

Cross-Language Study of Velar and Bilabial Stop Perception

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Human speech perception is a topic of research since four decades and still the process of speech perception is far from being understood. The knowledge from the speech production studies that the acoustic cues of the speech sounds differ from language to language has triggered many studies in speech perception across languages of the world.

This study was aimed at evaluating the cueing strength of closure duration, preceding vowel duration, transition duration of preceding and following vowel and VOT for the perception of medial geminate unaspirated bilabial and velar stop consonants in Malayalam and Telugu listeners and compare the results with the findings of Usha Rani (1989) among the Kannada and Hindi listeners.

Four Kannada words with geminate bilabial and velar stop consonants (/akka/, /agga/, /appa/ and /abba/) were taken for the experiments. Out of these four words /akka/ was meaningful in Telugu /appa/ was meaningful in Malayalam and /abba/ and /agga/ were meaningless in both the languages.

The test stimuli synthesized by (analysis-by-synthesis/synthesis-by-rule method) Usha Rani (1989) were used. Five different experiments were conducted for each of the parameters mentioned earlier. The first experiment dealt with closure duration (92 stimuli), second with preceding vowel duration (12 stimuli), third with preceding vowel transition duration (23 stimuli), fourth with following vowel transition duration (26 stimuli) and the last with VOT (4 stimuli). In total there were 157 stimuli, each audiorecorded three times with an interstimulus interval of two seconds and were given for the perceptual judgement of 20 subjects. Ten native Malayalam (5 males and 5 females) speakers in the age range of 17-18 years and ten native Telugu (7 males and 3 females) speakers in the age range of 17-19 years participated in the perceptual judgement. All of them had arrived in Mysore within one month and had no exposure to Kannada. All the subjects were tested individually and were instructed to select one of the four forced-choice percept for each stimuli.

The effect of temporal parameters were evaluated in terms of voicing and clustering features of stop consonants. The other variables in the study were sex, language variation and role of semanticity.

The following were the results :

1. The percept changed from cluster to non-cluster as the closure duration was reduced.
2. The percept changed from voiceless to voiced as the closure duration was reduced.
3. Presence or absence of voicing during closure played an important role in perception, although, it was not a parameter under study.
4. Preceding vowel duration, preceding vowel transition duration, following vowel transition duration and VOT were found to be insufficient to cue for voicing.
5. Semanticity (meaningful vs nonsense words) did not seem to play any role.

6. No apparent differences were found between males and females and across the two languages under study.
7. The results of this study were similar to those of Usha rani (1989) in Kannada and Hindi speakers.

It can be concluded that the closure duration and presence or absence of voicing are the major cues for the perception of voicing and clustering, while the other parameters turned out to be the minor cues. The minor

cues probably interacting together or along with the major cues may signal the distinction between two phonemes.

The participation of semantic processing involving the higher cortical areas (Wernicke's, Supramarginal and angular gyrus) was not indicated by the results. It is suggested that the interaction of the different cues should be studied by embedding the synthetic words in natural sentences and also among the patient groups with lesion in specific areas of the auditory system to gain a better understanding of the process of speech perception.