TR－A－0172

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1993. 3.23

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Production and Perception of the Consonantal Voicing Distinction in Speech without VOT: An Acoustic Study using Electric Larynx Speech*

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ABSTRACT

Acoustic features and perceptual cues for the voicing distinction of English intervocalic stops were investigated using two alaryngeal talkers who speak with electric larynges after surgical removal of the larynx. These talkers produced multiple repetitions of /əCVC/ syllables. In the electric larynx speech, the sound source was continuously generated throughout an utterance, and systematic control of voice onset time (VOT) for the intervocalic stops was not possible. Statistical analyses based on the talkers' intention revealed different acoustic characteristics for the two talkers, DB and AS. DB showed increases in duration and amplitude of burst-like high frequency noise following the consonant release more for the voiceless stops than for the voiced cognates, suggesting some articulatory efforts to generate voiceless stops. In AS, F1 and F2 were higher and consonant closure was longer for voiceless stops than for the voiced cognates. Correlation coefficient scores for the production and perception of the talkers' speech suggested that perceptual cues for the voicing distinction were different for the two talkers. Acoustic features related to the production of burst-like noise and pseudo-VOT (interval between the bylining of burst-like noise and the following vowel) were highly correlated with the perception of voiceless-ness in DB. Correlation scores were not high in AS but shorter duration of the preceding vowel and longer consonant closure were related to the perception of voiceless-ness. The results suggested possible compensation manoeuvres of electric larynx speech and individual variations for encoding a phonetic feature.

*The current study was perform during the period from April 1991 to March 1992. This paper was presented at the 122nd Meeting of the Acoustical Society of America at Houston Texas in November 1991.