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Transgender (TG) individuals may seek the assistance of speech-language pathologists to create a voice, speech pattern, or nonverbal behaviors to match their chosen gender (Adler, 2006). Because vocal feminization treatment is relatively new, voice assessment and treatment knowledge is limited due to paucity of empirical research and relevant clinical experience. Common targets in vocal feminization treatment are fundamental frequency/ pitch (Wolfe, Ratusnik, Smith & Northrop, 1990; Gelfer & Schofield, 2000), increased formants/ resonance (Mount & Salmon, 1988; Carew, Dacakis & Oates, 2007; Gelfer & Mikos 2005; Gorham-Rowan & Morris, 2006) intonation patterns/ prosody (Fitzsimmons, Sheahan & Staunton 2001). Recent data suggest a speaker's self-perception of femininity correlates with a listener's judgment of femininity and therefore may be of value in designing therapeutic protocols (McNeill, Wilson, Clark & Deakin, 2008). The current study explores relationships between the typical acoustic measures of the voice targeted in treatment and listener- and self-perceptions of vocal femininity. This study also explores appropriate psychosocial measures to be used in development of efficacious assessment and treatment for vocal feminization of TG clients, investigating the reliability and validity of the Transgender Self Evaluation of Voice Questionnaire (TSEQ; Davies, 2006).

Twenty male-to-female TG speakers, and 5 biologically male and 5 biologically female speakers participated. All TG speakers were presenting as female 100% of the day and taking hormones, and 45% of the TG speakers had completed sexual reassignment surgery. All of the TG speakers either had been or were currently in voice therapy to feminize their voice, but none were judged to have a voice disorder when speaking. Twenty second audio samples were extracted from a picture description and presented to 25 naïve listeners to rate speech femininity and likeability. Each speaker self-rated overall femininity, speech femininity and likeability of their voice using a visual analog scale anchored by "masculine" and "feminine". All TG speakers completed the TSEQ, Voice Handicap Index (VHI) and Voice-Related Quality of Life (V-RQOL) and were invited to complete them again two weeks later. Fourteen participants (70%) did complete and return the questionnaires for a test-retest reliability analysis.

Speakers and listeners rated voices as more feminine as pitch increased and semitone range decreased. Perturbation measures (indicative of voice quality) were not correlated with femininity ratings for this sample of healthy voices (see Table 1). Scores on the TSEQ strongly correlated with scores from the VHI and V-QOL and self ratings of vocal femininity and likability (see Table 2). Test-retest reliability for the psychosocial measures was excellent (.85-.97) (see Table 3).

We have expanded McNeill, Wilson, Clark, and Deakin's 2007 findings by enlarging the sample size and addressing American gender schema. The validation of appropriate subjective and objective measures for determining vocal femininity will guide the development of more effective clinical practice for transgender voice treatment. Our data support the use of acoustic and perceptual targets and the TSEQ in vocal feminization treatment.

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Table 1. Acoustics v. Perceptions (Pearson correlations)

	Speaker's Self-Rated Femininity of the Voice	Listener-Rated Femininity of the Voice
Speaking Mean F0	.766*	.881*
Sustained /a/ Mean F0	.783*	.748*
Semitone range	-.509*	-.602*
NHR	-.115	-.139
VTI	.167	.163
Shimmer Percent	-.311	-.328
Jitter Percent	.076	-.096

*statistically significant at $\alpha=.05$

Table 2. TSEQ v. Perceptions (Pearson correlations)

	Transgender Self-Evaluation Questionnaire
Voice Handicap Index	.910*
Voice-Related Quality of Life	-.936*
Self-rated Overall Femininity	-.218
Self-rated Voice Femininity	-.454*
Self-rated Voice Likability	-.615*
Listener-rated Voice Femininity	-.375
Listener-rated Voice Likability	-.311

*statistically significant at $\alpha=.05$

Table 3. Test-retest reliability (Pearson correlations)

	Time 1 Mean (sd)	Time 2 Mean (sd)	r
VHI (n=13)	60 (22)	60 (21)	.95*
V-RQOL (n=14)	79 (20)	79 (22)	.85*
TSEQ (n=14)	65 (30)	65 (29)	.97*

*statistically significant at $\alpha=.05$