R12: EFFECT OF CONSONANT-VOWEL BOUNDARY TO SPEECH PERCEPTION IN COCHLEAR IMPLANTS

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Speech sounds are broadly classified into vowels and consonants. Consonants carry more information than vowels while reading as there are more consonants compared to vowels in English language. Despite being less in numbers, vowels contribute more to speech intelligibility than consonants. Previous research with normal hearing listeners showed that the vowel-only sentences (consonants replaced) led to a 2:1 intelligibility advantage over consonant-only sentences (vowels replaced) regardless of the type of segmental replacement. However, the contribution of consonants and vowels to speech perception in cochlear implant (CI) listeners is not well understood.

A segment replacement paradigm on TIMIT speech corpus was used to evaluate the effect of consonant-vowel boundary to speech perception in CI listeners. Two processing strategies were created to emphasize the duration of vowels and consonants by presenting different amounts (0%, 40%, 60%, 80%, and 90%) of consonants and vowels. The first strategy (FVXC) preserved full vowels (FV) and presented different amounts of consonant (FV+%C) by replacing the consonant centers with either silence or speech shaped noise. The second strategy (FCXV) preserved full consonants (FC) and presented different amounts of vowel (FC+%V) by replacing the vowel centers with either silence or speech shaped noise. Clean speech and interrupted speech (3 Hz interruption rate, 50% duty cycle) were also presented. A PDA based research platform was used to present the stimuli to CI listeners.

For FCXV presentation condition, noise replacement paradigm had higher speech intelligibility compared to silence for 0%, 40%, and 60% vowel presentation conditions. There was no difference in speech intelligibility for 80% and 90% vowel presentations. Moreover, there was no significant difference between the replacement paradigms for FVXC presentation condition. Also, the speech intelligibility was very low (< 10%) for 3Hz interruption suggesting the inability of the CI listeners to tolerate interruptions in continuous speech. Overall it could be concluded that the CI listeners have difficulty in fusing interrupted speech signals into one coherent speech stream and phonemic restoration in CI listeners occurs depending on the presented speech stimuli.