

NECK AND VOICE CHARACTERISTICS AS IDENTIFIERS OF SPEAKERS' GENDER

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Information about speakers' identity is available to listeners through visual as well as auditory signal. The literature suggests that speaker's *gender* identification may be dependent on various vocal characteristics such as fundamental frequency (F0), formant frequencies, intonation contours and vocal intensity. Related visual characteristics may include, for example, body configuration, facial structure, hairiness and muscle mass. Aspired by a clinical motivation, the present study was aimed to explore the relationship between physical measurements of the neck as well as basic acoustic characteristics, on the perception of the speaker's gender.

Thirty speakers (15 men, 15 women), age 18-33 years, were recorded for this study. F0 values, as well as frequencies of first two formants were extracted from the recordings. Speakers' necks were photographed from two angles (0° and 90°), while masking other gender or individual markers. Standard physical measurements of the necks were taken. Following, all recordings and photographs were presented to a group of 124 judges, who rated them for femininity/masculinity. Finally, ten independent judges rated each photograph for general aesthetic characteristics.

Results confirmed strong correlations between specific aesthetics and physical neck characteristics. Judges' ratings of femininity/masculinity were highly correlated with specific voice characteristics, as well as with physical measurements. For example, *neck width* was strongly correlated with masculinity ($r=0.7$, $p<0.001$), whereas *neck length* was not. Using a mixed model regression analysis, data demonstrated that visual perception of femininity/masculinity could be predicted by the speaker's *neck girth*, and by the *prominence* of the Adam's apple. Surprisingly, it was also affected by the *judge's age* ($p<0.05$). Auditory perception of gender was predicted by the speaker's *F0* and *neck length*. It was also affected by the *judge's gender* ($p<0.05$). Results provide a framework for predicting gender identification, from visual and auditory signal; and may be implemented for predicting treatment outcome in specific cases, such as gender reassignment and transsexualism.