

Speech Intensity and Phonation Energy of Mandarin Broadcasters

Introduction: The present study aimed to compare the speech intensity and its associated phonation energy (skin vibration on the neck) using accelerometers during voice production between broadcasting students and individuals with no broadcasting training.

Method: Thirty two broadcasting students (17 males and 15 females, mean age = 21 years), with a minimum of three years of professional broadcasting training, were recruited to participate in the study. Each participant produced the vowel /a/ (in natural, broadcasting, and loud mode), which was recorded with a digital audio recorder, together with the skin vibration signals using an accelerometer placed around the thyroid cartilage area. Thirty seven university students (16 males and 21 females, mean age = 22.3 years) with no experience in broadcasting were recruited as control subjects to perform the same voice production task (in natural and loud mode) for comparison.

Results: The broadcasting students' voices had a significantly higher equivalent sound level (SPL_{eq}) than non-broadcaster participants, in both natural voice ($p < 0.001$) and in loud voice ($p < 0.001$). The male broadcasters hadn't a significant higher skin accelerometer level (SAL) than non-broadcasters, which suggested that they didn't input a higher phonation energy when having a higher acoustic output (speech intensity) than non-broadcasters, while the female broadcasters used a higher input. Both male and female broadcasters had a significantly higher ratio of acoustic output to skin vibration on neck (SPL_{eq}/SAL) than non-broadcasters (male: 3.22~3.71 dB higher, $p < 0.001$; female: 3.19~3.63 dB higher, $p < 0.001$).

Conclusion/Discussion: The significant higher ratio SPL_{eq}/SAL indicated that the broadcasting students were more efficient in voice production (lower effort in vocal fold vibration with a higher acoustic output). The influence of the different vowels (formants) on the voice source energy will also be discussed.

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