# ACOUSTICS2008/3431
# Integration of acoustic cues for consonant identification by cochlear implant users

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Users of cochlear implants (CIs) obtain substantial benefit from their devices, but their speech perception is (on average) less than perfect and there are significant individual differences among patients. In particular, their consonant identification levels are lower than those of normal hearing listeners, or even most users of hearing aids. We have developed a simple quantitative model (Multidimensional Phoneme Identification or MPI model) to predict consonant confusion matrices for individual cochlear implant users based on their discrimination of three consonantal acoustic cues: place of stimulation in the cochlea, silent gap duration, and percentage of energy above 800 Hz. Despite using only three degrees of freedom (i.e. JND for each cue) the model can explain most of the consonant pairs that are confused (or not confused) by individual CI users. However, when a listener's measured JNDs are used as inputs to the model, the predictions that result tend to have a higher percentage of correct responses than shown by the listener. One possible explanation is that CI users' speech perception may be limited not only by their basic psychophysical capabilities but also by their imperfect integration of different acoustic cues. [Work supported by NIDCD (R01-DC03937)].