

Further Evidence of the Construct Validity of the Transsexual Voice Questionnaire (TVQ^{MtF}) Using Principal Components Analysis

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Summary: Objectives. The Transsexual Voice Questionnaire (TVQ^{MtF}) is a population-specific self-report tool designed to capture the perceptions of male-to-female transsexual women (MtF women) regarding their vocal functioning and the voice-related impact on their everyday life. The aim of this study was to further the psychometric evaluation of the TVQ^{MtF} by examining its construct validity and confirming its reliability.

Study Design. This is a prospective validity and reliability study.

Methods. One hundred fifty-one MtF women provided data for principal components analysis with oblimin rotation. Data from 133 of these participants were also analyzed to evaluate the internal consistency of the TVQ^{MtF}.

Results. Principal components analysis identified a two-factor structure. The largest component (accounting for 51.99% of the variance) captured individuals' perceptions of their vocal functioning and included items related to the link between voice and gender identity. This component was labeled *vocal functioning*. The second component (5.82% of the variance) contained items that related to the impact of voice on the individual's participation in everyday life and was labeled *social participation*. Internal consistency was high (Cronbach's $\alpha = .97$).

Conclusions. The findings support the construct validity of the TVQ^{MtF}. Additionally, the high internal consistency of the TVQ^{MtF} found in the current study confirms that the content of the TVQ^{MtF} reliably measures the self-perceptions of MtF women regarding their voice. The current findings also support the clinical utility of the TVQ^{MtF} providing a means of organizing TVQ^{MtF} responses to inform the voice training process.

Key Words: Self-report measure–Vocal function–Psychosocial impact–Transgender–Transsexual.

INTRODUCTION

Because voice is a salient cue to listeners' perceptions of a speaker's gender,^{1–4} many individuals whose gender identity is the opposite of that assigned to them at birth (ie, transsexual individuals) seek the services of speech pathologists to modify their voices. This is particularly the case for male-to-female transsexual women (MtF women) whose voice characteristics are often male-like and therefore incongruent with their identity and presentation as women. A gender incongruent voice holds not only the potential to cause the individual substantial degrees of personal distress or discomfort but also to attract negative responses from society.⁵ Fundamental to effective and efficient speech pathology management of voice change in MtF women is a comprehensive assessment of their voice, including their own perspective of the impact of their voice on their everyday life.^{6,7}

Incorporating the MtF woman's perspective of the impact of her voice on her everyday life is in line with the International Classification of Functioning, Disability and Health (ICF),⁸ which is increasingly being applied to the voice and communication characteristics of transgender individuals.^{5,9–11} The importance of establishing the MtF woman's perception of her voice is also highlighted by the fact that two major components of voice

assessment, ie, acoustic analysis and the clinician's auditory-perceptual evaluation, do not necessarily reflect the voice-related impact that she experiences.^{12,13} McNeill et al,¹³ for example, found that fundamental frequency (F0), the acoustic correlate of pitch, accounted for only 10% of the variance in the happiness of MtF women with their voices. These authors also found that auditory-perceptual ratings of speaker femininity by speech pathologists do not always reflect the MtF woman's experience of voice-related impact. In their study, voice clinician's ratings of the femininity of individuals' voices did not correlate with the individuals' happiness with their voices. McNeill et al¹³ used visual analogue scales to obtain individuals' perceptions of their voices. Three self-report voice tools designed to elicit MtF women's perceptions of their vocal functioning and its impact on their lives have also been employed by speech pathologists working with MtF women: the Voice Handicap Index,¹⁴ the Voice-Related Quality of Life scale,¹⁵ and the Transgender Self-Evaluation Questionnaire (TSEQ).⁶ The recently developed Transsexual Voice Questionnaire (TVQ^{MtF})⁹ now provides a population-specific, psychometrically evaluated, self-report voice questionnaire designed for MtF women.

The TVQ^{MtF} was developed following an undertaking to examine the psychometric properties of the TSEQ.⁹ The development of the TVQ^{MtF} was informed by a review of the TSEQ items by MtF women and speech pathologists experienced in working with MtF women. It was also informed by the findings of Byrne's in-depth interviews of 14 MtF women who described their experiences of voice-related impacts.⁵ Byrne⁵ reported a "clear presence of the ICF [International Classification of Functioning, Disability] model" (p. 83)⁵ in the stories of these women who described not only their vocal functioning but also

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how their voices limited activity and restricted participation in their everyday lives. Thematic analysis of the voice-related content from these 14 in-depth interviews further informed the development of the TVQ^{MtF}. In line with Byrne's findings, this thematic analysis was based on the ICF framework.⁸ Three themes that were missing or underrepresented in the TSEQ emerged from this analysis (the effect of emotion and mood on voice, the presence of voice quality problems, and societal responses to voice). These themes informed the items to be added, deleted, or modified to create the TVQ^{MtF}, and consequently contribute to the likelihood that vocal functioning and psychosocial impact may emerge as components of the TVQ^{MtF}.

The TVQ^{MtF} is a 30-item questionnaire that provides a means for MtF women to record their perception of their voice and its impact on their everyday lives. The MtF woman indicates the perceived frequency with which she experiences each of 30 vocal situations (eg, *I avoid using the phone because of my voice*) by selecting one of four options: 1 = never or rarely, 2 = sometimes, 3 = often, 4 = usually or always. The range of possible scores is 30 to 120, with a (desirable) lower score indicating fewer negative voice-related experiences. Initial psychometric evaluation of the TVQ^{MtF} revealed high internal consistency (Cronbach's $\alpha = .96$) and excellent test-retest reliability (Intraclass correlation coefficient [ICC] = .98; 95% confidence interval = .97–.99).⁹ High internal consistency and test-retest reliability have also been demonstrated for the Swedish and Portuguese translations of the TVQ^{MtF}.^{16,17} Although the reliability of the TVQ^{MtF} has been well documented, examination of its validity is incomplete.

Davies and Johnston¹⁸ provide preliminary evidence of the content validity of the TVQ^{MtF}. They analyzed the content of interview transcripts and the responses of five women to the TVQ^{MtF}, and found that 29 of the 30 TVQ^{MtF} items addressed the concerns of the participants as voiced in the interviews. Concerns of the participants that were not covered by the TVQ^{MtF}, for example, the likelihood of voice change and the voice training process, were expressed with low frequency and mostly by only one participant. A positive relationship ($P = 0.040$) was also found between the TVQ^{MtF} items and the "ideas" that occurred *most frequently* in the interviews. Although these findings provide some support for the content validity of the TVQ^{MtF}, the authors acknowledge that a larger sample size would provide greater confidence in their findings.

With regard to examining construct validity, several approaches can be used, such as exploration of the underlying structure of the measure, known-groups method, and convergence with measures of similar constructs. Dacakis *et al*¹⁹ have previously employed the known-groups method²⁰ to examine the construct validity of the TVQ^{MtF}. Known-groups method tests the ability of a measure to discriminate between groups that are known to differ. Based on the findings of Byrne that women who had undergone gender reassignment surgery (GRS) had a reduced focus on voice,⁵ the authors compared the TVQ^{MtF} total scores of 26 MtF women who had undergone GRS with the scores of 27 MtF women who had not undergone GRS. The results demonstrated that although both groups of MtF women experienced ongoing concerns about their vocal functioning, a statistically

significant difference ($P = 0.004$) was found between the TVQ^{MtF} total scores of the two groups. This difference was consistent with women who had undergone GRS reporting significantly less frequent problems than those who had not undergone GRS. At the item level, there were also differences between the two groups on five items related to the link between voice and gender identity. The differences on items 10, 19, and 6 reached statistical significance at the alpha level adjusted for multiple comparisons (ie, $P < 0.002$), and items 3 and 24 showed a trend toward significance ($P < 0.005$). These results raise the possibility that following GRS, MtF women may rely less on their voice to consolidate their gender identity, and this possibility may relate to the alleviation of gender dysphoria that has been reported to accompany the acquisition of a gender congruent body.^{21,22} The results of this study aligned with Byrne's⁵ findings and her theoretical proposal that MtF women who have and have not undergone surgery differ in their perceptions of their voice and its impact. Although this significant difference between the two groups of women provides indirect support for the construct validity of the TVQ^{MtF}, more direct evidence of its construct validity can be provided through principal components analysis (PCA) of the measure.

In summary, although excellent reliability has been reported for the TVQ^{MtF} in several studies, limited research attention has been directed to the construct validity of this self-report tool for MtF women. PCA was therefore undertaken. In view of the implied underlying structure of the data that informed the development of the TVQ^{MtF},⁹ it was anticipated that a stable set of components would emerge to support the construct validity of the TVQ^{MtF}.

METHODS

Approval for the study was obtained from the La Trobe University, Faculty of Health Sciences, Human Research Ethics Committee (FHEC08/155).

Participants

Participants for this study were recruited from the La Trobe Communication Clinic, Melbourne, and the private practices of two psychiatrists and a gynecologist who specialize in MtF women's health. Individuals who heard about the project from the participants were also able to volunteer for the research. Recruitment packages were distributed, and the data were collected between 2010 and 2014. The recruitment package contained a participant information sheet, consent form, the TVQ^{MtF}, demographics questionnaire, and a reply paid envelope. Given the procedures used to recruit the participants, it was not possible to identify the exact number of people who received notification of the study; thus, the response rate could not be calculated.

One hundred sixty-one individuals indicated their willingness to participate in the study by returning the completed TVQ^{MtF}, demographics, and consent forms in the reply paid envelope. Individuals who had not yet transitioned to their female presentation "usually or always" were excluded from the study because the TVQ^{MtF} is designed to capture the voice-related experiences of MtF women presenting as their female self in a variety of speaking situations.⁹ Individuals who did not respond to more than

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