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Attitudes about voice and voice therapy among transgender individuals

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ATTITUDES ABOUT VOICE AND VOICE THERAPY AMONG TRANSGENDER INDIVIDUALS

A Thesis
Submitted to the Graduate Faculty of the Louisiana State University and Agricultural and Mechanical College in partial fulfillment of the requirements for the degree of Master of Arts

in

The Department of Communication Disorders

by
Stefanie E. Hays
B.M., Loyola University, December 2006
May 2013
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There are a few notable people without whom this study would not have been possible. I would like to acknowledge my advisor, Melda Kunduk, for her indispensable assistance in design and completion of this study. I would also like to thank my committee members for their role in the development and execution of this study.

I would like to acknowledge the gay, lesbian, bisexual, transgender, and queer community for their acceptance and support in this project. Most importantly, this study would not have been possible without the hundreds of trans people who participated in my study, encouraged their peers to participate, permitted me access to their communities, and provided vital feedback at all stages of the process. I am greatly indebted to each of you and hope that this study will bring about greater understanding and acceptance.
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ABSTRACT

Due to increased interest in the area of voice problems and treatment among transgender individuals in recent years, a study about vocal experiences, vocal handicap, and participation in treatment methods among this population is needed. This study examined vocal handicap among transgender women, transgender men, and individuals identifying as a non-binary gender through an online questionnaire. The goals of the study were to compare vocal handicap between transgender men and women as well as those who had participated in voice therapy and those who had not. Another goal was to identify reasons among transgender individuals for not participating in voice therapy. Analysis of the answers from 233 participants of the survey revealed a wide range of attitudes and opinions about voice and voice therapy. Among transgender women, there was no significant difference in voice handicap among participants who had participated in voice therapy and those who had not. In transgender men, on the other hand, there was a significant difference between vocal handicap in participants who had experienced voice changes secondary to hormone therapy and those who had not; however, a surprising 39% of transgender men still had a Transgender Self-Evaluation Questionnaire score indicating a severe vocal handicap. No significant difference between Transgender Self-Evaluation Questionnaire scores was noted between transgender women and transgender men. A third group, those who identified outside the gender binary, emerged, and appeared to also have a range of experiences and attitudes about voice, both positive and negative.
1. INTRODUCTION

In recent decades, individuals who identify as transgender or transsexual have gained greater visibility and have undergone treatment for their unique problems more readily. Transgender or transsexual individuals consider their gender to be opposite of their biological sex as dictated by chromosomes and sex organs (Kuper, Nussbaum, & Mustanski, 2012). They face a unique set of health problems, and may seek out hormone therapy, psychotherapy, surgery to alter physical appearance, or treatment to alter their voices. They typically undergo a time of “transition” in which they begin presenting as their confirmed gender; for example, a transgender woman, who was classified as male at birth may begin dressing in a more feminine way and asking individuals to use the pronouns “she” and “her” during transition, and a transgender man, who was classified as female at birth, might use a more masculine voice and appearance during transition. (Kuper, et al., 2012). Current standards encourage referring to these individuals as their confirmed gender; therefore, those who are “male-to-female” will be referred to as transgender women (TF) in this paper, and those who have transitioned from “female-to-male” as transgender men (TM). The populations of transgender, transsexual, or gender non-conforming individuals will be referred to as “transgender” throughout this paper, a term considered more inclusive by many members of the community (Adler, 2006).

One paradox of the transgender voice is that it may be within functional limits for that of their biological sex, functioning without what speech therapists might see as a pathology. Consequently, atypical therapy techniques and assessments must be considered (Adler, 2006). This phenomenon has been noted in other fields, some of which have responded with a movement towards measurements and treatments that focus on quality of life (Godano, 2008). The connection between voice and quality of life is well-documented (Murry, 2004), and voice is
a significant marker of gender (Gelfer & Schofield, 2000). As such, quality of life measures are appropriate for assessing transgender voice problems. One common measure of client attitudes about voice in the Vocal Handicap Index (VHI); however, this tool may not fully capture the attitudes specific to transgender clients (T’Sjoen et al., 2006). The Transgender Self-Evaluation Questionnaire (TSEQ) was developed to fit the needs of the transgender voice client (Adler, 2006), and correlates highly with standardized methods of measuring vocal handicap (Owen, 2009). This instrument consists of 30 questions about voice attitudes and usage, all of which are rated on a 5-point Likert scale. The sum of these ratings yields a TSEQ score which can classify vocal handicap as not present, moderate, or severe. The connection between quality of life and voice in transgender patients is well-documented in our field, but receives less attention in general research into transgender quality of life (Godano, 2008; Grant, 2011). Consequently, wide-reaching and in-depth studies may neglect the topic of voice entirely, focusing instead on physical appearance.

Because of this, what we know about transgender voice comes primarily from those seeking treatment in our field, and most of the transgender patients seen by speech-language pathologists are TF (Adler, 2006). Some of these women undergo laryngeal surgery, such as cricothyroid approximation, which has varying levels of effectiveness and client satisfaction (Neumann, Welzel, Gonnermann, & Wolfradt, 2002). Others seek out speech therapy. The most noticeable aspect of speech that many seek to change is that of fundamental frequency (Oates & Dacakis, 1983). However, some studies have demonstrated that elevation of fundamental frequency alone is not sufficient for listeners to perceive the speaker as feminine (Coleman, 1983). Other speech factors to consider include formant frequencies (Carew, Dacakis, & Oates,
Interestingly, though our field assumes that perception of gender is the primary concern for these patients, perceived femininity or fundamental frequency does not necessarily correlate with the clients’ satisfaction with their voices (McNeill, Wilson, Clark, & Deakin, 2008). Among TF clients, scores on assessments such as the VHI and TSEQ were not highly correlated with perceived femininity of voice (Owen, 2009). Another study found that while there was only a moderate correlation between others’ perception of voice and TSEQ scores, there was a higher correlation for self-reported likeability – not necessarily femininity – and TSEQ score (Hancock, Krissinger, & Owen, 2011). Our assumptions about femininity and its significance in transgender women’s attitudes about their voices might be oversimplified, as it seems some other factors may be involved. If we continue to rely on patient attitudes and perceptions for assessment, we must gain a more complete understanding of this population’s views of voice.

While we know little about the attitudes of TF towards their voices, we may know even less about TM. Transgender individuals transitioning from female to male often receive hormone therapy for masculinization and often experience growth of the larynx and a deepening of the voice, (Thornton, 2008). Consequently, there is less literature devoted to facilitating masculinization through speech therapy. Despite the assumption that this vocal change is facilitated by decreased pitch, there appears to be no correlation between fundamental frequency and perception as male in TM speakers (Van Borsel, de Pot, & De Cuypere, 2009). Researchers speculated that higher fundamental frequency may be more acceptable in males than lower fundamental frequency in females. Another study found that listeners often needed both visual and auditory cues in order to determine gender in TM speakers (Van Borsel, De Cuypere, & Van
Neither of these studies addressed patient perceptions of attitudes towards their own voices, though it was clear that acoustic measurements of voice were inadequate for assessment of these patients. Our understanding of what characteristics lead to perception of the voice as male was incomplete, and our field had almost no research on transgender men’s attitudes about their voices.

However limited our information is about the attitudes of transgender individuals involved in speech therapy and research, we know less about the significant transgender population that does not seek out treatment. A Dutch survey found that 3% of transgender men and 56% of transgender women sought speech therapy at some point during the transition process (Motmans, Meier, Ponnet, & T'Sjoen, 2012). We have some information on the attitudes and characteristics of the voice in those who seek therapy, but what of those who do not? Some logical assumptions can be made from the information already at our disposal. The relative ease of the voice’s transition to male as opposed to female has already been discussed and likely accounts for the larger percentage of transgender women seeking speech therapy than transgender men. Moreover, a recent survey of American transgender populations found that these individuals were less likely to have insurance and much more likely to live in poverty than the general American population (Grant, 2011), suggesting that financial factors may play a role in decision to seek treatment. The same survey also found that 33% of participants had postponed or avoided healthcare services due to concerns about discrimination. Any additional factors that contribute to the decision to not engage in speech therapy are merely speculation at this time.
As it stands, the field of speech-language pathology has an incomplete understanding of the needs of the transgender population as a whole. There is little information about the attitudes of transgender men as well as those that opt out of professional treatment for voice problems.

The purpose of this study was to examine attitudes of transgender individuals about their voices and voice therapy for populations that do and do not seek out therapy. The first research goal was to compare reported attitudes about voice between TF and TM individuals who do and do not seek voice therapy. I expected to find more negative views of voice among TF participants than TM as well as more negative views in those who have not participated in voice therapy. The second research goal was to examine attitudes about voice therapy among transgender individuals who do and do not seek out therapy, and identify the factors that contribute to the decision to not seek voice therapy for treatment of transgender voice problems. I anticipated finding that money and insurance were significant factors, as well as the opinion that changes due to hormone therapy are adequate from TMs.
2. METHODS

Participants

A total of 233 adults participated in the study. Participants were recruited through lesbian, gay, bisexual, and transgender (LGBT) and trans-focused listservs and forums, including Louisiana Trans Advocates, Transgender Advocates of the Capital Region, Transgender Resource Center of New Mexico, Spectrum Transgender Group of Western New York, Chicagoland T-girls, Professional Transgender Resource Network of Nebraska, Tennessee Transgender Support, Chicago Gender Society, Midwest Trans* Queer Wellness Initiative, Humboldt Trans Support Group, Massachusetts Trans Political Coalition, and Advocates for Transgender Health. Participants were eligible if they self-identified as transgender or transsexual and were over 18 years old.

Procedures

Participants completed a questionnaire (see Appendix A) using SurveyMonkey, a web-based tool for administering and evaluating surveys. Participants were asked to indicate consent to the survey (see Appendix B). Data were analyzed using SPSS. TSEQ scores among genders were analyzed with a one-way analysis of variance (ANOVA) and t-tests were used to determine differences in TSEQ scores within the same gender based upon factors such as participation in voice therapy and experience of voice changes due to hormones. Spearman rho correlations were used to determine correlations between TSEQ and a variety of questions about vocal experiences, usage, and desires. Additional information was examined using descriptive statistics.
3. RESULTS

Demographics

Of the 310 participants who started the survey, 233 were considered eligible for this study.

Participants were considered ineligible if they did not identify as transgender/transsexual, were under the age of 18, started the survey without completing it, or had incomplete data points.

Among the participants who were included in this study, 73% (Table 1) identified as female (or labeled their current gender as “female,” “mtf,” “lady, “transwoman,” etc., and will henceforth be referred to as TF) and 22% identified as members of the TM group (or labeled their gender as “male,” “ftm,” “transman,” “masculine,” etc.).

Table 1.
Gender identity as reported by study participants (N=233).

<table>
<thead>
<tr>
<th>Gender group</th>
<th>N</th>
<th>% of total</th>
<th>Participants’ labels</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trans female</td>
<td>170</td>
<td>72.9</td>
<td>F, female, lady, ladyfolk, male to female, mtf, trans female, trans mtf, trans woman, transgender female, transgender woman, transgendered woman, transitioned female, transsexual female, woman, woman of transsexual history</td>
</tr>
<tr>
<td>Trans male</td>
<td>51</td>
<td>21.9</td>
<td>Ftm, male, man, masculine, transmale, transman, trans- masculine</td>
</tr>
<tr>
<td>Non-binary</td>
<td>12</td>
<td>5.2</td>
<td>Androgynous, bi-gender, bi-gendered, genderqueer, gender queer, other, queer/gender fluid, queer/bigender/androgynous, third gender</td>
</tr>
</tbody>
</table>

Note: survey provided space for participants to type their own gender identity, to prevent exclusion and omission of identities.
An additional 5% of participants identified outside of the traditional gender binary (NB, or non-binary), preferring terms such as “third gender,” “bigender,” “genderqueer,” or “androgynous.” 84% of participants identified as Caucasian (Figure 1).

Figure 1. Race and ethnicity among participants.

An additional 2% preferred not to specify their race or ethnicity, while 1% identified as Asian,
2% as black/African-American, 3% as Hispanic/Latino, and 5% as mixed. Other races/ethnicities accounted for less than 1% of the sample (Table 2).

Table 2.
Ages and races/ethnicities of participants, as grouped by gender.

<table>
<thead>
<tr>
<th>Age</th>
<th>TF</th>
<th>TM</th>
<th>NB</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>18-24</td>
<td>10.59%</td>
<td>43.14%</td>
<td>16.67%</td>
<td>18.03%</td>
</tr>
<tr>
<td>25-34</td>
<td>16.47%</td>
<td>47.06%</td>
<td>33.33%</td>
<td>23.18%</td>
</tr>
<tr>
<td>35-44</td>
<td>22.95%</td>
<td>9.80%</td>
<td>41.67%</td>
<td>21.03%</td>
</tr>
<tr>
<td>45-54</td>
<td>22.35%</td>
<td></td>
<td></td>
<td>16.31%</td>
</tr>
<tr>
<td>55-64</td>
<td>23.53%</td>
<td></td>
<td></td>
<td>17.17%</td>
</tr>
<tr>
<td>65+</td>
<td>4.11%</td>
<td></td>
<td>8.33%</td>
<td>3.43%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Race/Ethnicity</th>
<th>TF</th>
<th>TM</th>
<th>NB</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asian</td>
<td>1.18%</td>
<td>1.96%</td>
<td></td>
<td>1.29%</td>
</tr>
<tr>
<td>Black/African-American</td>
<td></td>
<td>7.84%</td>
<td></td>
<td>1.71%</td>
</tr>
<tr>
<td>Caucasian/White</td>
<td>86.47%</td>
<td>74.51%</td>
<td>91.67%</td>
<td>84.12%</td>
</tr>
<tr>
<td>Hispanic/Latino</td>
<td>2.35%</td>
<td>7.84%</td>
<td></td>
<td>3.43%</td>
</tr>
<tr>
<td>Native American/First Nations</td>
<td></td>
<td>1.96%</td>
<td></td>
<td>0.43%</td>
</tr>
<tr>
<td>Other</td>
<td>1.76%</td>
<td></td>
<td></td>
<td>1.29%</td>
</tr>
<tr>
<td>Pacific Islander/Native Hawaiian</td>
<td>0.58%</td>
<td></td>
<td></td>
<td>0.43%</td>
</tr>
<tr>
<td>Prefer not to specify</td>
<td>2.35%</td>
<td>8.33%</td>
<td></td>
<td>1.71%</td>
</tr>
<tr>
<td>Two or more races/ethnicities</td>
<td>5.29%</td>
<td>5.88%</td>
<td></td>
<td>5.58%</td>
</tr>
</tbody>
</table>

Note: TF=transgender female, TM=transgender male, NB=non-binary participants.
A wide range of ages was represented in the study, particularly among the TF population, which ranged from 19 to 74 years old with the average at 43.94 (SD = 13.53, Figure 2).

The TM and NB populations were much younger; the average age among TM was 26.67 (SD = 6.74), while NB’s average age was 35.50 (SD = 11.98). While most participants were living full-time as their gender (69%, Table 3), some had not yet begun to present publicly as their gender (2%, Figure 3).
Table 3. Frequency of presentation as confirmed gender and time since transition, as grouped by gender.

<table>
<thead>
<tr>
<th>Questions</th>
<th>TF</th>
<th>TM</th>
<th>NB</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>How often do you present as the gender above?</td>
<td>N = 170</td>
<td>N = 51</td>
<td>N = 12</td>
<td>N = 233</td>
</tr>
<tr>
<td>Never</td>
<td>2.35%</td>
<td></td>
<td></td>
<td>1.72%</td>
</tr>
<tr>
<td>Sometimes</td>
<td>5.88%</td>
<td>3.92%</td>
<td>16.77%</td>
<td>6.01%</td>
</tr>
<tr>
<td>About half of the time</td>
<td>10.00%</td>
<td>16.7%</td>
<td>8.15%</td>
<td></td>
</tr>
<tr>
<td>Almost always</td>
<td>14.12%</td>
<td>13.72%</td>
<td>33.33%</td>
<td>15.02%</td>
</tr>
<tr>
<td>Always</td>
<td>67.65%</td>
<td>82.35%</td>
<td>33.33%</td>
<td>69.10%</td>
</tr>
<tr>
<td>How long had you presented as the gender listed above (almost always or always)?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than 6 months</td>
<td>3.60%</td>
<td>6.12%</td>
<td></td>
<td>4.08%</td>
</tr>
<tr>
<td>6-12 months</td>
<td>9.35%</td>
<td>8.16%</td>
<td>12.5%</td>
<td>9.18%</td>
</tr>
<tr>
<td>1-3 years</td>
<td>25.18%</td>
<td>36.7%</td>
<td>37.5%</td>
<td>28.57%</td>
</tr>
<tr>
<td>3-5 years</td>
<td>12.95%</td>
<td>22.45%</td>
<td>12.5%</td>
<td>15.31%</td>
</tr>
<tr>
<td>5-10 years</td>
<td>24.46%</td>
<td>10.20%</td>
<td></td>
<td>21.94%</td>
</tr>
<tr>
<td>10+ years</td>
<td>24.46%</td>
<td>8.16%</td>
<td>37.5%</td>
<td>20.92%</td>
</tr>
</tbody>
</table>

Note: TF=transgender female, TM=transgender male, NB=non-binary participants.

Among those that presented most or all of the time, about half had been doing so for less than 3 years: 49% of TF, 53% of TM, and 50% of NB (Figure 4).
Figure 3. Responses to question 6: “How often do you present as the gender listed above? (I.e., how often do you wear clothes or use a voice that others would consider to match this gender)” Note: this question is meant to provide information about stage in transition. TF=transgender female, TM=transgender male, NB=non-binary participants.

Figure 4. Responses to question 7: “How long have you been presenting at least some of the time as the gender listed above?”
Statistical analysis

A one-way ANOVA was performed to examine the Transgender Self-Evaluation Questionnaire scores among TM, TF, and NB populations. The Transgender Self-Evaluation Questionnaire (TSEQ) describes a score of 30-59 as indicating no vocal handicap, 60-89 as indicative of moderate vocal handicap, and any score above 90 as indicative of severe vocal handicap. There were no statistically significant differences among the groups in terms of their TSEQ scores ($p > 0.05, f < 3.035, df = 2$).

An independent t-test was performed to examine TSEQ scores between TM who reported voice changes due to hormone therapy and those who had not (see Table 4). A statistically significant difference was noted between the groups ($t = 4.461, p < 0.001$). However, when a similar t-test was performed between TF who reported voice changes due to hormone therapy, no statistically significant difference between populations was found. Also, an independent t-test found no significant difference in TSEQ scores among TF who had participated in voice therapy and TF who had not.

Table 4.
T-tests for Transgender-Self Evaluation Questionnaire scores between transgender men and women who had and had not undergone voice treatments.

<table>
<thead>
<tr>
<th>Population</th>
<th>Variables</th>
<th>$T$</th>
<th>$p$</th>
</tr>
</thead>
<tbody>
<tr>
<td>TM</td>
<td>Participants who had experienced voice changes</td>
<td>4.461</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td></td>
<td>secondary to hormone therapy (N = 35, $M = 65.67$)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Participants who had not experienced voice changes</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>secondary to hormone therapy (N = 16, $M = 99.56$)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TF</td>
<td>Participants who had experienced voice changes</td>
<td>.087</td>
<td>&gt; 0.1</td>
</tr>
<tr>
<td></td>
<td>secondary to hormone therapy (N = 19, $M = 84.31$)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
(Table 4 continued.)

<table>
<thead>
<tr>
<th>Population</th>
<th>Variables</th>
<th>$T$</th>
<th>$p$</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TF</strong></td>
<td>Participants who had not experienced voice changes secondary to hormone therapy (N = 151, $M = 84.94$)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TF</strong></td>
<td>Participants who had participated in voice therapy (N = 50, $M = 79.92$)</td>
<td>1.417</td>
<td>&gt; 0.1</td>
</tr>
<tr>
<td></td>
<td>Participants who had not participated in voice therapy (N = 120, $M = 86.93$)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: TF=transgender female, TM=transgender male, NB=non-binary participants.

Spearman correlations were performed between TSEQ scores and a variety of separate ratings of voice characteristics and problems for TF, TM, and NG groups. For these calculations, $0 \leq r < .3$ was considered weak, $.3 \leq r < .7$ was considered moderate, and $.7 \leq r \leq 1.0$ strong (Owen, 2009). Among TF, difficulty maintaining “best” voice correlated highly with TSEQ ($r = .784$, $p < 0.001$, Table 5).

Table 5. Spearman’s rho calculations for Transgender Self-Evaluation Questionnaire scores and voice ratings among transgender males (TF).

<table>
<thead>
<tr>
<th>Correlating measures among TF (N = 170)</th>
<th>$R$</th>
<th>$p$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strong correlation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Difficulty maintaining voice &amp; TSEQ</td>
<td>.784</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>Moderate correlation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ability to speak without fatigue &amp; TSEQ</td>
<td>.670</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>Vocal disparity &amp; TSEQ</td>
<td>.656</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>Current voice &amp; TSEQ</td>
<td>-.630</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>Time presenting as TF &amp; TSEQ</td>
<td>-.324</td>
<td>&lt; .001</td>
</tr>
</tbody>
</table>

Notes: High correlation was defined as $.7 \leq r \leq 1.0$, and moderate as $.3 \leq r < .7$. For ratings of voice, lower numbers are more masculine and higher numbers are more feminine.
The ratings that correlated moderately with TSEQ scores in TF were ability to speak without fatigue ($r = .670, p < 0.001$), current voice ($r = -.630, p < 0.001$), and length of time presenting as female ($r = -.324$). Vocal disparity, which was calculated by determining how much the participant’s rating of current voice differed from their rating of desired voice, also correlated moderately with TSEQ scores among TF ($r = .656, p < 0.001$). In TM participants, current voice rating correlated highly with TSEQ score ($r = .710, p < 0.001$, see Table 6), as did vocal disparity ($r = .758, p < 0.001$) and difficulty maintaining “best” voice ($r = .811, p < 0.001$).

Table 6.
Spearman’s rho calculations for Transgender Self-Evaluation Questionnaire scores and voice ratings among transgender males (TM).

<table>
<thead>
<tr>
<th>Correlating measures among TM (N = 51)</th>
<th>$r$</th>
<th>$p$</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Strong correlation</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current voice &amp; TSEQ</td>
<td>.710</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>Vocal disparity &amp; TSEQ</td>
<td>.758</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>Difficulty maintaining voice &amp; TSEQ</td>
<td>.811</td>
<td>&lt; .001</td>
</tr>
<tr>
<td><strong>Moderate correlation</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stage in transition &amp; TSEQ</td>
<td>-.581</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>Time presenting as TM &amp; TSEQ</td>
<td>-.505</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>Awareness of gender differences &amp; TSEQ</td>
<td>.398</td>
<td>.004</td>
</tr>
<tr>
<td>Frequency altering voice &amp; TSEQ</td>
<td>.693</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>Ability to speak without fatigue &amp; TSEQ</td>
<td>-.491</td>
<td>&lt; .001</td>
</tr>
</tbody>
</table>

Note: high correlation was defined as $.7 \leq r \leq 1.0$, and moderate as $.3 \leq r < .7$. For gender ratings of voice, lower numbers are more masculine and higher numbers are more feminine.

Several ratings correlated moderately with TSEQ scores among TM, including stage in transition ($r = -.581, p < 0.001$), length of time presenting as male ($r = -.505, p < 0.001$), awareness of gender differences in speech ($r = .398, p = 0.004$), how frequently the participant behaviorally
altered their voice \( (r = .693, p < 0.001) \), and ability to use “best” voice without fatigue \( (r = -.491, p < 0.001) \). Among NB, difficulty maintaining “best” voice and vocal disparity correlated moderately with TSEQ scores \( (r = .576, p = 0.05 \text{ and } r = .694, p = 0.012, \text{ respectively, Table 7}) \).

Table 7.
Spearman’s rho calculations for Transgender Self-Evaluation Questionnaire scores and voice ratings among non-binary participants (NB).

<table>
<thead>
<tr>
<th>Correlating measures among NB (N = 12)</th>
<th>( r )</th>
<th>( p )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moderate correlation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Difficulty maintaining voice &amp; TSEQ</td>
<td>.576</td>
<td>.05</td>
</tr>
<tr>
<td>Vocal disparity &amp; TSEQ</td>
<td>.694</td>
<td>.012</td>
</tr>
</tbody>
</table>

Note: high correlation was defined as \( .7 \leq r \leq 1.0 \), and moderate as \( .3 \leq r < .7 \).
For gender ratings of voice, lower numbers are more masculine and higher numbers are more feminine.

A strong negative Spearman correlation was also found between satisfaction with outcomes of voice changes due to hormone therapy and TSEQ score among TM \( (r = -.734, p < 0.001, \text{ Table 8}) \).

Table 8.
Spearman’s rho calculations for correlations between Transgender Self-Evaluation Questionnaire and satisfaction with different therapy techniques.

<table>
<thead>
<tr>
<th>Population</th>
<th>Correlating variables</th>
<th>( R )</th>
<th>( p )</th>
</tr>
</thead>
<tbody>
<tr>
<td>TM</td>
<td>Satisfaction with changes due to hormone therapy &amp; TSEQ</td>
<td>-.734</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>N = 51</td>
<td>TSEQ</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TF</td>
<td>Satisfaction with changes due to hormone therapy &amp; TSEQ</td>
<td>-.542</td>
<td>0.014</td>
</tr>
<tr>
<td>N = 170</td>
<td>TSEQ</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Satisfaction with outcome of voice therapy &amp; TSEQ</td>
<td>-.667</td>
<td>&lt; 0.001</td>
</tr>
</tbody>
</table>

Note: TF=transgender female, TM=transgender male.
Among TF, there was a moderately high correlation between TSEQ and ratings of satisfaction with voice therapy \( (r = -0.667, p < 0.001) \), and a moderate correlation between TSEQ and ratings of satisfaction with voice changes due to hormones \( (r = -0.542, p = 0.014) \).

The Transgender Self-Evaluation Questionnaire

The Transgender Self-Evaluation Questionnaire (TSEQ) describes a score of 30-59 as indicative of no vocal handicap, 60-89 as indicative of moderate vocal handicap, and any score above 90 as indicating a severe vocal handicap. TF had a high average score \( (M = 84.87, SD = 29.50, \text{ Table 9}) \) on the TSEQ (Figure 5).

Table 9.
Descriptive statistics for calculated Transgender Self-Evaluation Questionnaire scores

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>Range</th>
<th># with no/mild voice handicap</th>
<th># with moderate voice handicap</th>
<th># with severe voice handicap</th>
</tr>
</thead>
<tbody>
<tr>
<td>TF</td>
<td>170</td>
<td>84.87</td>
<td>29.497</td>
<td>30 - 138</td>
<td>41 (24.1%)</td>
<td>42 (24.7%)</td>
<td>88 (51.8%)</td>
</tr>
<tr>
<td>TM</td>
<td>51</td>
<td>77.08</td>
<td>29.468</td>
<td>31 - 136</td>
<td>19 (37.3%)</td>
<td>12 (23.5%)</td>
<td>20 (39.2%)</td>
</tr>
<tr>
<td>NB</td>
<td>12</td>
<td>73.00</td>
<td>17.083</td>
<td>37 - 96</td>
<td>3 (25.0%)</td>
<td>8 (66.7%)</td>
<td>1 (8.3%)</td>
</tr>
<tr>
<td>Total</td>
<td>233</td>
<td>82.55</td>
<td>29.155</td>
<td>30 - 138</td>
<td>63 (27.0%)</td>
<td>62 (26.6%)</td>
<td>109 (46.8%)</td>
</tr>
</tbody>
</table>

Note: “No/mild voice handicap” is defined as a score of 30 – 59, “moderate voice handicap” 60-89, and “severe voice handicap” more than 90.

Note: TF=transgender female, TM=transgender male, NB=non-binary participants.

Fifty one percent of TF scores fell in the “severe” range, while 24% fell in the range indicating no vocal handicap. Though TM had a slightly lower average score \( (M = 77.08, SD = 29.47) \), 39% of participants reported a severe vocal handicap, while 37% had no vocal handicap.
Figure 5. Presentation of Transgender Self-Evaluation Questionnaire scores among genders. Note: TF=transgender female, TM=transgender male, NB=non-binary participants.

Among those that identified as NB, TSEQ scores had a lower average ($M = 73.00, SD = 17.08$).

Eight percent of NB reported a severe vocal handicap and 25% had no vocal handicap.

Voice changes due to hormone therapy

Among TM, 74% of participants had experienced voice changes due to hormone therapy. Satisfaction ratings for these changes were fairly high ($M = 3.97$). Seventy seven percent of TM who’d experienced voice changes due to hormones described their voices as “somewhat masculine” or “very masculine,” as compared to only 19% of TM who hadn’t. Fifty percent of TM who had experienced these voice changes had TSEQ scores in the normal range, while 18% reported score in the “severe” range. These participants were more assign their satisfaction with hormone therapy a lower rating, and were moderately more likely to have a larger vocal disparity value, which was calculated by determining how much the participant’s rating of current voice differed from their rating of desired voice (Table 5).
Figure 6. Ratings of satisfaction with voice changes secondary to hormone therapy among all genders.
Note: TF=transgender female, TM=transgender male, NB=non-binary participants.

Eleven percent of TF also reported voice changes due to hormones. These participants tended to report lower satisfaction with voice because of these changes than TM (Figure 6).

Figure 7. Ratings of satisfaction with the outcome of voice therapy among all genders.
Note: TF=transgender female, TM=transgender male, NB=non-binary participants.
Voice therapy

Fifty TF (29% of this population) reported participating in voice therapy over the course of their transition. Satisfaction with the results of therapy was mixed (Figure 7); 46% of this population reported satisfaction ratings of 4 or 5 (mostly or very satisfied), and 28% reported ratings of 1 or 2 (low satisfaction).

Among TF who had not participated in voice therapy, (Figure 8), 68% said they would consider voice therapy in the future, as did 26% of TM and 40% of NB.

Figure 8. Participant answers to the question “Would you consider seeking voice therapy in the future?”
Note: TF=transgender female, TM=transgender male, NB=non-binary participants.

Among TF and NB, the most common reason for abstaining from voice therapy was expense (32% and 50%, Table 10), while the most common reason for TM was adequate changes due to hormone therapy (31%).
Table 10. Most important reasons for not seeking voice therapy by gender.

<table>
<thead>
<tr>
<th>Reason</th>
<th>% selected as most important</th>
<th>% who would consider future voice therapy</th>
<th>Average TSEQ</th>
</tr>
</thead>
<tbody>
<tr>
<td>I am pleased with my current voice quality.</td>
<td>8.46</td>
<td>9.09</td>
<td>46.8</td>
</tr>
<tr>
<td>I can successfully modify my voice without help.</td>
<td>10.00</td>
<td>15.38</td>
<td>58.9</td>
</tr>
<tr>
<td>I don’t think speech and voice specialists know about transgender voice problems.</td>
<td>5.38</td>
<td>57.14</td>
<td>71.86</td>
</tr>
<tr>
<td>I think a therapist might discriminate against me because of my gender identity.</td>
<td>0.77</td>
<td>100*</td>
<td>81*</td>
</tr>
<tr>
<td>I’m embarrassed to talk to a professional.</td>
<td>4.62</td>
<td>83.33</td>
<td>103</td>
</tr>
<tr>
<td>It’s too expensive.</td>
<td>34.62</td>
<td>86.67</td>
<td>101.24</td>
</tr>
<tr>
<td>My insurance doesn’t cover it.</td>
<td>3.53</td>
<td>100</td>
<td>104.83</td>
</tr>
<tr>
<td>There is no one who provides that sort of treatment in my location.</td>
<td>11.54</td>
<td>100</td>
<td>105.93</td>
</tr>
<tr>
<td>Other</td>
<td>20.78</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**TF (N = 120)**

<table>
<thead>
<tr>
<th>Reason</th>
<th>% selected as most important</th>
<th>% who would consider future voice therapy</th>
<th>Average TSEQ</th>
</tr>
</thead>
<tbody>
<tr>
<td>I am pleased with my current voice quality.</td>
<td>23.08</td>
<td>100</td>
<td>45.1</td>
</tr>
<tr>
<td>I can successfully modify my voice without help.</td>
<td>2.56</td>
<td>100*</td>
<td>93*</td>
</tr>
<tr>
<td>I don’t think it would make a difference.</td>
<td>7.69</td>
<td>33.33</td>
<td>68.67</td>
</tr>
<tr>
<td>I experienced voice changes when I started hormone therapy and/or had voice surgery.</td>
<td>30.77</td>
<td>25</td>
<td>59.25</td>
</tr>
</tbody>
</table>

**TM (N = 49)**

<table>
<thead>
<tr>
<th>Reason</th>
<th>% selected as most important</th>
<th>% who would consider future voice therapy</th>
<th>Average TSEQ</th>
</tr>
</thead>
<tbody>
<tr>
<td>I am pleased with my current voice quality.</td>
<td>23.08</td>
<td>100</td>
<td>45.1</td>
</tr>
<tr>
<td>I can successfully modify my voice without help.</td>
<td>2.56</td>
<td>100*</td>
<td>93*</td>
</tr>
<tr>
<td>I don’t think it would make a difference.</td>
<td>7.69</td>
<td>33.33</td>
<td>68.67</td>
</tr>
<tr>
<td>I experienced voice changes when I started hormone therapy and/or had voice surgery.</td>
<td>30.77</td>
<td>25</td>
<td>59.25</td>
</tr>
</tbody>
</table>
(Table 10 continued.)

<table>
<thead>
<tr>
<th>% selected as most important</th>
<th>% who would consider future voice therapy</th>
<th>Average TSEQ</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TM (N = 49)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I’m embarrassed to talk to a professional.</td>
<td>5.13</td>
<td>50</td>
</tr>
<tr>
<td>I think a therapist might discriminate against me because of my gender identity.</td>
<td>2.56</td>
<td>0</td>
</tr>
<tr>
<td>My insurance doesn’t cover it.</td>
<td>5.13</td>
<td>50</td>
</tr>
<tr>
<td>It’s too expensive.</td>
<td>17.95</td>
<td>28.57</td>
</tr>
<tr>
<td>There is no one who provides that sort of treatment in my location.</td>
<td>5.13</td>
<td>100</td>
</tr>
<tr>
<td>Other</td>
<td>17.95</td>
<td></td>
</tr>
<tr>
<td><strong>NB (N = 10)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I am pleased with my current voice quality.</td>
<td>10</td>
<td>0*</td>
</tr>
<tr>
<td>I can successfully modify my voice without help.</td>
<td>10</td>
<td>0*</td>
</tr>
<tr>
<td>I don’t think it would make a difference.</td>
<td>10</td>
<td>0*</td>
</tr>
<tr>
<td>It’s too expensive</td>
<td>50</td>
<td>60</td>
</tr>
<tr>
<td>Other</td>
<td>20</td>
<td></td>
</tr>
</tbody>
</table>

Note: TF = transgender female, TM = transgender male, NB = non-binary participants.
*These values only had one respondent.
Most participants who did not participate in therapy for reasons like expense and availability indicated a willingness to consider therapy in the future, while those who selected reasons like satisfaction with voice and adequate voice changes due to hormones were more likely to indicate that they would not consider voice therapy in the future.
4. DISCUSSION

The goals of this study were to examine the differences in Transgender Self-Evaluation Survey scores between genders, to determine rates of and satisfaction with voice therapy among a sample of the transgender population, and to identify the reasons for abstaining from voice therapy among this population through an online questionnaire. Analysis of the answers from 233 revealed a wide range of attitudes and opinions about voice and voice therapy. In TF, the most interesting finding was the lack of a significant difference in voice handicap among participants who had participated in voice therapy and those who had not. In TM, on the other hand, there was a significant difference between vocal handicap in participants who had experienced voice changes secondary to hormone therapy and those who had not; however, a surprising 39% of TM still had a TSEQ score indicating a severe vocal handicap. No significant difference between TSEQ scores was noted between TF and TM.

The majority of participants in this study were classified as TF, or those transitioning to female. The survey also accessed a larger number of TM than had previously been seen in this field’s literature (51 participants, or 22%). Interestingly, 5% of participants identified outside of binary gender options. While these NB identities have never been noted in voice literature, there is significant precedent in other fields (Lewis, 2008; Davidson, 2007; Factor, 2008); the National Center for Transgender Equality found that 14% of their respondents in a wide-reaching study of the transgender population did not strongly identify with the categories of “male” or female” (Grant, 2011). In the survey, participants were asked to provide their own gender labels in a free-form box. The wide range of gender identities seen in Table 1 demonstrates the importance of attention to varied gender labels in this population.
The participants were less racially and ethnically diverse than hoped; only 16% of participants did not identify as white. More wide-reaching studies (Grant, 2011) found this population to be ethnically and racially diverse. This larger study was administered through a variety of mediums, online and offline, and devoted resources to reaching out to the entire population, which this study was unfortunately unable to do. The smaller representation of minorities may be accounted for by the types of groups and populations who agreed to participate in the survey, the online nature of the survey, and factors such as language; an email exchange with a potential research participant requested a Spanish version of the survey, for example. However, all listed ethnic and racial groups were represented by at least one participant in this study. Future studies are warranted to explore the attitudes of different racial and ethnic groups with regard to voice therapy and any specific voice concerns.

Participants were much more diverse in age. Participants from 18 to a surprising 74 completed all questions. TF represented the largest range of ages by far, as seen in Figure 2, indicating fair sampling among this group (or possibly that older members of this population have greater inclusion in trans communities or access to the internet). TM and NB tended to be younger, though it is possible that diversity would increase with sample size. Visual inspection of a scatterplot displaying age vs. TSEQ score revealed a negative trend in TM, with TSEQ decreasing as age increased (see Figure 9), but Pearson correlations between these variables were not statistically significant among any gender groups ($p > 0.05$).

Many participants in different stages in the transition process responded to the survey, who presented as their confirmed gender for different percentages of the time. Stage of transition ranged from participants who had not yet begun the process to participants that presented all the time as their confirmed gender, the latter of which constituted the majority of study participants.
Figure 9. Transgender Self-Evaluation Questionnaire Scores as a function of age among transgender men.

Previous studies of transgender voice problems have focused on those at the last stage of transition, but this survey offers a look at the population in earlier stages. The participant’s stage in transition demonstrated a moderate positive correlation with TSEQ in scores of both TM and TF. Though NB demonstrated a moderate negative correlation between TSEQ score and the stage of transition, the small number of participants in this group does not allow generalization of this finding for this group. These findings for TF and TM suggest that vocal handicap increases once participants begin living full-time as their confirmed gender. Further research is needed to determine whether or not intervention at the beginning of or just before this stage results in a more successful transition.

Time presenting as confirmed gender (i.e. months or years since the participant started living most or all of the time their as confirmed gender) was also examined among participants who reported that they presented this way most or all of the time, and the sample shows a diverse representation. While the research suggests that voice may be more problematic early in transition or presentation (as did one study participant, stating that “From what I have seen on
the many trans-related help lists, I expect there is far more voice-oriented angst among those early in transition, say in first 3 years”), time presenting was found to have only a moderate negative correlation with TSEQ among TF and TM. This suggests that while some transgender speakers either behaviorally modify their voice more successfully over time or learn to feel more positively about their voices regardless of success, this is not the case for all participants, and some may continue to experience high handicap many years after transition.

Transgender Self-Evaluation Questionnaire

As stated earlier, the Transgender Self-Evaluation Questionnaire (TSEQ) describes a score of 30-59 as indicating no significant voice handicap, 60-89 as indicative of moderate voice handicap, and any score above 90 to indicate severe voice handicap. There was no statistically significant difference among TSEQ scores for TF, TM, or NB, indicating that these populations may experience more similar degrees of vocal handicap than previously suggested. Furthermore, the range of scores among TF and TM were almost identical (respectively, 30 to 138 and 31 to 136), indicating that both populations are extremely heterogynous in voice experiences, from very positive to very negative. Most TF reported scores in the “severe” range, suggesting that voice and related attitudes are a serious, widespread problem in this population, as has been suggested in previous literature (McNeill, et al., 2008; Owen, 2009). Several comments made by study participants express severe voice problems, such as, “I would do just about anything to sound the way I do in my mental voice. I hate how I sound now,” and “It crushes me inside. I don’t own a car, I use public transportation. I will not speak to other passengers or use my phone in public for fear of reprisals. (I live in the inner city and there have been several LGBT hate crimes recently.) For me, it’s entirely a safety issue. It's the only thing holding me back.” (See more comments in Appendix B).
However, 24% reported attitudes in the “normal/mild” vocal handicap range. This population holds a wide variety of opinions about voice, and to assume that all TF experience negative feelings about their voice would be a grievous error. This is further supported by statements made by study participants, such as “I'm somewhat of a trans-rebel. I use the same voice I've always had, and really don't intend to do anything to change it” and “I am not concerned my voice does not match my gender. I am happy who I am and don't fake anything.”

More TM reported low voice attitudes within normal limits than TF (37% compared to 24%). Interestingly though, 39% of TM reported voices within the severe range. This goes against the expectation often stated in our field that TM rarely experience voice problems; while less TM have TSEQ scores than TF, 39% is a sizeable portion of the population and warrants possible study. While it is possible that the smaller sample was less representative of the entire population or that TM with voice problems were more likely to take the survey, it is also possible that this field must reconsider preconceived notions about voice in TM.

The NB population appears to have a similar level of negative feelings about voice as TF and TM, indicating that this population may need further exploration in the field. However, the small sample size of this population may have also affected the outcome of the analysis. Certain trends arose among particular questions on the TSEQ upon inspection of mean and median scores (Table 11). Three questions were consistently ranked higher than others: “I am envious of other members of my gender who have more masculine/feminine voices than me,” “I feel upset when I’m perceived as the wrong gender on the phone,” and “I feel the pitch range of my voice is restricted.”
Table 11. Highest and lowest-ranked questions on the Transgender Self-Evaluation Questionnaire.

<table>
<thead>
<tr>
<th>Question</th>
<th>Median ranking</th>
<th>% participants who assigned a score of 1 or 2</th>
<th>% participants who assigned a score of 4 or 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>“I am envious of other members of my gender who have more masculine/feminine voices than me.”</td>
<td>4</td>
<td>24.25</td>
<td>59.00</td>
</tr>
<tr>
<td>“I feel upset when I’m perceived as the wrong gender on the phone.”</td>
<td>4</td>
<td>26.78</td>
<td>56.49</td>
</tr>
<tr>
<td>“I feel the pitch range of my voice is restricted.”</td>
<td>3</td>
<td>20.92</td>
<td>47.28</td>
</tr>
<tr>
<td>“People seem irritated with my voice.”</td>
<td>1.5</td>
<td>81.17</td>
<td>5.02</td>
</tr>
<tr>
<td>“My voice causes me to lose income.”</td>
<td>1</td>
<td>82.43</td>
<td>7.95</td>
</tr>
<tr>
<td>“People ask, ‘what’s wrong with your voice?’”</td>
<td>1</td>
<td>85.36</td>
<td>0.84</td>
</tr>
</tbody>
</table>

Note: A rating of 1 indicates no agreement and a rating of 5 indicates high agreement.

These scores may indicate that these areas are particularly troublesome for this population. Three questions also emerged as likely to receive unusually low scores: “My voice causes me to lose income,” “people ask, ‘what’s wrong with your voice?’” and “people seem irritated with my voice.” The consistently low scores indicate that these questions may not accurately reflect the problems and needs specific to transgender voice issues. These trends were consistent within the TM, TF, and NG groups.

Several additional ratings on the questionnaire were found to correlate with TSEQ scores. Among TF, difficulty maintaining “best” voice correlated highly with TSEQ, indicating that TF with high levels of voice handicap experience trouble maintaining their voice for extended
periods of time, which is further supported by a moderate correlation between ability to speak without fatigue and TSEQ. Vocal disparity and ratings of current voice also had a moderately strong correlation with TSEQ, as could be expected. Time presenting as female, which was expected to have a negative correlation, had a moderately weak negative correlation. This suggests that many TF continue to experience voice problems for several years or perhaps their entire lives.

Among TM, rating of current voice and voice disparity correlated highly with TSEQ. Interestingly, difficulty maintaining voice also correlated highly with TSEQ. Behavioral modification of voice is not typically expected in TM, but this correlation suggests that some TM do struggle to maintain their voice and experience a stronger level of vocal handicap. In this population, both stage in transition and time living as male had moderate negative correlations with TSEQ score. This could be explained at least partially by hormone therapy; those later in transition are more likely to have participated in hormone therapy. Ability to speak without fatigue had a negative moderate correlation with TSEQ, as might be expected. Frequency of use of an altered voice, another indicator of behavioral changes, correlated moderately with TSEQ. Again, it seems that TM who modify their voices behaviorally may have difficulty doing so, and experience higher levels of voice handicap as a result. It is therefore possible that behavioral therapy can greatly impact this population’s quality of life. This is an interesting possibility in a population that does not frequently seek out voice therapy, and an excellent avenue for future study.

Among NB, vocal disparity and difficulty maintaining “best” voice correlated moderately with TSEQ score. This population may also benefit from intervention focused on generalization and maintenance of voice.
Current and desired voice

The study also investigated the discrepancy between the current voice and desired voice (Table 12).

Table 12. Participants’ perceptions of the differences between their current (actual) and desired voices (vocal disparity).

<table>
<thead>
<tr>
<th>Vocal disparity</th>
<th>Description</th>
<th>% TF</th>
<th>% TM</th>
<th>% NB</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>No difference between current and desired voice</td>
<td>25.29</td>
<td>33.33</td>
<td>8.33</td>
</tr>
<tr>
<td>1</td>
<td>Current voice 1 step away from desired voice (e.g., current voice “very masculine,” desired voice “somewhat masculine”)</td>
<td>31.18</td>
<td>41.18</td>
<td>41.67</td>
</tr>
<tr>
<td>2</td>
<td>Current voice 2 steps away from desired voice (e.g., current voice “very masculine,” desired voice “gender-neutral”)</td>
<td>26.47</td>
<td>17.65</td>
<td>33.33</td>
</tr>
<tr>
<td>3</td>
<td>Current voice 3 steps away from desired voice (e.g., current voice “very masculine,” desired voice “somewhat feminine”)</td>
<td>14.12</td>
<td>9.80</td>
<td>8.33</td>
</tr>
<tr>
<td>4</td>
<td>Current voice 4 steps away from desired voice (e.g., current voice “very masculine,” desired voice “very feminine”)</td>
<td>3.53</td>
<td>3.92</td>
<td>0</td>
</tr>
</tbody>
</table>

Note: TF=transgender female, TM=transgender male, NB=non-binary participants.

Vocal disparity was a ranking meant to demonstrate the difference between these two values, and ranged from 0 (no difference) to 4 (a very large difference.) Most study participants had a small vocal disparity (31% of TF, 41% of TM, and 42% of NB), indicating that they were nearing a
satisfactory voice. As these participants typically only need to make their voices slightly more masculine or feminine, it is possible that small behavioral modifications could further improve their voices to a satisfactory level. A surprising number of participants reported no disparity at all (25% TF, 33% TM, and 8% NB), indicating that many are able to modify their voices to an adequately feminine or masculine quality. However, not all participants who had no voice disparity also had no vocal handicap; other factors such as inability to maintain best voice, high levels of difficulty speaking, or reduced range/volume may have contributed to this factor. Further study into what types of voice problems aside from insufficient masculinity/femininity exist in transgender populations is needed. Only a few participants reported a very large vocal disparity (4% of TM and TF, 0% of NB), indicating that most participants are able to make some progress toward their desired voice.

Voice surgery

Only 2 of 233 participants, both TF, had undergone voice surgery. The first participant, a Caucasian 59-year old, reported a positive experience with a laryngoplasty procedure. She rated her satisfaction with the procedure as 5 (or very high), commenting that after surgery, “Pitch is in a desirable range and resonance is diminished.” Her TSEQ score was 44, and she described her current voice as “very feminine.” She had not participated in voice therapy.

The second participant, a 55-year-old Caucasian, reported a very different experience. She was uncertain what type of surgery was performed but rated her satisfaction as 1 (very low), explaining that “it didn’t work and cost $7000.” She described her voice as somewhat masculine and had a very high TSEQ score (133). She had participated in voice therapy, which she gave a satisfaction rating of 3, explaining that it was “hard to practice.” She reported that raising pitch was her most successful strategy in obtaining a desirable voice.
Because of the small number of participants who chose to undergo vocal surgery and the disparity in their experiences, it is difficult to draw many conclusions about the relevance to the entire TG population. It seems likely, however, that vocal surgery is rare in this population, and that both positive and negative experiences are possible.

Voice and hormones

As expected, hormone therapy had a strong correlation with lower reported voice problems among TM, indicating that TM participate in hormone therapy experience significantly more positive attitudes about their voices than those who do not. Despite this, 6 TM who had experienced these changes (18%) reported a TSEQ score in the “severe” range. One of these participants provided the following comment at the end of the survey: “I appreciate that you let transguys give input too. In our community there's a belief that all transguys develop a ‘passable’ voice with hormone therapy and that's just not true.” Even more unexpectedly, 2 TM who had taken hormones did not experience any voice changes. One of these participants, a 29-year-old Caucasian, received a low TSEQ (39). In one of the comment fields on the survey, he stated that “I may not be completely pleased with my voice quality, but it doesn't bother me enough to care to change it.” The other participant who took hormones but did not experience voice changes, however, reported a TSEQ of 80. This 33-year-old Hispanic/Latino reported altering his voice quite often. Neither participant had engaged in any voice therapy.

These findings indicate an incomplete understanding of the effect of hormones upon the voices and attitudes of TM, as well as crucial avenues for future study. If more than 20% of the TM population experiences no or inadequate voice changes after hormone therapy, as was found in this study, information about the measures necessary to acquire a satisfactory voice should be gathered in future research.
Quite unexpectedly, some TF (11%) experienced voice changes due to hormones, though satisfaction ratings were generally low. This suggests that hormonal changes did not impact attitudes about voice, or perhaps that hormones changed the voice minimally. An examination of comments provided by TF supports the latter speculation; comments included “there was a slight change in tonality and inflection, but not enough,” and “because it didn't change much.” Some TF, however, rated their voice changes secondary to hormone therapy quite highly and provided positive comments, such as “after nearly two years on Estradiol and Spiranolactone, it seems I have a higher and more reliable vocal range... It is easier than it was in the beginning but nowhere near ideal...According to the information I have seen, this seems to fall outside what is generally expected from HRT with Male to Female Transsexual persons,” and “it has made my voice clearer and as a singer it has made it easier to reach some top end notes.” Again, these findings indicate that our understanding of the effect of hormone therapy upon voice is incomplete. Further study of TF who report some voice changes after hormone therapy is warranted.

Additionally, 1 NB participant with a low TSEQ score (37) reported voice changes, to a high level of satisfaction (5) and no vocal disparity (describing both current and desired voice as “somewhat masculine.”)

Voice therapy

Among TF who had undergone voice therapy, experiences were very mixed. Several participants rated their experiences highly, suggesting that efficacious voice therapy can positively impact voice outcomes. This is further supported by the comments of the 23 participants that ranked their satisfaction with therapy as 4 or 5, which include “voice therapy has transformed my life. I am now much more confident in public and I'm enjoying my 'new'
gender,” “the therapy has given me a credible female voice, and that has been very liberating for me. I am confident that I can use my voice in any situation,” and “I was not sure I could change my voice. I was very surprised I could. I am happy with my voice now” (see Table 13 for more comments).

Unfortunately, some TF had negative therapy experiences. 14 participants rated their satisfaction with voice therapy as 1 or 2, indicating dissatisfaction. Some of their comments included, “therapy was too expensive to continue and I didn't learn enough to have a satisfying voice,” “nothing in therapy really helped with resonance,” and “I undertook voice therapy with a local therapist but was deeply dissatisfied with it.” It is also important to note that at least four participants indicated they had voice therapy yet described an “at-home” approach in their comments, suggesting there may have been some misunderstanding of the question.

The range of satisfaction rating and comments indicate that voice therapy can improve voice significantly, but does not always do so, and some TF have very negative experiences in therapy. Therapy is, as stated previously, extremely difficult and demanding, and some participants elect an at-home approach instead of a voice therapist. Some research has already been performed on the most effective treatments in voice therapy for TF (Adler, 2012; Carew, 2007; Davies, 2006), suggesting that raising pitch as well as altering quality of voice is needed. More information about these practices is needed to ensure effective therapy. Further research is also needed to examine the efficacy of at-home problems, effective treatment practices, and what leads to dissatisfaction with voice therapy.

2 TM participants also reported a history of voice therapy, both of whom had TSEQ scores in the severe range and neither of whom had taken hormones. One rated his satisfaction as 2 (though his stated reason for this score was “because I’m beginning the process”), and reported
a vocal disparity of 3 (as current voice was very feminine and desired voice was somewhat masculine). The other rated satisfaction as 3 (providing no further comments) and had a vocal disparity of 2 (with a current voice described as somewhat feminine and desired voice somewhat masculine.) Both describe lowering pitch in therapy, and listed that as the most useful strategy.

At this time, there is no research on treatment efficacy of therapy techniques for TM individuals, and these participants may have greatly benefited from such studies. Only 2 participants reported a history of voice therapy, however, their reports indicate that a few TM (particularly those who are not currently taking hormones) participate in voice therapy in hopes of gaining a more masculine voice. More research about the treatment and outcomes for these individuals is needed.

2 NB participants (both seeking a less masculine voice) had participated in voice therapy as well, and both rated their satisfaction with changes after voice therapy at a 3. Both participants had TSEQ scores in the moderate range, and vocal disparities of 1. However, one of these participants described their therapy experience as consisting only of “one short free session with my trans group. Great advice/practice, but not really enough to lead to substantive change by itself.” The other participant said that “I have had reasonable success but haven't applied myself fully,” suggesting a more traditional and complete approach to voice therapy. Because of the small number of participants (and the fact that one participant only was able to attend 1 session of therapy), few assumptions about the NB population can be made at this time. One NB participant who had not had therapy commented, “I don’t know if speech therapy is aimed at non-binary people.” At this time, no information on therapy for non-binary people is available, but the possibility of this kind of therapy could be explored in future research.
Most TF and NB said that they would consider voice therapy in the future, while most TM said they would not or were not sure, indicating that TF and possibly NB have more interest in receiving voice therapy. Among TF, the most frequently cited reason for abstaining from voice therapy was “it’s too expensive.” In America, the transgender population is much less likely to have health insurance than the general population, as well as more likely to live in poverty (Grant, 2011). Ways of providing more accessible care to this population should be evaluated. Other common reasons that TF did not participate in therapy included a lack of professionals providing this kind of care in their area (all of whom said they would like to participate in voice therapy in the future) and satisfaction with current ability to modify their voice. Several participants also provide a range of “other” reasons, providing their own answers (Table 13). Among TM, the most frequent reason for not seeking voice therapy was that they were satisfied with the voice changes that had been caused by hormone therapy (though 25% of these respondents said they would consider therapy in the future). This is consistent with findings that TM who experience voice changes due to hormone therapy have significantly more positive attitudes about their voices than those that have not experienced these changes. The two most frequently-chosen answers aside from hormonal voice changes were satisfaction with current voice (20%) and expense (15%). Among NB, price was again the most frequently-selected option for abstention from therapy. Though participants’ answers were varied, money and availability were often cited as the most important reasons for not participating in voice therapy. Options for making this type of service more accessible and widely available should be considered.
Conclusion

Overall, this study provided a much more complete view of the entire transgender population and has revealed them to be extremely heterogynous. In TF, no significant difference in voice handicap was among participants who had participated in voice therapy and those that had not. In TM, on the other hand, there was a significant difference between vocal handicap in participants who had experienced voice changes secondary to hormone therapy and those who had not; however, a surprising percentage of TM still had a TSEQ score indicating a severe vocal handicap, and no significant difference between TSEQ scores was noted between TF and TM. A third group of non-binary individuals emerged and further study is warranted to further examine their vocal attitudes and needs.

Limitations

While the presentation of this survey as an online questionnaire maximized the population size, it also came with limitations. It is possible that some participants misunderstood questions and were not able to complete the questionnaire accurately without an interviewer; indeed, 3 participants were removed due to apparent misunderstanding of questions. Because of the anonymous nature of the survey, there was no way to ensure that participants were being wholly accurate in their identification, or that participants only answered the survey once. There was no way to control for environmental distractions, time, or visual presentation of the survey. The sample was also limited to participants with internet access who were members of trans-focused or LGBT listservs, forums, and groups. It is unknown what effect this sample restriction may have had upon results. The sample was also limited in representation of racial and ethnic minorities, and one potential participant emailed to request access to a Spanish version of the survey, which was unfortunately not available. A larger sample of participants who had
undergone voice surgery and participants who identified as a non-binary gender was also needed.

The survey also was limited in its ability to assess voice; for example, one participant described in an email exchange a highly successful voice but a high level of handicap due to anxiety and a “perfectionist” personality. Similar discrepancies are likely throughout the survey. One major weakness was a simplification of strategies listed in voice therapy; these participants were typically very knowledgeable about their voices and strategies, and several noted the oversimplification in comments. Furthermore, at least two participants reported additional communication problems (hearing loss and vocal lesions secondary to acid reflux), though as there was no question about this, more participants may have had these problems.

The survey also did not include any information about geographic location, which could have yielded valuable information about availability of services and any differences in handicap in different locations.

Future Directions

This study gathered a great deal of previously unexamined information about the transgender population and opened many possibilities for future research. Among TF, further information is needed about speakers who develop a successful voice without any intervention. Research should be done to examine what makes voice therapy successful or unsuccessful, and an examination of the voice changes that occur secondary to hormone therapy in this population is needed. More information is also needed regarding outcomes and frequency of vocal surgery in this population. Among TM, a study of participants that do not experience satisfactory voice changes secondary to hormone therapy would be extremely valuable. A study of effectiveness of voice therapy and successful strategies in this population is also needed. At this time, there is no information regarding NB voice and voice outcomes, and the field may wish to examine if
treatment options can be made available to this population, what kind of strategies could be used, and how to assess and diagnose these problems. Further examination of the strengths and weaknesses of the TSEQ may also be warranted.
REFERENCES


APPENDIX A. QUESTIONNAIRE

1. Age: _____

2. Race/ethnicity:
   - Asian
   - Black/African-American
   - Caucasian/White
   - Hispanic/Latino
   - Native American/Alaska Native/First Nations
   - Pacific Islander/Native Hawaiian
   - Two or more races/ethnicities
   - Other
   - Prefer not to specify

3. Gender assigned at birth: M/F

4. Current gender identity:

5. Right now my voice is:
   - Very masculine
   - Somewhat masculine
   - Gender-neutral
   - Somewhat feminine
   - Very feminine

6. My ideal voice is:
   - Very masculine
   - Somewhat masculine
- Gender-neutral
- Somewhat feminine
- Very feminine

How often do you experience the following on a scale of 1 – 5?

1 = never, 2 = almost never, 3 = sometimes, 4 = almost always, 5 = always.

7. People have difficulty hearing me in a noisy room
8. I have trouble finding a vocal range that feels authentic to me.
9. My voice makes me feel less like the gender I really am.
10. I feel the pitch range of my voice is restricted
11. The sound of my voice varies throughout the day.
12. I feel my voice gets in the way of living as my preferred gender presentation.
13. I use the phone less often than I would like.
14. I’m tense when talking with others because of my voice.
15. I tend to avoid groups of people because of my voice.
16. People seem irritated with my voice.
17. People ask, “what’s wrong with your voice?”
18. I speak with friends, neighbors, and relatives less often because of my voice.
19. I avoid speaking in public because of my voice.
20. I feel my voice sounds artificial to others
21. I have to strain to make my voice sound like I want it to.
22. I feel frustrated with trying to change my voice.
23. My voice difficulties restrict my personal and social life.
24. The pitch of my voice is unreliable.
25. When I laugh, cough, or sneeze, I sound like a man (mtf)/woman (ftm).

26. I feel my voice doesn’t match my physical appearance.

27. I use a great deal of effort to speak.

28. My voice is worse in the evening.

29. My voice causes me to lose income.

30. I don’t feel my voice reflects the “true me.”

31. I am less outgoing because of my voice.

32. I feel self-conscious about how strangers perceive my voice.

33. My voice “gives out” in the middle of speaking.

34. I feel upset when I’m perceived as a man (mtf)/woman (ftm) on the phone.

35. I am envious of other men (mtf)/women (ftm) who have more masculine/feminine voices than me.

36. My voice embarrasses me.

37. How often do you intentionally alter your voice when you speak (i.e., using a voice that is purposefully more feminine, masculine, or gender-neutral) on a scale from 1 – 5? 1 = never, 3 = some of the time, 5 = all of the time

38. How difficult is it to make your voice sound the way you would like it to sound on a scale from 1 – 5? 1 = very easy, 3 = somewhat difficult, 5 = extremely difficult

39. How long are you able to speak in your “best” voice without fatigue on a scale from 1 – 5? 1 = very briefly, 3 = several hours, 5 = all day

40. Which of the following do you do when you speak in this sort of voice? Check all that apply.
   - Raise pitch
   - Lower pitch
- Speak more softly
- Speak more loudly
- Speak more gently
- Speak more forcefully
- Change the way you move your mouth
- Vary your pitch/loudness more
- Vary your pitch/loudness less
- Other: (please describe) _______________________________

41. Have you had surgery to change the way your voice sounds? Yes/No

41a. If you answered “yes,” how satisfied are you with these changes on a scale from 1 – 5? 1 = not at all, 3 = somewhat, 5 = extremely

41b. Please briefly describe why you selected this number to describe your satisfaction with voice changes after surgery. _______________________________

41c. If you answered “no,” would you consider voice surgery in the future? Yes/No/Not sure

42. Have you experienced voice changes as a result of hormone therapy? Yes/No

42a. If you answered “yes,” how satisfied are you with these changes on a scale from 1 – 5? 1 = not at all, 3 = somewhat, 5 = extremely

42b. Please briefly describe why you selected this number to describe your satisfaction with voice changes after surgery. _______________________________

42c. If you answered “no,” have you taken hormones as part of your transition process? Yes/No

43. Have you had voice therapy to change the way your voice was perceived? Yes/No

43a. If you answered “yes,” how satisfied are you with these changes on a scale from 1 – 5? 1 = not at all, 3 = somewhat, 5 = extremely
43b. Please briefly describe why you selected this number to describe your satisfaction with voice changes after surgery. ________________________________________________________________

43c. Which of the following techniques did you use in voice therapy? Check all that apply

- Raising pitch
- Lowering pitch
- Changing the breathiness of the voice
- Changing the loudness of the voice
- Changing the way I move my mouth
- Changing the way I alter pitch and emphasize words when I speak
- Changing the way
- Learning about the ways men and women speak differently
- Other: (please specify) _______________________

43d. Of the techniques that you indicated, please rank their usefulness in achieving your best voice on a scale from 1 – 5. 1 = not useful, 3 = somewhat useful, 5 = very useful.

43e. If you answered “no,” what are the reasons? Check all that apply.

- I am pleased with my current voice quality.
- I can successfully modify my voice without help.
- I don’t think it would make a difference.
- I experienced voice changes when I started hormone therapy.
- I don’t think speech and voice specialists know about transgender voice problems.
- It’s too expensive.
- I think a therapist might discriminate against me because of my gender identity.
- There is no one who provides that sort of treatment in my location.
- I’m embarrassed to talk to a professional about my voice.
- My insurance doesn’t cover it.
- Other: ________________________________

43f. Of the reasons that you have selected for not participating in voice therapy, please rank their importance on a scale from 1 – 5. 1 = not important, 3 = somewhat important, 5 = extremely important.

43g. Would you consider voice therapy in the future? Yes/No/Not sure
APPENDIX B. CONSENT FORM

Study Title: Attitudes about voice and voice therapy among transgender individuals

Performance Site: Online survey

Investigators: The following investigators are available for questions about this study:
Stefanie Hays, graduate student at Louisiana State University, department of Communication Disorders
shays2@lsu.edu
Melda Kunduk, assistant professor at LSU, department of Communication Disorders
mkunduk@lsu.edu
(225) 578-3930, office hours Monday 11-1 and Friday 8 – 5.

Purpose of the study: The purpose of this study is to better understand attitudes and opinions about voice and voice therapy in transgender and transsexual populations, to determine whether participation in voice therapy correlates with a more positive attitude about voice in this population, and to identify barriers to and problems with participation in therapy for this population.

Participant inclusion: Participants are eligible to participate if they identify as transgender or transsexual and are older than 18.

Number of participants: No less than 100

Study procedures: Participants will spend approximately 15 minutes completing a questionnaire about their voice, voice therapy, and their feelings about these topics.

Benefits: This study may yield valuable information which leads to a better delivery of therapy to transgender patients.

Risks: There are no known risks involved in participation.
Right to refuse: Subjects may chose not to participate or withdraw from this study at any time without penalty or any loss of benefit to which they might otherwise be entitled.

Privacy: The results of this study may be published, but all completed questionnaires are to be completely anonymous.

I understand the purpose and procedures of this study. I may direct additional questions regarding study specifics to the investigators. If I have questions about subjects' rights or other concerns, I can contact Robert C. Mathews, Institutional Review Board, (225) 578-8692, irb@lsu.edu, www.lsu.edu/irb. Requirement of signed consent has been waived by the Institutional Review Board at Louisiana State University (IRB #E8034).

By clicking on the "next" button, I agree to participate in the study described above.
APPENDIX C. SELECTED COMMENTS FROM SURVEY PARTICIPANTS

Comments from TF about voice changes due to hormones

“It has made my voice clearer and as a singer it has made it easier to reach some top end notes after nearly two years on Estradiol and Spiranolactone, it seems I have a higher and more reliable vocal range.. It is easier than it was in the beginning but nowhere near ideal...According to the information I have seen..this seems to fall outside what is generally expected from HRT with Male to Female Transsexual persons.”

“Hormone therapy has made me speak naturally in a slightly higher pitch, and makes me require less effort to speak in an androgynous voice.”

“There was a slight change in tonality and inflection, but not enough.”

“Pre-HRT I spoke very fixed around 110-120Hz  17 weeks into HRT I can speak almost effortlessly at around 140-150Hz. However I am somewhat dis-satisfied with my voice because I would like to be up in the 180-200Hz range which I find very difficult to reach at times.”

Comments from TM about voice changes due to hormones

“Once on testosterone my voice lowered to a perfect pitch...definitely male, but not too deep. It sounds like me.”

“I am satisfied with my voice because it is much deeper than it used to be, but my range is smaller than it used to be, especially the high end.”

“I am satisfied because I do not do anything to change it...I know it is pitch related and I do not ever do anything to alter it. I am who I am, and I do not believe my voice defines my gender.”

“My voice dropped drastically but I wish I had voice training to strengthen and adapt my vocal cords. My voice seems to get strained easily now.”

“Although my voice has changed a fair amount, it's still changing and it's frustrating to not know
where it's going to end up.”

“It is very weak when I speak "male". If I speak in a pitch and loudness that is natural then people either think I'm a woman or a gay man. Either way it's annoying and invalidating to my experience.”

“I appreciate that you let transguys give input too. In our community there's a belief that all transguys develop a ‘passable’ voice with hormone therapy and that's just not true.”

“I like my voice. I'm a singer and can still sing, although in a different register. But it's not a 5 because sometimes folks on the phone identify me as female. I'm not always sure if this is my voice or the fact that my name is ambiguous in terms of gender, but I think it is sometimes because of my voice.”

Comments from TM about voice changes due to hormones

“I like my voice! It was nice before when it was more "feminine", but it's also nice now when it's more "masculine".”

Comments from TF about voice therapy

“Never have a problem with my voice being identified as female”

“The therapy helped me to discover my proper voice.”

“I was not sure I could change my voice. I was very surprised I could. I am happy with my voice now.”

“Voice therapy has transformed my life. I am now much more confident in public and I'm enjoying my 'new' gender.”

“My normal voice range is in the gender neutral to feminine range. I basically keep my voice above the 175 HZ level. Before beginning training, it was primarily in the gender neutral to masculine range.”
“As a lawyer, I speak all day on the phone and in meetings and I'm fully comfortable with my voice.”

“After working with my voice therapist, over time I have been misgendered (referred to as male) less and less.”

“I feel like most of the changes to my voice came from practice unrelated to the techniques taught to me from my therapy. During my therapy I had trouble understanding the methods and ideas, which lead to me feeling like I hadn't gained much. My voice improved a little, but not as much as I had hoped.”

“I was in a university setting with student therapists. I felt it was more about their grade than the outcome of my sessions, which I was charged handsomely for.”

“Therapy was too expensive to continue and I didn't learn enough to have a satisfying voice.”

“I undertook voice therapy with a local therapist but was deeply dissatisfied with it.”

“I started from a very deep voice. My pitch is fine in female mode, though something (resonance?) isn't quite right.”

“While it isn't quite the voice that I want, it still works well enough for me most of the time - telephone excepted.”

“I have had reasonable success but haven't applied myself fully.”

“It helped a bit, but I still have work to do.”

“Therapy just educated me about the problem and taught me some basics. I really need to spend a lot of time practicing. Therapy is a tiny tiny piece of what is needed.”

“It is a gradual process that takes lots of constant effort and I don't feel that the effort I put in is reflective of where I would like my voice to be at this stage.”

“It seemed that I could not attain the pitch / resonance called for.”
“Speech pathologists should be trained in this field and receive training to improve working with transsexuals.”

**Comments from TF about general voice experience**

“I have had vocal training (choir singing), which I think taught me some useful techniques how to modulate the voice.”

“I have many Transgender friends. Many have had voice therapy and some have had surgery. ALL sound like a man trying to sound like a woman. I gave up pretending to be something the day I "came out". I am happy to be a woman. I am PROUD to be a transgender woman. I have won this right by fighting hard and being hurt. Now I am the victor!”

“For transwomen who live or hope to live full-time, developing an effective female voice is crucial to acceptance in the cis-world.”

“Voice is important, but only a small part of living in my preferred gender. Self confidence and self acceptance have proven significantly more important.”

“I am willing to try anything to help my voice. Any experimental treatments, etc.”

“It would be nice to polish off my transition with a voice to match. So often people I have spoken to on the phone tell me my appearance doesn't match my voice. I speak to large groups frequently, and gave up on the soft breathy voice so many trans women fall back on simply because my audience couldn't hear me. I would love to be able to cough or sneeze while in a bathroom or dressing room without bringing attention to myself. I'd love to be able to sing again.”

“It crushes me inside. I do not own a car. I use public transportation. I will not speak to other passengers or use my phone in public for fear of reprisals. (I live in the inner city and there have
been several LGBT hate crimes recently.) For me, its entirely a safety issue. It's the only thing holding be back.”

“My voice does effect my confidence throughout the day, and I know if I were able to be truly satisfied with it I'd be much happier. I hope what I've said here can help you and others with future developments in transgender voice therapy.”

“As in most areas of transition treatment is expensive and not covered by insurance, until that changes I hope for acceptance & equality no matter what I look or sound like!”

“For me at least personally, how comfortable I am with voice depends on who I'm speaking to and where I'm speaking. I don't want a totally femme-y voice most of the time because I like to speak loudly, and in New York City most people don't seem to care what kind of voice I speak in. However, I am also a singer in a band, and I would have a more feminine singing voice ideally. I also get frustrated about people misgendering me based on my singing voice. I wish I sounded more feminine when I sing, but not so much when I speak.”

“Interesting how the ears are stronger than the eyes...people see 100% female while interacting with me..ie: walk, look, mannerisms and all those female Identifiers vanish as soon as I speak, so what you hear is stronger than what you see...”

Comments from TM about general voice experience

“Voice is probably the number one most important thing determining whether or not you pass.”

“Satisfaction with results from testosterone treatment varies from one transguy to the next. I was very fortunate to have a deep voice to begin with, and therefore very satisfied.”

“My voice matches more with my outward appearance. It "fits"”

“Voice surgeries are very scary. And it's hard to change your vocabulary to more masculine words all the time. Especially when expressing emotion like excitement.”
“I am a little bit of a special case because I'm also hard of hearing. That makes monitoring and consciously altering my voice really hard.”

“I am only able to not worry about the things asked about in this survey because I am a FTM person who has taken testosterone and it has dropped my voice a significant amount. Getting a job, phone conversations, and speaking less in public, etc were all things I worried about when I was pre-T.”

“I have personally struggled with starting hormone therapy due to the fear of negative affects on my singing voice. Thankfully I have a lower voice than my assigned gender at birth, so I can practice speaking in a more masculine way, but I feel like because I have to try so hard to sound more masculine, I am sacrificing my personality. This has been a struggle.”

Comment from TM about general voice experience

“I recommend voice training for anyone who wishes to speak more effectively, and I can only imagine it would be greatly beneficial to trans people who don't already have voice training to help them present their genders more legibly and with more confidence.”

“I am a transmasculine person who identifies as Genderqueer. I am considering T in the future to drop my voice. I really want to take T because of this, but I don't know any other way to drop my voice. It would be great to have a masculine voice because it would help me present in a more androgynous way. Currently I am ID'd as female by others because of my voice and other physical characteristics typically associated with female.”

“Finding info about voice therapy is hard and I'm unsure where to look.”
### APPENDIX D. ADDITIONAL REASONS GIVEN FOR ABSTAINING FROM VOICE THERAPY.

<table>
<thead>
<tr>
<th>Reason given</th>
<th># participants</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TF</strong></td>
<td></td>
</tr>
<tr>
<td>Reasons like “not ready yet”</td>
<td>4</td>
</tr>
<tr>
<td>Reasons like “low priority compared to other factors”</td>
<td>2</td>
</tr>
<tr>
<td>Reasons like “therapy makes for an over artificial voice”</td>
<td>2</td>
</tr>
<tr>
<td>Reasons like “I never really thought about it”</td>
<td>2</td>
</tr>
<tr>
<td>Reasons like “A drama coach/singing instructor worked with me”</td>
<td>1</td>
</tr>
<tr>
<td>Reasons like “I am not concerned my voice does not match my gender”</td>
<td>2</td>
</tr>
<tr>
<td>“I transitioned many years ago. I retrained my voice on my own and it's now automatic, not modified.”</td>
<td>1</td>
</tr>
<tr>
<td>“I have been trying to get an appointment and was told that they had a three year waiting list.”</td>
<td>1</td>
</tr>
<tr>
<td>“I have chronic laryngitis from smoking and a very &quot;gravelly&quot; voice.”</td>
<td>1</td>
</tr>
<tr>
<td><strong>TM</strong></td>
<td></td>
</tr>
<tr>
<td>Reasons like “my voice will change on HRT”</td>
<td>4</td>
</tr>
<tr>
<td>Reason like “I am pleased with current voice”</td>
<td>2</td>
</tr>
<tr>
<td>“Voice therapy is mainly offered to MTFs, not FTMs, unless you are a singer”</td>
<td>1</td>
</tr>
<tr>
<td><strong>NB</strong></td>
<td></td>
</tr>
<tr>
<td>“I don’t know if speech therapy is aimed at non binary people”</td>
<td>1</td>
</tr>
<tr>
<td>“[I] would consider it when I get onto hormone treatment”</td>
<td>1</td>
</tr>
</tbody>
</table>
APPENDIX E. IRB APPROVAL

Application for Exemption from Institutional Oversight

Unless qualified as meeting the specific criteria for exemption from Institutional Review Board (IRB) oversight, all LSU research/ projects involving human subjects, samples, or data obtained from humans, directly or indirectly, with or without their consent, must be approved or exempted in advance by the IRB. This form helps the PI determine if a project may be exempted, and is used to request an exemption.

Applicant: Please fill out the application in its entirety and include the completed application as well as parts A-F, listed below, when submitting to the IRB. Once the application is completed, please submit two copies of the completed application to the IRB office or to a member of the Human Subjects Review Committee. Members of this committee can be found at https://research.lsu.edu/compliance/policies/procedures/irb/.

- A Complete Application Includes All of the Following:
  (A) Two copies of this completed form and two copies of parts B through F.
  (B) A brief project description (adequate to evaluate risks to subjects and to explain your responses to Parts 1 & 2).
  (C) Copies of all instruments to be used.
  (D) If this proposal is part of a grant proposal, include a copy of the proposal and all recruitment materials.
  (E) The consent form that you will use in the study (see part 3 for more information).
  (F) Certificate of Completion of Human Subjects Protection Training for all personnel involved in the project, including students who are involved with testing or handling data, unless already on file with the IRB. Training link: https://pony.nlm.nih.gov/learn/login.php
  (G) IRB Security of Data Agreement: (https://research.lsu.edu/files/docs/26774.pdf)

1) Principal Investigator: Stefanie Hayes
   Dept: Communication Disorders
   Ph: (504)983-1617
   E-mail: shays@lsu.edu
   Rank: graduate student

2) Co-investigator(s): please include department, rank, phone and email for each.
   Meda Kukack,
   Associate Professor, Department of Communication Disorders
   (225)578-3930
   mkukack@lsu.edu

3) Project Title: Attitudes about voice and voice therapy among transgender individuals

4) Proposal? (yes or no) No
   If Yes, LSU Proposal Number
   (This application completely matches the scope of work in the grant)
   (More than one subject pool. This application will not be filled later)

5) Subject pool (e.g., psychology students) transgender individuals
   (Circle any "vulnerable populations" to be used: children <18, the mentally impaired, pregnant women, the aged, others). Projects with incarcerated persons cannot be exempted.

6) PI Signature: 
   Date: 11/21/2015
   (No per signatures)

** I certify my responses are accurate and complete. If the project scope or design is later changed, I will submit for review. If I obtain written approval from the Authorized Representative of all non-LSU institutions from which the study is conducted, I also understand that it is my responsibility to maintain copies of all consent forms at LSU for three years after completion of the study. I leave LSU before that time the consent forms should be preserved in the Departmental Office.

Screening Committee Action: Exempted

Signed Consent Waived: Yes

Reviewer: Mathews
   Signature: Ruth McCurry
   Date: 11/21/15
Study Title: Attitudes about voice and voice therapy in transgendered individuals

Performance Site: Online survey

Investigators: The following investigators are available for questions about this study:
Stefanie Ilays, graduate student at Louisiana State University, department of Communication Disorders
slays2@lsu.edu

Melda Kunduk, assistant professor at LSU, department of Communication Disorders
mkunduk@lsu.edu
(225) 578-3930, office hours Monday 11-1 and Friday 8-5.

Purpose of the study: The purpose of this study is to better understand attitudes and opinions about voice and voice therapy in transgender and transsexual populations, to determine whether participation in voice therapy correlates with a more positive attitude about voice in this population, and to identify barriers to and problems with participation in therapy for this population.

Participant inclusion: Participants are eligible to participate if they identify as transgender or transsexual and are older than 18.

Number of participants: No less than 100

Study procedures: Participants will spend approximately 10 minutes completing a questionnaire about their voice, voice therapy, and their feelings about these topics.

Benefits: This study may yield valuable information which leads to a better delivery of therapy to transgender patients.

Risks: There are no known risks involved in participation.

Right to refuse: Subjects may choose not to participate or withdraw from this study at any time without penalty or any loss of benefit to which they might otherwise be entitled.

Privacy: The results of this study may be published, but all completed questionnaires are to be completely anonymous.

I understand the purpose and procedures of this study. I may direct additional questions regarding study specifics to the investigators. If I have questions about subjects' rights or other concerns, I can contact Robert C. Mathews, Institutional Review Board, (225) 578-8692, irb@lsu.edu, www.lsu.edu/irb.

Requirement of signed consent has been waived by the Institutional Review Board at Louisiana State University. By clicking on the below button, I agree to participate in the study described above.
VITA

Stefanie Elizabeth Hays received her bachelor’s degree in vocal music education at Loyola University of New Orleans in 2006. Thereafter, she taught vocal music in charter schools in New Orleans. As her interest in voice problems and attitudes about voice grew, she decided to enroll in the graduate school in the Department of Communication Disorders at Louisiana State University. She will receive her master’s degree in May 2013 and plans to begin work as a speech-language pathologist upon graduation.