Voice Onset Time for Stutterers and Non-stutterers*

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The notion that the larynx is a culprit for stuttering dates back as early as the eleventh century. Recently the explanation regarding the basic nature, cause and maintenance of stuttering has been given on the basis of laryngeal dysfunction. Voice Onset Time (VOT) is one of the parameters among the temporal aspect of speech, which indicates laryngeal function. VOT has been defined as "The duration between the release of a complete articulatory constriction or burst transient and the onset of phonation" (Lisker and Abramson, 1964, 1967). Studies have shown that VOT in stutterers is longer than that of non-stutterers in case of English stop sounds.

The present study was undertaken to compare the VOT's of stutterers for voiced and voiceless stop sounds of Kannada language in spontaneous reading and in syllables, in isolation with that of non-stutterers.

The following hypotheses were posed :

(1) There will be no difference between stutterers and non-stutterers for VOT values of voiceless stop sounds (*a*) in reading, (*b*) in isolation.

(2) There will be no difference between stutterers and non-stutterers for VOT values of voiced stop sounds (*a*) in reading, (*b*) in isolation.

(3) (*a*) There will be no difference between VOT for voiced stop sounds and VOT for voiceless stop sounds in non-stutterers.

(*b*) There will be no difference between VOT for voiced stop sounds and VOT for voiceless stop sounds in stutterers.

(4) There will be no difference between the VOT for syllables in isolation and VOT for the same sounds in spontaneous reading (*a*) in stutterers, (*b*) in non-stutterers.

(5) There will be no difference between the VOT for each sound with respect to the position of articulatory constriction (*a*) in stutterers, (*b*) in non-stutterers.

(6) There will be no difference between the VOT for stop consonants in Kannada and the reported VOT for stop consonants in other languages in non-stutterers.

To test the hypotheses five stutterers and five non-ttutterers were taken. The two groups of subjects were matched in terms of age, sex and language background. For the purpose of this study a passage in Kannada was constructed. This passage included words which contained / p /, / t /, / ṭ /, / k /, / b /, / d /, / ḍ / and / g / sounds in initial position. The subjects were instructed to read the passage. Besides this, the subjects also read the syllables of the same

* Master's Dissertation, University of Mysore, 1979.

sounds mentioned above, in isolation, with the vowel (*a*) (in cv paradigm). The speech samples were recorded in a high quality tape recorder. The initial segments of the words having the aforesaid sounds and the syllables were separated and displayed in wide band spectrograms, using a Kay 6061 B Sonagraph. VOT measurements were made using the technique followed by Lisker and Abramson (1964).

The results of the study revealed that :

(1) The stutterers showed a longer VOT for voiceless and voiced stop sounds both in reading and in isolation when compared to that of non-stutterers.

(2) There was a difference in VOT between each voiceless stop sound and its voiced counterpart ; *i.e.*, there was always a voicing lag for the voiceless stop sounds (indicated by positive numbers) and a voicing lead for voiced stop sounds (indicated by negative numbers). This was observed for both stutterers and non-stutterers in reading as well as in isolation.

(3) The stop sounds in isolation consistently displayed a longer VOT in spectrograms than in reading.

(4) There was a consistent increase in VOT with respect to the position of articulatory constriction (as it moved backward in the oral cavity) in case of non-stutterers.

(5) No consistent variation in VOT with respect to the position of articulatory constriction was observed for stutterers. However, there was a difference in VOT for various stop sounds.

(6) The mean VOT values for the stop sounds in initial position of words in Kannada (obtained from the present study) were observed to be different than that of other languages. Thus VOT varies from language to language.

Recommendations for Further Study

(1) The same study may be repeated with a large number of stutterers and non-stutterers.

(2) VOT may be studied for various groups of stutterers depending upon severity.

(3) Age and sex dependency with VOT may be studied.

(4) VOT for stop sounds in running speech and that of isolated words may be studied for stutterers and non-stutterers.

(5) VOT for stop sounds in medial and final positions of words may be studied.

(6) A comparison of VOT before and after therapy may be studied in case of stutterers.

(7) VOT for stop sounds in isolation may be studied for various language speakers to see whether VOT for isolated sounds are language dependent or sound dependent.

(8) VOT for Kannada stop sounds (or any other language which is the mother tongue) and English stop sounds (or any other language which is second language) may be studied comparatively in stutterers and in non-stutterers.

(9) VOT for stutterers and non-stutterers may be studied by oscillographic method and the results can be compared with spectrographic method.