias that cisgender heterosexual clinicians and researchers may face when treating or studying
queer/transgender/nonbinary populations. In other words, do members of the LGBT+ community have different ideas of what they want their masculine/feminine voices to sound like in comparison to what a cisgender heterosexual clinician may expect? Or do the words masculine and feminine have the same meanings to all individuals, regardless of gender and sexuality? In order to answer this question, first we must understand how the perceptions of each group are either similar or different.

Currently, it is understood that disagreement exists when the terms “male” and “female” are applied to voices. But the results of this study clearly illustrate that cisgender heterosexual adults, cisgender queer adults, and transgender/nonbinary queer adults agree in their judgements of voices when prompted to use continuum vocabulary (i.e., masculine, feminine). This research demonstrated that cisgender heterosexual clinicians share an understanding of what marks masculine, feminine, and gender-neutral voices with individuals involved in the LGBTQ+ community. From this common ground in vocabulary terms and definitions, there is a foundation for understanding client goals and expectations.

Disagreement between cisgender heterosexual individuals and transgender individuals exists, however, when using binary labels (male, female), as exhibited in the studies by Junger et al. (2013, 2014). Therefore, clinicians engaging in voice training with transgender and/or queer clients should use vocabulary where agreement is proven (i.e., continuum terms) in order to provide the best services possible for clients.

Limitations

Study limitations included the makeup of the participant base, as the vast majority of participants were college students or college graduates. Other limitations included lack of transgender heterosexual participants, a group that was initially meant to be included in the study,
and no report on the socioeconomic makeup of the participant group. Finally, the majority of participants were white/Caucasian, so it is difficult to know with any degree of certainty whether or not the results would accurately generalize to other races and/or ethnicities.

**Future Directions**

Future directions include looking at the vocabulary data collected and determining how each group linked their perceptions of masculine, feminine and androgynous voices to the gender they associated with each voice. For instance, 26 out of 27 cisgender heterosexual participants used the terms male and female in their vocabulary, and 22 out of 27 used male and female exclusively. An additional individual used boy and girl exclusively. This is in spite of the fact that these individuals all rated a significant portion (19%) of the voices they listened to a 4 (equivalent to androgynous on the Likert scale). Further investigation of this link for all groups may further illustrate how and why misgendering occurs. Additionally, the study could be repeated with a more descriptive Likert scale that is labelled at every point, rather than only labelled “Masculine” and “Feminine” at either end. This could help determine more clearly whether the numbers on the Likert scale indicate the same degree of intensity of gender to each participant. And with research showing the unconscious agreement of what continuum terms on a 7-point Likert scale means, this could support the creation of an online community voice bank in order for clients and clinicians to have a standardized set of voices to shape client goals around, or to provide initial talking points when clients first enter the therapy room.
References


APPENDIX A: Demographic Questionnaire for Study Participants

Participant # ______

Voice Gender Study: Demographics Questionnaire

Please answer all questions in the way that best describes you

1. Age: ____________

2. Race: ____________

3. Please indicate the highest level of education you have currently attained:
   a. Some high school but did not graduate
   b. Graduated high school
   c. Some college
   d. College degree or higher

4. Gender: Please circle your gender, or write yours in if it is not listed
   a. Cisgender Man
   b. Cisgender Woman
   c. Transgender Man
   d. Transgender Woman
   e. Agender
   f. Nonbinary
   g. Genderfluid
   h. Not Listed: Please write in: ____________________________

5. Sexuality:
   a. Heterosexual/Straight
   b. Homosexual/Gay/Lesbian
   c. Bisexual
   d. Pansexual
   e. Asexual
   f. Queer
   g. Not Listed: Please write in: ____________________________

6. Do you have any close friends and/or family who identify with the LGBT+ community?
   a. Yes
   b. No

7. Do you consider yourself familiar with LGBT+ spaces, people, and/or vocabulary?
   Please describe (use the back of this page if you need more room):
APPENDIX B: Findings from Previous Researchers

Figure 4: Comparison of correct identification of gendered voices between males and females across all conditions (Junger et al., 2013).

Figure 5: Comparison of correct identification of gendered voices between genders across all conditions (Junger et al., 2014).
APPENDIX C: Stimulus Words

<table>
<thead>
<tr>
<th>Stimuli</th>
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<tbody>
<tr>
<td>Uniform</td>
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</tr>
<tr>
<td>Hovering</td>
<td>Hyena</td>
</tr>
<tr>
<td>Currency</td>
<td>Submerging</td>
</tr>
<tr>
<td>Filtration</td>
<td>Timpani</td>
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<tr>
<td>Arable</td>
<td>Cenotaph</td>
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</table>

Table 6: Stimulus words taken from the PPVT-4 (Dunn & Dunn, 2007).
APPENDIX D: Descriptive Data: Likert Responses and Open Responses

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Table 7: Descriptive statistics for Likert Responses by gender identity (1 being cisgender, 2 being nonbinary, and 3 being binary transgender).
Table 8: Descriptive statistics for Likert Responses by sexuality (1 being heterosexual, and 2 being queer).

<table>
<thead>
<tr>
<th>Cisgender Heterosexual Vocabulary</th>
<th>Cisgender Queer Vocabulary</th>
<th>Transgender/Nonbinary Vocabulary</th>
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<tbody>
<tr>
<td>1. Male/gay</td>
<td>1. Man</td>
<td>1. Trans woman</td>
</tr>
<tr>
<td>male/muffled male</td>
<td>2. Woman</td>
<td>2. Trans man</td>
</tr>
<tr>
<td>3. Female</td>
<td>4. Female</td>
<td>4. Cis woman</td>
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<td>4. Female unsure/?</td>
<td>5. Trans male</td>
<td>5. Cis man</td>
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<td>5. Gender neutral</td>
<td>6. Trans female</td>
<td>6. Woman</td>
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<tr>
<td>---</td>
<td>---</td>
<td>---</td>
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<tr>
<td></td>
<td></td>
<td>15. Trans/transgender man</td>
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<td>16. Male</td>
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<td></td>
<td></td>
<td>17. Female</td>
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<tr>
<td></td>
<td></td>
<td>23. Cis gay masculine</td>
</tr>
<tr>
<td></td>
<td></td>
<td>24. Feminine</td>
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<tr>
<td></td>
<td></td>
<td>25. Cis straight masculine</td>
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<tr>
<td></td>
<td></td>
<td>26. Feminine of center/femme of center</td>
</tr>
<tr>
<td></td>
<td></td>
<td>27. Feminine neutral</td>
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<tr>
<td></td>
<td></td>
<td>29. Neutral</td>
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<td></td>
<td></td>
<td>30. Male</td>
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<tr>
<td></td>
<td></td>
<td>31. Nonbinary</td>
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<td></td>
<td></td>
<td>32. Slightly feminine</td>
</tr>
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</tbody>
</table>
Mostly feminine, some androgyny though
Androgynous but a bit masculine
Feminine, but very close to androgyny
Enby
Girl
Trans boy
Boy/young boy

Table 9: Open-response answers generated by all participants and categorized by group.

<table>
<thead>
<tr>
<th>Gender</th>
<th>Sexuality</th>
<th>VocabCount</th>
<th>95% Confidence Interval</th>
<th>95% Confidence Interval</th>
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</table>

*a. This level combination of factors is not observed, thus the corresponding population marginal mean is not estimable.

Table 10: Indicates no significant effect of gender and sexuality in combination on production of unique vocabulary responses. Gender: 1 (cisgender women), 2 (cisgender men), and 3 (transgender/nonbinary individuals). Sexuality: 1 (heterosexual), 2 (queer).