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Phoneme confusions as a function of noise, spectral resolution and L2 experience

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Consonant and vowel confusion matrices were measured from normal hearing listeners with varying degrees of experience in English. There were five listeners each in the following categories: native English speakers, and Spanish speakers who were immersed in English at the ages of 0-5 years, 5-10 years, 10-18 years, and over 18 years. Twelve vowels (hVd) or 18 consonants (vCv) were presented and responses were collected in a confusion matrix. Spectral resolution was varied by using a noise-band vocoder with 2, 4, 6, 8, and 16 channels, as well as unprocessed speech. All stimuli were presented in speech shaped noise at SNR levels of -5 dB to +15 dB in 5 dB steps as well as in quiet. Noise and spectral resolution had a similar effect on voicing, manner and place of articulation, and also had similar effects as a function of L2 experience. For native speakers of Spanish the duration of L2 experience had the largest effect on voicing cues, less effect on manner cues, and almost no effect on place cues.