REACTION TIME IN STUTTERERS

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In many studies reaction time has been found to be delayed in stutterers. Many of these studies have used auditory stimuli to obtain reaction time. The present study was carried out to find the possible differences in reaction time for auditory and visual stimuli. The reaction time to auditory and visual stimuli in 10 *stutterers and* 10 *normals were obtained. It was found that the reaction time was delayed in stutterers under both the conditions, when compared with normals. Further, it was also found that the stutterers were slower in responding to visual stimuli than to auditory stimuli.*

Reaction time in stutterers, to various stimuli through motor and vocal responses, has been the subject of study in recent times (Adams and Hayden, 1976; Cullinan and Springer, 1980; Cross and Luper, 1979; Cross *et ah,* 1979; McFarlane and Prins, 1978; Prosek *et al.* 1979; Reich *et al.* 1979! Starkweather *et al.,* 1976; Venkatagiri 1981).

Many of these studies have indicated that stutterers show delayed responses through vocal and motor activities. It has been suggested that the slower reaction time in sutterers may be related to the occurrence of stuttering. On the other hand the auditory system in stutterers has been considered to be different from normals (Lee, 1950).

In many studies of reaction time, stimuli has been presented through the auditory system. Therefore, it was considered that it will be interesting to study the reaction time in stutterers by presenting stimuli through auditory and visual modalities separately and to note the differences in reaction time, if any, when compared to normals. To verify this hypothesis the present study was carried out.

Method

Subjects : 10 stutterers and 10 normals (8 male and 2 female) were the subjects for this study. Normal subjects were matched with stutterers for age

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and sex. The age range was 12 to 25 years. The clinical population was selected among the subjects who were diagnosed as sutterers by qualified speech pathologists. Severity of stuttering among clinical population varied from mild to severe. None of the stutterers had any other problem.

The following vowels and syllables were used as auditory and visual stimuli:

/ a, e, i, u, o, ga,ta, da, ta,da, pa,ba /.

The above-mentioned 12 speech sounds and syllables were recorded on a sony-C-90 cassette using philips tape recorder (2218). An interval of 10 seconds was given between each stimulus. The same 12 vowels and syllables written boldly in Kannada on flash cards which served as visual stimuli.

Procedure

Auditory Stimulus : The subjects were instructed in Kannada as follows :

> "Now you are going to hear few speech sounds like : a, i, o, ga, pa, ba / from the tape recorder. As soon as you hear repeal it loudly and as quickly as possible."

Two philips tape recorders (2218) were used to conduct the experiment. The tape recorders were kept 2 ft. away from the subjects. From one tape recorder the pre-recorded auditory stimulus war presented and the subject asked to respond as stated above. Both the auditory stimulus and the subjects' response were recorded on the same tape using another philips tape recorder.

Visual Stimuli: "Now you are going. to see some flash cards with letters like : / a, i, u, ga, pa, ba / on it. As soon as you see the card read it loudly and as quickly as possible.

The flash cards were presented to the subject by placing the cards on the table with a bang sound. The subject was . asked to read the syllable written as in the card which were taken as responses Both the bang with the presentation of visual stimulus and subject,s response were recorded on the same cassette tape using philips tape recorder (2218). The bang served as stimulus presentation signal.

The auditory and visual stimuli sets were randomly presented to subjects to avoid order effect.

The analysis of reaction time was done using pitch analyzer (PM-1OO) which displays frequency and intensity on "Y" axis and time (In centi seconds) on "X" axis.

The signals recorded on the tape consisting of the stimulus and responses were fed to **PM-100.** The duration between the end of the stimulus and the beginning of the response was measured. This was considered as "Reaction time". Thus, the reaction times were obtained for all the subjects.

Results and Discussion

Table I indicates that stutterers as a group have taken more time to respond both to the visual and auditory stimuli : and stutterers have also shown greater variability in terms of reaction time which is evident from the S.D. scores. Further both normals and sutterers have taken, more time to react to visual stimulus than the auditory stimulus. The statistical analysis using ' Significance of mean difference (for small independent groups) tests has also revealed that there was significant difference in terms of reaction time etween normals and stutterers. Adams and Hayden (1976), Venkatagiri (1981) reported that both stutterers and non-stutterers showed greater variability in terms of reaction time. However in the present study only stutterers showed greater variability (S.D. 194-6 and 222-4 m.sec).

TABLE I. The mean reaction time in Normals and Stutterers for auditory and visual stimuli

		REACTION TIME	
		Auditory	Visual
Normals	Mean	252 m.sec.	518.2 m.sec.
	S.D.	69.4	99.5
Srutterers	Mean	391.2 m.sec.	844.5 m.sec.
	S.D.	194.6	222.4

The present study has shown that the stutterers axe significantly slower, in initiating phonation. Thus the findings of the study are in agreement with the above-mentioned reports.

Stutterers have been found to be faster in initiating whispered /a/ than voiced /a/whereas the normals have shown no significant difference between these two tasks (Venkatagiri 1981).

Thus most of the studies indicate delay in initiating phonation in stutterers when compared to normals. The findings of present study also confirm this.

It is interesting to note that the stutterers have shown greater delay in responding to visual stimulus than in responding to auditory stimulus in the present study. Starkweather *et al.* (1976) have found that stutterers were significantly slower in producing syllable- than non-stutterers in response to visual stimulus.

The study was started with the assumption that the stutterers would show greater delay in responding to auditory stimulus than to visual stimulus, as literas ture regarding stuttering has indicated that the auditory functioning in stutterer- is different from normals. But. in the present study the reverse has been found that is, stutterers have shown greater. delay in responding to visual stimulus than in responding to auditory stimulus. However, it must be noted that normals have also taken more time to react to the visual stimulus than to the auditory stimulus.

Thus it can be concluded that the stutterers are slower in responding to both visual and auditory stimulus and the response to visual stimulus is much more delayed than the auditory. This warrants further studies in this regard.

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