

The Effect of Stimuli With And Without
Time-Out On Stuttering

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CERTIFICATE

This is to Certify that the dissertation entitled
"The effect of stimuli with and without time-out
on Stuttering" is the bonafide work in partial ful-
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CERTIFICATE

This is to certify that this dissertation
has been prepared under my supervision and
guidance.


(N.P. Nataraja)
Guide.

DECLARATION

This dissertation is the result of my own study undertaken under the guidance of Mr. N.P. Nataraja, Lecturer in Speech Pathology, All India Institute of Speech and Hearing, Mysore, and has not been submitted earlier at any University for any other diploma or degree.

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CHAPTER IINTRODUCTION

Ammons, right back in 1700, proposed that stuttering was a habit disorder and named it 'hesitentia'. Many other including Alexander Melville Bell (1853) and Wolpe (1958) have also proposed that stuttering is a learnt behavior.

Blumel (1935) viewed stuttering as a conditioned reflex and proposed the two - factor theory.

Following these were the investigators who applied the different learning theories to explain stuttering.

Brutten and Shoemaker (1967) explain stuttering based on Mowrer's principle. They combine both classical and operant conditioning to explain stuttering. They consider that repetitions and prolongations which form the core of stuttering, are precipitated by classically conditioned negative emotion. Certain actions and behaviors are learnt in order to escape from and to avoid these disruptions. These are instrumental responses which create a desirable consequences i.e., decrease in the disruptions followed by lessening of punishment which in turn reduces the negative emotion. These favourable consequences thus reinforce the avoidance behavior.

Flanagan, Goldiamond and Asrin (1959) considered stuttering as operant responses which have the characteristics of being controllable by ensuing consequences.

Shames and Sherrick (1963) view stuttering as emerging from normal non-fluencies. Normal nonfluencies according to them, may be due to vocal behavior emitted by the infants during speech development. They get extinguished if they don't produce any noticeable consequence. But if they are followed by desirable consequences such as parental attention, they get positively reinforced and therefore, the behavior increases when these disfluencies are pushed, the child tries to avoid them. This avoidance behavior provides the child with a double reward. It helps the child to maintain fluent speech atleast for some time (this is positive reinforcement)

This fluent speech gives a relief from punishment. Thus the avoidance behavior though unwanted, gets reinforced because of the desirable consequence it provides.

The aforesaid authors have not only explained stuttering based on learning principles, but have also emphasized upon the use of learning principles in therapy.

Brutten and Shoemaker recommended the use of deconditioning

or counter conditioning for the reduction of primary behavior and the use of negative practice to eliminate secondaries of stuttering.

Punishment has been more often used in stuttering therapy than rewards or positive reinforcements. Pioneers in manipulating stuttering with shock were Van Riper (1937) and Frick (1951). Both of them reported an increase in disfluency when it was punished. Later Goldiamond et al (1958) reported that, in their experiments stuttering behavior was reduced when a loud sound was made contingent on it. A series of studies have been done, and more are being reported on manipulating the stuttering behavior with various types and schedules of reinforcements. Recent studies on the effect of stuttering contingent shock have shown that it reduces stuttering behavior (Martin and Siegel, 1966; Quist & Martin, 1967; Curlee & Perkins, 1967; Vishwanath 1972), Delayed auditory feedback has also been reported to decrease stuttering (Nessel 1958; Soderberg 1959; Adamczyk, 1959; Neeley; 1961; Chase, Sutton & Rapin, 1961; Logne, 1962; Goldiamond, 1965; Gross and Nothanson, 1967)

Haraldson, Martin and Starr (1968) have used time-out as a 'punisher' for stuttering and they report a decrease in stuttering when time-out is made contingent on stuttering.

Response-cost has also been used as a punisher for stuttering, decrease in stuttering has been reported (Halvorson, 1971). recently Verbal stimuli have also been used to manipulate stuttering behavior (Quist & Martin, 1966; Martin & Siegel 1966; Cooper, Cady and Robbins, 1970).

Afrin and Holz (1966) view punished as one which brings about a reduction in the occurrence of the behavior that is punished. Martin and Siegel, also follow the same definition. According to Brutten and Shoemaker (1970) punishment is any aversive stimulus that brings about an increase in the frequency of disfluencies.

Martin and Siegel (1966) reported that frequency of stuttering can be manipulated by response contingent presentation of an aversive stimulus. Introduction of response contingent shock results in an almost total reduction of stuttering behavior. Removal of shock was followed by a return to base rate frequency.

They also report that if the response which is punished is told, a specific response alone can be removed amidst a variety of such responses.

They conclude that Frick and Van Riper obtained contradictory results because they used the shock non-contingently.

Dattatreya (1973) has also reported that random presentative of shock has no significant effect on stuttering. Viswanath (1972) also reported of results similar to that of Martin and Siegel (1966).

Punishment as a reinforce has been criticized and it is held that it has a temporary effect. Studies by Skinner (1938) and Estes (1944) demonstrated that the suppression effect of punishment is temporary. Results of Flanagan, Goldiamond and Asrin (1958), Martin and Siegel (1966) and Quist (1966) studies with stutterers are consistent with the temporary suppression hypothesis. One reason frequently advanced to support the objection to using punishment as a method of manipulating behavior is that the individual delivering the punishment may take on certain of the aversive properties of the punishing stimulus.

Martin and Siegel (1966) also report that verbal punishment, "not good" and reward, "good" may be used to reduce stuttering. Effect of verbal reward and punishment such as "right" and "Wrong" on the speech of 24 normal speakers (12 males and 12 females), was reported by Strassis (1961). Though both groups were affected, males showed more disfluencies. Cooper, Cady and Robins (1970) studied the effect of three verbal stimuli "wrong" "right" and "tree" on the speech

of 14 stutterers and 14 non-stutterers. They did not have a differential effect on the disfluencies of either group. Therefore the affective content of disfluency contingent verbal stimuli may not be a significant factor in any change of disfluency rate. The author conclude that as Wingate (1959) and Daly and Cooper (1967) have noted, "we may actually be calling for the speaker's attention to the disfluencies which reduce the disfluencies" (Cooper et al, 1870). Vijaylakshmi (1973) found that the three verbal stimuli "Good", "no" and "sehu" showed no differential effect on stuttering. She also concluded that the decrease observed in stuttering may actually be a result of "high lighting" of disfluencies. Time-out refers to a procedure where all stimuli that are known reinforcers of a behavior are removed contingent on the behavior to be reduced. this time-out from positive reinforcement is usually instituted for a brief period and then the reinforcing stimuli are presented. Time-out procedures with stutterers have been designed as time-out from talking. That is when the stutterer omits a disfluency he is required to stop talking immediately and remain quiet for a brief period of time before he may continue speaking.

The first reported use of response contingent time-out from speaking was by Haraldson, Martin and Starr (1968). The

rationale was based on the notion that speaking is "self reinforcing". Thus response contingent cessation of speaking would result in a reduction in stuttering.

Subsequent research with adults (Martin and Haroldson, 1969; Adams and Poelka, 1971; James and Ingham, 1974) and with children (Martin and Berndt, 1970; Martin Kuhl and Haroldson 1972) supported this finding

Martin and Gavisser (1971), Haroldson et al (1968) and Egolf, Shames and Seltzer (1971) have also reported the usefulness of time-out in the reduction of stuttering.

Costello (1975) also reported that contingent time-out resulted unimportant. He also noted that the results he obtained "..... seem to provide little support for the notion that time-out from speaking primarily represents time-out from positive reinforcement".

The results of different studies which have used contingent stimulation to reduce stuttering show that the stimulus need not be aversive to bring about reduction in stuttering (Cooper et al, 1970; Vijaylakshmi. 1973). Wingate (1959)

and Cooper et al (1970) hold that any stimulus which calls the subject's attention to his stuttering will reduce his stuttering. Siegel and Martin (1968) and Siegel (1970) hypothesised that disfluencies are behaviours that "carry their own punishments" and therefore any stimulus which seems to alert speakers to these behaviours will result in response reduction.

Thus, it would be interesting to find out whether time-out reduce stuttering because it is a punisher or because the stimulus presented to indicate the occurrence of stuttering block.

Need for the study

Knowing whether stuttering reduce because of attention or because of punishment will aid in either acceptance or in the rejection of previously given explanations. If it is just highlighting of stuttering brings about a reduction in stuttering, then the main aim of the therapy would be to make the subject more attentive to his stuttering. Thus the outcome of this study would help in choosing the therapy.

Statement of the problem

The present study attempted to find out the role of the

Stimulus used to signal the time-out and the actual time-out in reducing the frequency of stuttering.

Methodology:

Five subjects were used in this study. All the subjects under went the following four experimental sessions:

1. Light with time-out for five seconds (LTO)
2. Light with time-out for five seconds(LNTO)
3. Sound with time-out for five seconds (STO), and
4. Sound without time-out (SNTO)

An observer-experimenter was trained to note the occurrence of stuttering and also to present the pre-determined stimuli.

All the data were analysed using suitable statistical tests.

The purpose of the study

The purpose of the study was to test the following hypothesis:

Main Hypothesis: There will be no difference in the occurrences of stuttering under the conditions of time-out

Contingent to stuttering and when only signal is used contingent to stuttering. (Signal refers to the stimulus used to point the occurrence of stuttering and to start the time-out)

Sub-hypotheses are:

1. There will be no effect of light with time-out on frequency of stuttering when the light with time-out is presented contingent to stuttering:
2. There will be no effect of light without time-out on frequency of stuttering when the light without time-out is presented contingent to stuttering:
3. There will be no effect of sound with time-out on frequency of stuttering when sound with time-out is presented contingent to stuttering;
4. There will be no effect of sound without time-out on frequency of stuttering when sound without time-out is presented contingent to stuttering:
5. There will be no difference between the conditions when light with time-out and light without time-out are made contingent to stuttering.

6. There will be no difference between the conditions when sound with time-out and sound without time-out are made contingent to stuttering:

Limitations are the study:

1. Only five male stutterers were studied.
2. The presentation of the stimuli was limited to two five minute sessions.
3. The severity of the stuttering was not controlled.
4. The therapies that the subjects previously had undergone were considered as a variable (However, no subjects and undergone therapies based on conditioning principles).
5. Only the primary behaviours of stuttering were considered.
6. Only reading situation was considered.

Definitions

1. Stuttering

"The term stuttering means -I (a) Disruption is the fluency of verbal expression, which is (b) characterized

by involuntary, audible or silent, repetitions or prolongations is the utterance of short speech elements, namely, sounds, syllables, and words of one syllable. These disruptions (c) usually occur frequently or are marked in character and (d) are not readily controllable. II sometimes the disruptions are (e) accompanied by accessing activities involving the speech apparatus, related or unrelated body structures, or stereotyped speech utterances. These activities give the appearance of being speech-related struggle. III Also, there are not infrequently (f) indications or report of the presence of an emotional state, ranging, from a general condition of 'excitement' or 'tension' to more specific emotions of a negative nature such as fear, embarrassment, irritation, or the like (g) the immediate source of stuttering is some incoordination expressed in the peripheral speech mechanism; the ultimate cause is presently unknown and may be complex or compound" (Wingate, 1964).

2. Signal with time-out

Is defined as the presentation of the stimulus (light/sound) contingent upon stuttering and making the subject stop reading as long as the signal (here, the signal will be on for five seconds) is on as per the prior instructions.

3. Signal without time-out (Highlighting)

Is defined as the presentation of the stimuli (light/sound)

contingent upon stuttering and making the subject not to stop reading, without making the subject aware of the association between signal and stuttering block, directly prior or during the experiment.

CHAPTER - II

REVIEW OF LITERATURE

"Stuttering is a baffling disorder for both client and clinician. It is amazing that such an ancient, universal and obvious human problem should defy precise description; despite countless scientific investigations, the basic nature and cause of stuttering remain a mystery".

(Emercik and Hatten, 1974)

Many have attempted to explain the phenomenon of stuttering, to find out the causative factor/s and treatment. As a result there are a variety of definitions and theories. Hegde (1976) has grouped the definitions into five different categories:-

1. Perceptual - judgemental definitions that restrict

the term stuttering to certain forms of disfluencies:

- (2) Experimental - theoretical definitions that also restrict the term to certain forms of disfluencies:
- (3) definitions that do not consider disfluencies to be crucial, and are based on avoidance behaviours;
- (4) definitions in terms of unspecified molar moment: and
- (5) definitions couched in terms of hypothetical variables".

Wingate's (1964) and Ven Riper's (1971) definitions cases under the first category. According to Wingate,

"The term stuttering means I(a) Disruption in the fluency of verbal expression, which is (b) characterized by involuntary, audible or silent, repetitions or prolongations in the utterance of short speech elements, namely; sound, syllables, and words of one syllable. These disruptions (c) usually occur frequently or are marked in character and (d) are not readily controllable.

II . Sometimes the disruptions are (e) accompanied by accessory activities involving the speech apparatus related or unrelated body structures, or stereotyped speech utterances. These activities give the appearance of being speech-related struggle.

III. Also, there are not infrequently (f) indications or report of the presence of an emotional state, ranging

from a general conditions of "excitement" or "tension" to more specific emotions of a negative nature such as fear, embarrassment, irritation or the like, (g)the immediate source of stuttering is come in co-ordination expressed in the peripheral speech mechanism, the ultimate cause is presently unknown and may be complex or compound".

(Wingate, 1964).

Van Riper (1971) states that, "stuttering is primarily a disorder of the temporal aspects of speech not of the articulatory, phonatory, or symbolic features."

Thus a variety of definitions are used, However, for the present purpose Wingate's definition will be used. With regard to the cause of stuttering behavior several attempts have been made and are going on. The explanations offered or the so-called, "theories" of stuttering are divergent to each and many are mutually exclusive, In an attempt to integrate the theories, Ainsworth (1971) writes:

"The process of attempting to provide a way of integrating the multiplicity of ideas and facts concerning the nature and sources of stuttering continues to be frustrating and fragmentary".

Bloodstein (1975) considers different theories, as belonging to three types, as follows:

(1) "Theories of the etiology of stuttering", which "offer an account of the etiology, or so-called onset of suttering", for e.g. Johnson's disgnosogenic theory (1942);Orton-Travis theory (1927,1931).

(2) "Theories of the moment of stuttering" which are "concerned primarily with the nature of discrete instanaces of stuttering behavior". For e.g. West's (1958), Eisenson's (1958) and Glouber's(1938) concepts,

(3) "Theories that shift the frame of reference "whose basic contribution lies in " a reformulation of a previous theory, either of the etiology or of the moment of stuttering, in terms of a new frame of reference". For e.g. cybernetic models of stuttering (Hyask 1960; Lee 1951) and learning theory interpretations (Wischner, 1950, Brutten and Shoemaker, 1967 and others).

Thus there are several "theories" of stuttering the hypothesis that stuttering as an organic disorders is as old as Aristotle (384 B.C) who speculated that something wrong with the tongue.

Orton (1927), Trevis (1931) and Bryngeleon (1935) have advocated the theory of cerebral dominance, Kepp (1934) and West (1943) forwarded bio-chemical theory Eisenson (1958)

believes that in majority of cases stuttering is based on a constitutional pre-disposition to motor and sensory preservation. Repressed need theories of etiology are in line with the theories of neurosis. Barbara (1954), Glouber (1958) and others raise the question whether the stutterer typically possesses a neurotic personality and why he chooses stuttering as a symptom. On the basis of Cybernetic theory, stuttering is viewed as a result of delay auditory feedback (DAF) (Lee, 1951; Black 1951; Cherry and Seyers, 1956).

Mysek (1960) states that any disturbance in the feed back circuits of the servo system which maintains the verbal output results in stuttering.

Sheehan (1958) looks at stuttering as "Approach -avoidance conflict". Stuttering is the result of a conflict between opposing drives - the desire to speak and the fear of speaking. Wischner (1950) views, "Stuttering as an instrumental avoidance response reinforced by anxiety reduction". According to him, " any pain producing or punishing state of affairs, which is elicited by the environment as a response to a child's behavioral pattern may serve as the original instigator to the acquisition of stuttering behavior." Wischner based his formulations mainly on two observations namely, adaptation effect

and phenomenon of expectancy or anticipation, which he equated with anxiety.

Researchers have been studying the laryngeal; phonatory and articulatory dynamics during stuttering. According to Schwertz (1974) the disorder is delayed contraction of the PCA muscle in response to the subglottal pressure required for speech. Zimmerman (1980a, 1980b, 1980c) finds stuttering as disordered articulatory movement patterns associated with perceptually judged disfluencies.

Shames and Sherrick (1963) believe that non-fluency which later leads to stuttering, is an operant behavior -because it appears to be shaped by environmental circumstances. Bratten and Shoemaker (1967) view that "stuttering as classically conditioned disintegrative emotional arousal." Their "two factor theory" states that fluency failures are a function of negative emotion that has associated with speech and speech related stimuli through a process of classical conditioning.

Thus, different "theories" are in existence. Based on their own theories, several have advocated different therapies for stuttering. For example: Van Riper's cancellations, Pullouts, and preparatory sets; Johnson's perceptual and evaluative re-

orientation; Bryngelson's voluntary stuttering and objective attitude. Psychodrama (Travis, 1957); Desensitization therapy (Van Riper, 1972); Filial therapy (Andronico and Blake, 1971); Drug therapies (Gutzman, 1954; Kent 1961; Hale 1951).

Behavior therapy procedures such as:-

Systematic desensitization (Wolpe, 1958); Fluency reinforcement procedure; Token economy procedure (Anderw & Inghen, 1972a, 1972b); Prolongation and DAF (Goldamond, 1965) Modification of thematic content (Shames et al 1969), Operent conditioning procedures, which employ contingent application of punishing stimuli such as shock, noise, verbal reprimands, response cost and recently time-out from speaking.

Punishment and stuttering:

Several studies have been conducted to find out the effectiveness of punishment. (Siegal 1970) writes that, "Punishment is accorded a prominent place in most contemporary theories is attempts to explain both the origin and persistence of stuttering behavior".

The application of punishment procedures to the problem of stuttering is of great interest. The effect of punishment

on stuttering behavior has been a controversial issues. (Martin et al 1968; Siegal, 1970; Fowler, 1971; Brutten & Shoemaker, 1970; Shemes and Egolf, 1976). This has been the subject of study since Thorndike's (1933) original statements of his law of effect.

The controversy between two group of workers, Martin et al (1968) and Brutton and Shoemaker (1970) can be summarized as follows: "Martin et al hold that stuttering defined molerly as dye fluency or in terms of molsculer components (repetition and prolongation of sounds and syllables) will decreases according to the negative law of effect. However, Brutten & Shoemaker maintain that different molecular response in molar moment has different causes under punishing coditons. More specifically they state that repetitions and prolongations of sounds and syllables increase in frequency when they are punished but other responses (Secondary behaviours) decrease according to the negative law of effect. This is because repetitions and prolongations and hypothesized to be directly caused by conditions negative emotion (which increase under punishing conditions) whereas the other behaviors are hypothesized to be escape or avoidance instrumental behavior "(Viswanath, 1972). Thus, the controversy is with regard to the predicted effect of punishment on one class of responses. But the supportive evidence

for either position is less and conflicting. Viswantha (1972) studied the effect of response contingent negative stimulation on selected responses in a moment of stuttering. Stuttering decreased significantly when punished. Repetitions of sounds and syllables did not exhibit a tendency toward increase when punished. They either decreased or were unaffected. The findings were contrary to the claim made by Brutten and Shoemaker that the repetitions and prolongations increase when punished and supported Martin's (1968) position.

Hegde (1971) applied shock contingent to stuttering while reading. Each subject had shock and no shock conditions. In all subjects more stuttering was evidenced during shock than in its absence. And subjects reported that the shock evoked anxiety.

Bharath Raj (1974) used shock as aversive stimulus contingent on stuttering and reported a decrease in stuttering.

Dattatreya (1973) investigated the effects of three schedules of negative stimulation on 8 stutterers. The three schedules were continuous contingent, random contingent and random negative stimulation.

The responses stimulated were repetitions and hesitations in one subject. the results showed that:

1. Both the continuous contingent and random contingent

negative stimulation decreased stuttering.

2. Random negative stimulation did alter the stuttering responses significantly.
3. There were no significant differences between the effects of continuous contingent and random contingent negative stimulations.

Vijaylakshmi (1973) selected the fluency aspect of the stutterer's verbal behavior as the responses for contingent reinforcement.

'Good', 'No' and 'Zehu' were the three verbal reinforcers.

Eight subjects were taken and 100% schedule of reinforcements was adopted. The data revealed that there is a significant effect of these stimuli on fluency. All the three stimuli were equally effective. Five subjects should showed a decrease in stuttering for all the three verbal stimuli. The results of this group of subjects was explained on the basis of the highlighting hypothesis advanced by Siegal and Martin (1968). And insufficient highlighting was offered as a possible explanation for the maintenances of stuttering. Other three subjects showed an increase in stuttering for one or more of the stimuli. "Subject 3 showed on increase in stuttering for 'Good', Subject 5 for 'no' and subject 8 for both 'Good' and 'No'. Possible explanations for

these results could not be provided". This discrepancy in the results suggested" that all the stutterers cannot be lumped together solely on the basis of their stuttering behavior and that other relevant factors in the stutterers should be examined". In general, she concluded that stuttering can be reduced by 'highlighting' fluency.

Time-out and stuttering behaviors:

"Time-out refers to procedure where all stimuli that are known reinforcers of a behavior are removed contingent on the behavior to be reduced. This time-out from positive reinforcement is usually instituted for a brief period and then the reinforcing stimuli are presented ". (Costelle 1975). Time-out procedures with stutterers have been designed as time-out from talking. That is when the stutterer emits a dis-fluency, he is required to stop talking immediately and remain quiet for a brief period of time before he may continue speaking. Therefore, this procedure assures that speaking is reinforcing for the speaker and that the interrupting of speaking functions as an aversive event.

The first reported use of responses contingent time-out from speaking was by Heroldson, Martin and Sterr (1968). In their study, 4 adult stutters spoke spontaneously and a red light was illuminated for 10 seconds contingent upon each stuttering block. Subjects were required not to speak while the light was on. The results showed that stuttering decreased markedly in all the subjects during the time-out sessions. The rationale was based on the notion that speaking is "self-reinforcing". As Heroldson et al (1968); Martin and Haroldson (1969) speculated:

"Speech is a system of behavior chains; and that these chains are maintained, in part, by some form of self-reinforcement. Theoretically, execution of speech chain produces internal stimulation, when a speech unit is reinforced by the environment, the response-produced, stimuli are pointed with the primary reinforcers and take on reinforcing properties of their own. At a letter time, presence of the response-produced stimuli alone is sufficient self-reinforcement to maintain the speech chain. Also removal of the response-produced stimuli is an aversive event".

Previous research had shown that "time-out" from positive

reinforcement would serve as a punisher in a variety of situations for both animals and human (Leitenberg, 1965; Azrin and Helz 1966) Based on these Haroldson et al (1968) predicted that response contingent cessation of speaking would result in a reduction of stuttering. Further, they state that:

"With regard to stuttering atleast, time-out appears to function as a punisher in much the same way as shock, or loud tone. It seems reasonably clear that time-out produces a reduction in stuttering equivalent to that obtained with shock or loud tone, and some what greater than with the word 'Wrong (Quist, 1966). On the other hand the date suggest that perhaps the suppression effects of time-out do not extinguish as rapidly as they do with shock, noise or 'Wrong'".

Subsequent research with adults (Martin and Heroldson, 1969; Adams and Popelka 1971; James and Ingham 1974; Costelle, 1975) and Childern (Martin and Berndt, 1970; Martin et al, 1972) supported the findings of Heroldson et al (1968).

Curles and Perkins (1969) combined the DAF technique and the time-out procedure and developed a therapy technique called 'conversational rate-control therapy'. Their preliminary results

suggest a decrease in stuttering with this technique.

Martin, Kuhl, and Haroldson (1972) used time-out with the pre-school children. Each child had weekly conversations with suzybelle, a puppet whose voice was provided by a speech therapist through an electronic connection in an adjoining room. During periods of time-out, the puppet was not visible and did not talk with the child for 10 seconds contingent on each stuttering. In both children stuttering reduced markedly and a one year follow-up showed only a few stuttering in each case.

Kruse (1974) studied the experiments effect on stuttering during self-administered time-out punishment. 4 groups of 6 subjects each were exposed to the presence and absence of 2 experimenters during 3 conditions: Pre-experimetal base rates, self-administered time -out punishemente (saTOP), and Post-experiemental extinction. The results showed that experimenter presence during saTOP significantly decreased stuttering, whereas experimenter presence during base rates significantly increased stuttering.

Hasabrouck and Martin (1974) compared time different schedule of time-out for disfluency. 40 normal speakers received 100% time-out contingent on disfluencies, then half the subjects continged on 100% time-out, while other half received time-out on

on a 25% variable ratio schedule. Sessions consisted of 7 conditions, each each 8 minutes long: Base rate; conditioning 1 through IV; and extinction I and II. Results indicated that differential effects during conditioning and extinction due to different schedules of stimulus presentation.

Hasebrouck and Martin (1975), examined the dyfluencies of 4 normal young children under (1) base rate, where subjects delivered messages to a listener, (2) timed base line, where time for message delivery was reduced, (3) added time, where additional time was allowed contingent on dysfluency, and (4) time-out, where communication time was eliminated contingent to stuttering. Time-out reduced dysfluency in all subjects, added time increased dysfluency in 2 subjects, and timed base line temporarily increased disfluency in 2 subjects and reduced disfluency in one.

A time-out group, was used in therapy by Egolf, Shames and Seltzer (1971). 10 male stutterers ranging in age from 20 to 52, attended a 90 minute session once in a week. Time-out procedures were introduced when the group involved in a social activity. The effects of the group time-out procedure were measured in terms of number of words uttered and number of seconds the elapsed until a subject stuttered. The results showed that, for the 10 subjects, there were significant difference in no

time-out conditions from time-out conditions . Further, they conclude that the severe (high frequency of stuttering) stutterers did not do as well as mild (low frequency of stuttering) stutterers with the time-out procedures.

James and Ingham (1974) investigated the influence of stutterer's expectancies of improvement upon the efficacy of responses-contingent time-out from speaking . 14 stutterers were exposed to 4 conditions; base rate; time-out + enhanced expectancies of improvement, base rate, and time-out + lowered expectancies of improvement. Subjects expectancies were manipulated by the administration of a placebo and instructions. Results indicated that time-out produced significant reductions in stuttering under both expectancy conditions. And thus the efficacy of the procedure under one condition was not significantly different from its efficacy under the other .

Costelloe (1975) in her three case study using time-out reported reductions in stuttering. A base line - time-out-reversal format was used. During the time-out condition the experimenter listened to the subjects speech as long as he was fluent and showed interest in his conversation. When he stuttered, the experimenter said ' Stop and looked away for 10 seconds and asked to continue speaking after 10 seconds. The improvement in

the speech was long-standing. She states that the use of these time-out procedures even though based on punishment contingencies was not emotionally unpleasant or aversive to the cases. She explained the reductions in stuttering on the basis of "highlighting" hypothesis offered by Siegel (1970).

Adams and Popelka (1971) questioned eight stutterers who had served as subjects in a study of the effect of time-out from speaking and found that six had failed to perceive the time-out as punishment. They evaluated time-out as a chance to relax. In James and Ingham's (1974) study this reaction was not common, but only six of the 14 subjects evaluated the time-out in terms suggesting unpleasantness. On the other hand Martin and Geviser (1971) showed that time-out was aversive enough so that normal speakers engaged in a free-choice button pressing activity during spontaneous speech learned to avoid the button that signaled time-out from speaking and to press the one that did not signal time-out.

The duration of time-out in most of the studies was 10 seconds. However, Martin and Geviser (1971) employed time-out of 7 seconds and there is a clinical evidence that periods of 30 seconds may facilitate control over stuttering (Curlee and Perkins, 1969). James (1976) studied the influence of duration on the

effects of time-out from speaking. 45 subjects were divided into 5 groups of which one group received no time-out while the other four groups received time-out of 1; 5; 10 and 30 seconds respectively. Each group received time-out of a particular duration only.

The time-out was indicated by using 290 Hz tone at 65dB.

The results showed that response-contingent time-out from speaking of all durations resulted in significant reduction in stuttering frequency. Control group (no time-out) showed no change. However, longer durations tended to bring greater reductions in stuttering frequency. No reliable differences between time-out durations were found. Author concluded that:

"the punishing effects of time-out from speaking procedure were predominantly due to its involving contingent interruption of speaking and that the actual duration of the period of silence was comparatively unimportant",
He also notes that results he obtained "----- seem to provide little support for the notion that time-out from speaking primarily represented time-out from positive reinforcement".

Henson (1978) studied the effects of contingent light-flesh

on stuttering and attention to stuttering. Two adult female stutterers were subjects. Attention was measured by asking the subject to depress a switch each time they detected that they stuttered. For one subject, the contingent light flash produced a marked decrease in stuttering, but had no effect on switch pressing, for the other subject, light had little effect of stuttering but results in an in switch pressing. For both the subjects, reductions in stuttering occurred when they were asked to note their stuttering by pressing the switch. The results suggested that the effect of light-flash on stuttering was due to the role to its calling attention to stuttering.

Thus the review of literature indicates that the several studies have shown that stuttering frequency may be experimentally reduced by contingent application of a variety of presumably aversive stimuli. Among the effective stimuli are: a loud tone; an electric shock; the words " not good" or "wrong"; time-out from speaking . Other studies have shown that certain stimuli that appear to be qualitatively non-aversive mayalso decrease stuttering. For example: Wingate (1959) found that the contingent registration of a point on a counter was sufficient to produce stuttering reductions. Similarly Cooper et al (1970) reported that the stimulus words 'right' and 'tree' were as effective as

the word "wrong" in contingently punishing the disfluencies of stutterers.

A question would arise that, why should aversive and non-aversive stimuli produce similar effects on stuttering? One possibility considered by Wingats (1959) and Cooper et al (1970) is that any stimulus which calls the subject's attention to his stuttering, will reduce his stuttering. Siegel and Martin (1968) and Siegel (1970) offered a similar, but more elaborate hypothesis with respect to the punishment of disfluencies in normal speakers, They reasoned that disfluencies may be behaviors that "Carry there is own punishments" and that any stimulus which serves to high light or alert speakers to these behaviors, will results in response reduction.

Thus different explanations have been offered to explain the reduction in stuttering when it is contingently paired with a stimulus. Several studies have indicated that the reduction is stuttering when time-out was made contingent with stuttering. All the studies reported, have used some kinds of signal either sound or light flash. Thus, in all these experiments two factors were involved when time-out was administered; (1) signal indicating the occurrence of stuttering and (2) time-out from

speaking.

Goldiamond (1965) Lacroix (1973) and Hanson (1978) have reported reduction of stuttering when the subjects were asked to note stuttering. There are similar reported reporting reduction of stuttering when the stuttering behavior is highlighted (Vijalakshmi, 1973; Costello, 1975; Hanson, 1978). Therefore, it is difficult to attribute reduction in stuttering, only to time-out from speaking, when time-out is made contingent on stuttering behavior. That means the reduction in stuttering may be due to highlighting of stuttering behavior, also (Siege 1970). Thus it remains unclear whether the reduction in stuttering is because of the highlighting by presentation of a stimulus to signal time-out or actual time-out from speaking or both. The present study makes an attempt to note the role of stimulus used to signal the time-out and the actual time-out in reducing the stuttering behavior.

CHAPTER - III

METHODOLOGY

The following experiments were conducted to determine the role of response contingent-time-out and highlighting .

For this purpose it was decided to use light and buzzers tone as stimuli to signal the time-out and time-out for five seconds, under the following four conditions:-

1. Light with time-out (LTO)
2. Light without time-out (LNTO)
3. Sound with time-out (STO)
4. Sound without time-out (SNTO)

All the experiments were conducted in one of the quiet-rooms of Speech laboratory of All India Institute of Speech and Hearing, Mysore.

Subjects:

Five male stutterers were taken from a clinical population of the Institute. Subjects age, ranged from 13 Years to 23 years. All subjects were college students except one who was in Tenth standard. The criteria for selection of subjects were:-

1. The Stuttering behavior should include the repetitions and /or prolongations and may include any other responses(s) like hesitations and interjections.

1. The subject should be able to read the stimulus material in Kannada language for complete 30 minutes.
2. Subject must be willing to participate in the study.

Selection of Responses :

Easily identifiable and frequently occurring responses were chosen. The two chosen responses were : (1) Repetitions of sounds and syllables and (2) Prolongations. In one subject's repertoire interjections of sound were most frequent. Hence that response was selected in his case.

Observer-experimenter:

In order to minimize the possible investigator's Bias, one post- graduate student in Speech and Hearing Science was chosen as the Observer-Experimenter. He was trained to, to (1) identify the selected responses, (2) to discriminate response from other response of like sort , and (3) to present the light flash or buzzer sound for pre-determined, specified duration contingent to the selected response, He was not told about the aim of the study.

Training of the Observer- Experimenter:

Following steps were taken to train the Observer- Experimenter:-

1. He was given description of various kinds of responses, including the selected responses. Wingate's (1964, 1976) definition of stuttering was used to identify and discriminate the selected responses.
2. Three record speech samples of stutterers were taken and each sample was played for five minutes. Both the Observer-Experimenter and the investigator tapped soon after the occurrences of selected responses, independent of each other. This was done to make sure that the Observer- Experimenter would identify the responses as specified by the investigator.
3. Then the same speech sample were played, with a change in the order. Both the investigator and Observer- Experimenter rated the occurrence of the selected responses in five minutes.

Each sample was rated at least twice. Thus two speech scores obtained. If the speech score obtained in the second session was not within the five percent of those obtained in the First session, the sample was rated, until the criterion of 95% correspondence was satisfied on two consecutive ratings. Besides the training of the Observer was continued until he was able to identify the stuttering blocks consistently. That is, until the difference between the two consecutive ratings was only +3. Only, then, the

Observer- Experimenter was considered trained to observe and deliver the stimulus as per the requirement of the experiment.

4. In Order to find out the reliability in the speech rating (Intra-judge reliability), the same speech samples were rated by the Observer- Experimenter after one week. It was found that speech rating was reliable. The correlation co-efficient was 0.92.

Reading material:

Subjects read the passages selected from a Kannada Book entitled. "Vyasanga Shikshaka" Volume - I. The passages selected were non-emotional and the subjects showed no difficulty in reading the given material.

Stimulus used:

The two stimuli used were light-flash and buzzer tone. These were used to indicate time-out from reading and in other experiments the same stimuli were used contingent with stuttering blocks to highlight them.

Instrumentation:

An automatic reset timer-cum-counter was fabricated at the Electro-acoustic section of All India Institute of Speech & Hearing. This instrument worked on a two-way relay system which timed for five seconds duration. When timer switch was 'on', the

timer activated and will be on for five seconds and after that it would go off. And at the same time the counter would count the number of times the switch was 'on'. When either a lamp or an electrical buzzer was connected, it was possible to prevent either light flash or tone for a duration of five seconds.

A Sonnet solid state taps recorder was used to record the reading samples of the subjects. A Weston Cassette tape recorder was used to play the recorded instructions.

Experimental situation:

The subject was seated on a chair. He was made to sit such that he will not be able to see the experimenter or the operation of the equipment. A table lamp was placed in front of the subject and the buzzer was kept two meters away from the subject. This experimental situation was maintained throughout the study for all the subjects.

Base rate Sessions:

As the study aimed at finding out the systematic variance on the occurrence of contingent stimuli (time-out/no time-out), it was necessary to note the unsystematic variance. Therefore, each subject was made to read a passage for a duration of thirty minutes in the same room/ situation where the study was conducted.

This was done on three consecutive days. The frequency of stiuuttering in each session was recorded. There wre no significant differences between them. Hence these were considered as "base rates".

Design of the Study:

The experimental sessions conducted are as follows:-

Experimetal Sessison I

Condition - 1 Contingent light flash for 5 seconds with time-out (LTO₁)

Condition - 2 Contingent buzzer tone for a second with no time-out (SNTO₁)

Experimental Session II

Condition -1 Contingent buzzertone for 5 seconds with time-out (STO₁)

Condition -2 Contingent light flash for a second with no time-out (LNTO₁)

Experimental Session III

Condition -1 Contingent light flash for a second with no time -out (LNTO₂)

Experimental Session III

Condition - 2 Contingent buzzer tone for 5 seconds
with time-out (STO₂)

Experimental Session IV

Condition - 1 Contingent buzzer tone for a second
with No time-out. (SNTO₂).

Condition - 2 Contingent light flash for 5 seconds
with time-out (LTO₂)

Thus there were four experimental sessions with two conditions in each. To rule out the order effects the balanced Latin Square design was adopted. The sequence of experimental sessions to be used for each subject was predetermined, which were as shown in the Table (1).

The Latin Square design was incorporated with the single case study model i.e., ABA₁ design. The letters stand for the three time segments successively in a condition. The first letter 'A' refers to the control segment, in which no independent variable is introduced. 'B' refers to the experimental segment wherein the independent variable is introduced. The last letter 'A' refers to the extinction segment where in the independent variable is withdrawn and thus similar to the control

Table (1): Sequence of Experimental Sessions

3.8

Sequence of sessions		1		2		3		4	
Subjects									
Av	Experiment-I			Experiment-I I		Experiment-II I		Experiment-IV	
	1	2	1	2	1	2	1	2	
	LTO ₁	SNTD ₁	STO ₁	LNTD ₁	LNTD ₂	STO ₂	SNTD ₂	LTO ₂	
K	Experiment-IV			Experiment-I II		Experiment-II		Experiment-I	
	1	2	1	2	1	2	1	2	
	SNTD ₂	LTO ₂	LNTD ₂	STO ₂	STO ₁	LNTD ₁	LTO ₁	SNTD ₁	
G	Experiment-II			Experiment-IV		Experiment-II I		Experiment-I	
	1	2	1	2	1	2	1	2	
	STO ₁	LNTD ₁	SNTD ₂	LTO ₂	LNTD ₂	STO ₂	LTO ₁	SNTD ₁	
H	Experiment-II I			Experiment-I		Experiment-IV		Experiment-II	
	1	2	1	2	1	2	1	2	
	LNTD ₂	STO ₂	LTO ₁	SNTD ₁	SNTD ₂	LTO ₂	STO ₁	LNTD ₁	
A	Experiment-IV			Experiment-II		Experiment-II I		Experiment-I	
	1	2	1	2	1	2	1	2	
	SNTD ₂	LTO ₂	STO ₁	LNTD ₁	LNTD ₂	STO ₂	LTO ₁	SNTD ₁	

segment, The differences between the 'A' & 'B' segments establishes the effect of the independent variable on the response, Whereas the difference between the 'B' & 'A₁' establishes the ongoing-effect of the independent variable.

The experimental sessions were of 30 minutes duration. Each session was divided into two halves of 15 minutes each. Each of was divided into three time segments of five minutes each, They were termed 'A', B and A₁, in succession, For example an experimental session (say I) was divided as follows:-

First half-condition-1:

A = Pre-experimental base rate	....	5 ¹
B = LTO ₁ - Light flesh with time out	.....	5 ¹
A ₁ = Post-exerimental base rate	.....	5 ¹

Second half-condition - 2:

A = Pre-experimental base rate	....	5 ¹
B = SNT0 ₁ - Buzzer without time-out	.....	5 ¹
A ₁ = Post-exerimental base rate	.....	5 ¹

Further the details of each experimental condition has been shown is Table- 1.

"EÁEÁ \ Ágiú JAZÁ °É½ZÁUÁNZÁÁ ±ÁgÁ Ár. -ÉÁ SÁZÁ
 VÁÁ NzÁ ÁÁÁÁ °. NzÁÉ, Á ÁgÁÉPA-ÉÁ °ÉÁZÁPÁEQÁÉ
 NzÁ ÁÁÁÁ °ÁAZÁ Á, ÉDAIÁÁP °Á ÁUEKEÁZÁE CEÁ ÁEÁZÁ,
 PÉ½ FUA±ÁgÁ ÁQÉÁt°É?.....

("Start reading when I say 'start'. As soon as the light
 in 'On' stop reading. You should be silent. When the light goes
 off, continue with the reading. If you have any doubts, do not
 hesitate to ask shall we start now?")

2. For the experimental condition: Sound (Buzzer tone)
 without time-out (SNTO₁ & SNTO₂) the instruction were:-

"EÁEÁ \ Ágiú JAZÁ °É½ZÁUÁNZÁÁ ±ÁgÁ °Ár °ÁÁÁ
 \ Ági' JAZÁUÁNZÁÁ ÁÁÁÁ °. °Á°ÁÁNZÁÁ ÁUÁSgÁgi ±ÁUÁÁÁÁ
 °ÁZÁ °ÁZÉ °Á°ÁPEÁÁkj".

("Start reading when I say 'Start' and Stop reading when
 I say "stop'. While reading you will hear buzzer sound in
 between").

3. For the experimental conditions: Sound (Buzzer tone)
 with time-out (STO₁ & STO₂), the instructions were:-

"EÁEÁ \ Ágiú \ JAZÁ °É½ZÁUÁNZÁÁ ±ÁgÁ Ár . °Á°ÁÁ
 SgÁgi ±ÁÁÁÁ PÉ½ZÁVÁÁ NzÁ ÁÁÁÁ ° NzÁÉ, Á ÁgÁÉPA ±ÁÁ
 °ÉÁZÁPÁEQÁÉ NzÁ ÁÁÁÁ °ÁAZÁ Á¹. CAIÁÁP °Á ÁUEKEÁZÁE
 CEÁ ÁEÁEZÁE PÉ½ ±ÁgÁ °ÁQÉÁt?....

The investigator marked after every five minutes on a copy of the reading materials which the subject was reading, and at the same time the Observer-Experimenter was told about the time. The marks gave an account of the syllable output in five minutes and also was necessary to introduce and to withdraw the stimuli. Before starting the second-half of each session, in each experimental session there was a break for two minutes. The above procedure was used for each condition of each of the experimental sessions.

QUESTIONNAIRE

At The end of the experiments i.e., on last day each subject was asked a series of questions to find out:-

1. Whether he could make-out the contingent presentation of 'light-flash/sound with or without time-out'
2. What was his reaction to the time-out periods; and
3. Whether the stimuli used in the study (light-flash and buzzer sound) was aversive or non-aversive.

of the five subjects only two subjects reported the awareness of the contingent presentation of the stimuli. Secondly four subjects failed to perceive the time-out period as punishment.

("Start reading when I say 'Start' and stop reading when I say 'Stop'. As soon as you hear the buzzer sound stop reading. You should be silent. When the sound goes off, continue with the reading. If you have any doubts, do not hesitate to ask. Shall we start now?").

4. For the experimental conditions : Light -flash without time-out (LNTO₁ & LNTO₂), the instructions were:-

"ÉÁÉÁ _ÁÓíÜ JAZÁUÁNZÁÁ ±ÁÁ^a ÁÁr. _ÁÁí' JAZÁ
 °É½ZÁUÁNZÁÁ ÁZÁÁ ±°Á. ±Á^a ÁNZÁÁ ÁUÁ^a ÁZÉ^a ÁZÉ^a ÉÁÁ SgÁÁÁÁÁÉ

("When I say 'Start' start reading and stop reading when I say 'Stop'. while reading, you will see light flashes in between").

In these instructions (1,2,3 and 4) indications as to 'why the stimuli are being presented' were not given to the subjects (Siegel, 1980).

All the subjects underwent all the four experiments. The four experimental conditions were carried out on consecutive days. That is, there was a time interval of approximately 24 hours between each experimental session, A sonnet tape recorder was used to record all the readings by the subjects in all the four experimental conditions . The counter connected to timer showed the number of times of presentation of light flashes/buzzer sounds.

The investigator marked after every five minutes on a copy of the reading materials which the subject was reading, and at the same time the Observer-Experimenter was told about the time. The marks gave an account of the syllable output in five minutes and also was necessary to introduce and to withdraw the stimuli. Before starting the second-half of each session, in each experimental session there was a break for two minutes. The above procedure was used for each condition of each of the experimental sessions.

QUESTIONNAIRE

At the end of the experiments i.e., on last day each subject was asked a series of questions to find out:-

1. Whether he could make-out the contingent presentation of 'light-flash/sound with or without time-out')
2. What was his reaction to the time-out periods; and
3. Whether the stimuli used in the study (light-flash and buzzer sound) was aversive or non-aversive.

Of the five subjects only two subjects reported the awareness of the contingent presentation of the stimuli. Secondly, four subjects failed to perceive the time-out period as punishment.

Instead they felt that time-out as a rest period; or a chance to relax. It made easier to continue with the reading. Whereas One subject who felt that time-out was a sort of punisher, wanted to lessen the number of time-out presentations. Thirdly, all the five subjects felt that the stimuli used were non-aversive.

CHAPTER IVRESULTS AND DISCUSSION

All the five subject undergone the four experimental sessions. The details are shown in the tabular form shown below:

Table 2

Details of the four experimental sessions

Sessions	Control Segment(A)	Experimental Segment(B)	Extinction Segment (A ₁)
1	Pre-experimental base-rate. Reading with no independent variable	Reading with contingent Light + rimout for 5 seconds (LTO)	Post-experiemental base rate. Reading with the independent variable withdrawn
2	Pre-experimental base-rate. Reading with no independent variable	Reading with contingent Light-flash with no time-out(LNTO)	Post-experiemental Base rate. Reading with the independent variable withdrawn
3	Pre-experimental base-rate. Reading with no independent variable	Reading with contingent sound with time-out for 5 Seconds (STO)	Post-experiemental Base rate. Reading with the independent variable withdrawn
4	Pre-experimental base-rate. Reading with no independent variable	Reading with contingent. Sound with no time-out (SNTO)	Post-experiemental base rate. Reading with the independent variable withdrawn.

Analysis of the Data

The frequency of stuttering has been expressed in terms of percentage of syllables stuttered (% of S.S.) using the formula:-

$$\% \text{ of S.S.} = \frac{\text{Number of blocks in a given duration}}{\text{Syllables out put in a given duration}}$$

This was done to overcome the effect of reading rate or syllable out-put in the given time on the frequency of stuttering.

Statistical Analysis

The data were analyzed using two different non-parametric statistical tests: (1) Wilcoxon matched-pairs signed ranks test and (2) Walsh test (Siegel, S, 1956).

The Wilcoxon matched-pairs signed-ranks test was used to test the stability of base rates. The A and B segments of the last base rate session were compared to find out whether there was any significant difference between the 2 segments. The base rates were stable as per the statistical analysis. Table 3 shown the stability of base rate.

Table 3

Results of the Wilcoxon test testing
the stability of base rate

Subjects	N matched pairs	Table G Values	Observed T values
Av	7	2	10
K	9	6	23
G	7	2	7
N	8	4	9
A	10	8	19.5

H_0 = There is no difference between the scores of the segment A and B of the last base rate sessions.

H_1 = There is difference between the two segments.

H_0 = Gets rejected when observed 'T' values is less than/equal to the value in the table G for N matched pairs.

H_0 is accepted at 0.05 level.

Walsh test was used to find out the effect of the stimulus (light and sound) with and without time-out on stuttering. For this purpose all the five subject considered as a group.

Effects of 'time-out' and 'high lighting' have been analyzed separately in the following way:

1. Effects of light with time-out (LTO)
2. Effects of light with no time-out (LNTO)
3. Effects of sound with time-out (STO) and
4. Effects of sound with no time-out (SNTO)

1. Effects of Light with time-out (LTO)

The results of this experiment are shown in table 4.

The inspection of the table shows a reduction in stuttering in condition B, i.e., when the light with time-out was introduced, in two subjects, whereas there is an increase in stuttering in 3 subjects. However, a statistical analysis shows a difference between conditions A and B. When condition A is compared with condition B. Thus the subhypothesis 1, that is, there will be no effect of light with time-out on stuttering is rejected.

Table 4Effects of light with time-out (LTO)

Subjects	A	B	A ₁	A-B (d)	B-A ₁ (d)	A-A ₁ (d)
Av	2.19	1.89	1.63	0.30	0.26	0.56
K	7.87	7.56	5.15	0.31	2.41	2.72
G	5.71	6.26	4.72	-0.55	1.54	0.99
M	4.21	5.82	4.28	-1.61	1.54	-0.07
A	6.07	8.15	7.14	-2.08	1.01	-1.07

Table H shows that for N= 5 the two tailed test for H₀, that M≠0 at 0.062 level is d₁ greater than 0

By comparison with A vs B : H₀ rejected

By comparison with B vs A : H₀ rejected

By comparison with A vs A₁ : H₀ rejected

Therefore there is difference in all case: H₀ rejected

Table 5Effects of light without time-out (LNTO)

Subjects	A	B	A ₁	A-B (d)	A-B (d)	A-A ₁ (d)
Av	1.74	1.89	2.09	-0.15	-0.2	0.35
K	5.01	4.12	4.37	0.89	-0.25	0.64
G	5.30	5.51	5.75	-0.21	-0.24	-0.45
M	3.96	4.17	4.17	-0.21	0	-0.21
A	7.36	8.51	6.79	-1.15	1.72	0.57

Table H shows that for N=5, the two tailed test for H₀, that M≠0 at 0.062 levels is d₁ greater than 0

By comparison with A vs B : H₀ rejected

By comparison with B vs A : H_0 rejected

By comparison with A vs A_1 : H_0 rejected

Therefore there is difference in all cases : H_0 rejected.

Further, the comparison of condition B with condition A, shows a reduction in stuttering in all the five subjects. A statistical analysis also shows a significant difference between condition B and A.

A comparison of pre-and post experimental conditions (A Vs A_1) shows a reduction in stuttering in 3 subjects and a slight increase in stuttering in 2 subjects. However, statistically, there is a significant difference between conditions A and B.

Thus, it may be concluded that there is an effect of light with time-out on stuttering, when it is made contingent with stuttering i.e., there is an increase in stuttering under condition B, when light with time-out is made contingent.

2. Effect of Light without time-out (LNTO)

Table 5 depicts the results of this experiment. A comparison of conditions A and B shows that there is an increase in stuttering in 4 subjects under condition B. Only one subject showed a decrease in stuttering.

Condition B and A_1 , when compared, show an increase in stuttering in 3 subjects and decrease in one subject, and remained unchanged in one subject. 3 subjects showed an

increase in stuttering and 2 subjects showed a decrease in stuttering when conditions A and A_1 , are compared.

However, a statistical analysis, comparing A with B, shows that there is a significant difference between the two conditions. Thus the sub hypothesis 2, that is, there will be no effect of light without time-out is rejected, i.e., there is an increase in stuttering, under condition B, when light without time-out is made contingent upon stuttering. Statistical consideration of conditions B and A_1 also shows a significant difference between the two. That is, there is an increase in stuttering under condition A_1 . Further a comparison of condition A with A_1 , statistically, shows a difference between the two i.e., there is an increase in stuttering under post experimental condition when compared with pre-experimental condition, Thus it may be concluded that there is an increase in stuttering when light without time-out is made contingent with stuttering.

3. Comparison of results of experimental session I (LTO) and 2 (LNTO)

To know the effect of light with time-out and light without time-out, it is necessary to compare the difference between experimental segment (B) and pre-experimental condition (A) of experimental session I, and difference between experimental segment (B) and pre-experimental segment (A) of experimental

Session 2 i.e, A-B of 1 Vs A-B of 2. This comparison is shown in table 6.

The table shows a greater increase in stuttering when light with time-out is made contingent with stuttering. When compared with the condition of stuttering when light without time-out is made contingent. Statistically there is a significant difference between conditions of LTO (A-B) and LNTO (A-B). Thus the subhypothesis 5 that there will be no difference in the effects of LTO and LNTO on stuttering when they are made contingent upon stuttering is rejected. Thus, it may be concluded that the stuttering increases to a greater extent when light with time-out is made contingent with stuttering than under the condition when light without time-out is made contingent.

4. Effects of sound with time-out (STO)

The results of the experiment are shown in Table 7. The inspection of the table reveals that there is an increase in stuttering (under condition B) when sound with time-out is made contingent with stuttering in 4 subjects and a decrease in stuttering in one subject. Further, a comparison of condition B. With A₁ (experimental session with post experimental session) shows a decrease in stuttering in four subjects and

Table 6
Comparison between LTO and LNTO
conditions

Subjects	LTO(A-B)	LNTO (A-B)	LTO-LNTO (d)
Av	0.30	0.15(-)	0.15
K	0.31	0.89	-0.58
G	0.55(-)	0.21(-)	0.34
M	1.61(-)	0.21(-)	1.4
A	2.08(-)	1.15(-)	0.93

Table H shows that for $N=5$, the two tailed test for H_0 that $M \neq 0$ at 0.062 levels is d_1 greater than 0

By comparison with A vs B : H_0 rejected

By comparison with B vs A : H_0 rejected

By comparison with A vs A_1 : H_0 rejected

Therefore there is difference in all cases: H_0 rejected.

Table 7
Effect of Sound with time-out (STO)

Subjects	A	B	A_1	A-B	B- A_1	A- A_1
Av	1.90	2.46	2.11	-0.56	0.35	-0.21
K	6.77	5.29	5.42	1.48	-0.13	1.35
G	5.07	5.45	5.25	-0.38	0.2	-0.18
M	5.25	6.17	4.30	-0.92	1.87	0.95
A	6.95	8.57	6.28	-1.62	2.29	0.67

Table H shows that for $N=5$, the two tailed test for H_0 that $M \neq 0$ at 0.062 levels is d_1 greater than 0

By comparison with A vs B : H_0 rejected

By comparison with B vs A_1 : H_0 rejected

By comparison with A vs A : H_0 rejected

Therefore there is difference in all cases: H_0 rejected. an increase in stuttering in one subject. There subjects showed a decrease in stuttering under post-experimental condition. When pre and post - experimental conditions are compared whereas two subjects showed an increase in stuttering. Statistical analysis indicates a significant difference between condition A and B. Thus subhypothesis 3. that there will be no effect sound with time-out on stuttering is rejected. Then it may be concluded that there is a stuttering when sound with time-out is made contingent on stuttering. A comparison of condition B and A_1 , also indicates a statistically significant difference between the two conditions. This difference confirms the effect of sound with time-out on stuttering, that is, sound with time-out increases the stuttering and when the sound with time-out is withdrawn, there is a decrease in stuttering. However, the effect of sound with time-out seems to be present in the post-experimental condition as a comparison of pre-experimental condition (A) with post-experimental condition (A_1) shows a statistically significant difference between the two with a lesser frequency of stuttering under post-experimental condition.

5. Effects of sound without time-out (SNT0)

Table (8) gives the results of the experiment . IV i.e.,
when sound without time-out was used contingent with stuttering

Table 8

Effect of sound without time-out (SNT0)

Subjects	A	B	A ₁	A-B(d)	B-A ₁ (d)	A-A ₁ (d)
Av	1.70	1.51	1.58	0.19	-0.07	0.12
K	7.10	3.81	6.73	3.19	-2.82	0.37
G	4.79	5.48	4.11	-0.69	1.37	0.68
M	4.14	4.31	4.25	-0.17	0.06	-0.11
A	6.81	5.43	6.68	1.38	-1.25	0.13

Table H shows that for N=5, the two tailed test for H₀
that d_1 at 0.062 levels is d_1 greater than 0

By comparison with A vs B : H₀ rejected

By comparison with B vs A₁: H₀ rejected

By comparison with A vs A₁ : H₀ rejected

Therefore there is difference in all cases: H₀ rejected.

Table 9

Comparison between STO and SNT0 conditions

Subjects	STO	SNT0	STO - SNT0 (d)
Av	0.56 (-)	0.19	0.37
K	1.48	3.19	-1.71
G	0.38 (-)	0.69 (-)	-0.31

M	0.92 (-)	0.17 (-)	0.75
A	1.62 (-)	1.38	0.24

N.B:- sign indicated increase in stuttering under the respective condition.

Table H shows that for $N=5$, the two tailed test for H_0 that d_1 at 0.062 levels is d_1 greater than 0

By comparison with A vs B : H_0 rejected

By comparison with B vs A_1 : H_0 rejected

By comparison with A vs A_1 : H_0 rejected

Therefore there is difference in all cases: H_0 rejected.

Two out of five subject have shown an increase in stuttering whereas, three subjects have shown a decrease in stuttering when sound without time-out made contingent with stuttering.

Further inspection by comparing experimental conditions with post experimental conditions indicates an increase in stuttering in the post-experimental conditions in 3 subjects, whereas two have shown a decrease in stuttering. Comparison of condition A with A_1 , indicates decrease in stuttering in four subjects. Whereas, only one subject has shown a slight increase in stuttering. The statistical analysis of the data reveals that there is a significant difference between (a) pre-experimental condition and experimental condition (b) experimental condition and post-experimental condition and (c) pre and post experimental conditions. Thus, the sub-hypothesis (4) that there will be no effect of sound without time-out on the frequency of stuttering, when it is made contingent

with stuttering is rejected.

7. Comparison of results of experimental sessions 3 and 4
(STO Vs SNT0)

To know the effect of sound with time-out and sound without time-out it is necessary to compare the difference between experimental segment(b) and pre-experimental condition (A) of experimental session (B) and difference between segment (B) and segment (A) of experimental session 4. That is A-B of 3 Vs A-B of 4. This has been shown in table 9.

Table reveals that there is a greater increase in stuttering when sound with time-out was made contingent than in the condition. Where sound without time-out was contingent to stuttering. Statistically there is a significant difference between the two conditions. Thus the sub-hypothesis (7) that there will be no difference between the condition when sound with time-out and sound without time-out are made contingent to stuttering is rejected. It will be interesting to study, the stuttering behavior when a longer and intensive stimuli without time-out is made contingent to stuttering.

The results of the experiments:

1. Light with time-out
2. Light without time-out
3. Sound with-out time-out, and

4. sound with time-out

reveal that the stuttering increases when time-out (light with time-out; sound with time-out) is made contingent with stuttering. Even when only the signal light is presented contingent with stuttering there is a increase in stuttering. However, a contradictory results have been observed. When only sound was presented (as a signal), there is a decrease in stuttering. These results are seen only when stutterers are considered as a group. However, when individual are considered, results are conflicting, That is, under all the conditions, some subjects have shown a decrease in stuttering, whereas some other have shown an increase in stuttering. Further, there is no consistent effect of these stimuli with or without time-out in two subjects (Av and A) whereas one subject (K) has shown a consistent decrease in stuttering under all the conditions. Two other subjects (G & A) have shown an increase in stuttering under all the conditions. For example, Subject Av has shown decrease in stuttering when light with time-out and sound without time-out were made contingent with stuttering. Whereas subject (A) has shown a decrease in stuttering. when sound without time-out was presented and has shown an increase in stuttering in all the three other conditions. Therefore, it may be stated that there may be other factors like volition as pointed out by Purushothama (1976) in the process of conditioning

This factor may play an important role determining the effect of the stimulus in increasing or decreasing . a behavior. Further there may be other factors, which are not identified in the present study, operating in bringing about a decrease or increase in stuttering in these subjects when signals are made contingent with and without time-out.

However, when the behavior of the whole group is taken signals with and without time-out seems to increase the primaries (repetition and prolongations) in most of the subjects. This seems to support the stand of Brutten and Shoemaker (1970) Hedge (1971) contradicting the finding of Martin and Siegel (1966), Viswanath (1973) Vijayalakshmi (1973) and Dattatraya (1972).

Analysis of data for the purpose of verification of main hypothesis that "there will be difference in the frequency of occurrence of stuttering under the condition of time-out contingent to stuttering and under the conditions only signal without time-out, contingent to stuttering" is rejected. That is statistical analysis reveals that the significant difference between the two conditions indicating a greater increase in the frequency of shuttering, when time-out is made contingent to stuttering than under the condition where only signal without time-out is presented contingent to stuttering. Perhaps this may be explained on the basis of the fact that the stutterers

have difficulty in initiating phonation or difficulty in initiation of speaking as pointed out by Van Riper (1972), Schwartz (1974). The results of the study also contradicts the claim that stuttering would reduce when the stutterer's attention is drawn to his stuttering behavior (Hanson, 1978) rather calling the attention of stutterer to his stuttering behavior may make him conscious of his problem and thus increase the findings of the present study questions the effect of time-out on stuttering as a 'punisher'. Thus the results of the present study contradicts the findings of (Gostello) 1975, James, 1976 Haroldson et al, 1968 and others).

Four of the subjects of the present study reported that they failed to perceive the time-out as a punisher. Instead they felt that time-out as a chance to relax or a kind of rest period.

Therefore, it may be concluded that the time-out increases the stuttering and even the highlighting of stuttering behavior increases stuttering.

CHAPTER V

SUMMARY AND CONCLUSIONS

There are several studies indicating that stuttering decrease when time-out is made contingent with stuttering. Most of these studies have used visual or auditory stimuli to indicate the occurrence of stuttering and to be silent for the required duration as time-out. Thus, there are two factors in the process of time-out. It was the purpose of the present study to find out the effect of visual or auditory stimuli with time-out from speaking or reading and the effect of visual or auditory stimuli only.

The following five male stutterers were made to undergo four experimental sessions:

1. Light with time-out for a duration of five seconds(LTO);
2. Light without time-out (LNTO)
3. Sound with time-out for a duration of five seconds (STO) and,
4. Sound without time-out (SNTO).

An observer experimenter was trained to note the occurrence of stuttering and also to present the predetermined stimuli.

The results of the Present study indicate that:

- (1) Stuttering increase when light with time-out was made contingent with stuttering;
- (2) Stuttering increase when light without time-out was made contingent with stuttering;
- (3) Stuttering increases when sound with time-out was made contingent with stuttering, and
- (4) Stuttering decrease when sound without time-out was made contingent with stuttering, in general

Further, there was a greater increase in suttering when the signal was presented with time-out contingent to stuttering than under the condition where the signal was presented without time-out.

It was also observed that the signal with and without time-out had different effects in different subjects . Thus the present study question the claim that time-out acts as a punisher, when made contingent to stuttering.

Recommendations for further research

1. To repeat the study with the similar set-up in a large group of stutterers;

2. To Study the effect of longer duration and more intensive stimuli on stuttering when presented contingently;
3. To study the effects of different kinds of stimuli with and without time-out by presenting the stimuli contingent to stuttering:
4. To repeat the study in spontaneous speech situation.

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A P P E N D I X

SUBJECT -1

1. Case history - File No. 3333
2. Age - 23 Years
3. Sex - Male
4. Age of onset - 7 years
5. Family history - Nil significant
6. Therapies given - Shadowing; and prolongation therapy
7. Description of
stuttering behaviour - Characterised by repetitions and
prolongations of intitial sounds. Hard
contacts and sometimes tremor of the
lower lip.
8. Awarness of con-
tingency - Reported that the stimuli were
presented
soon after the stuttering blocks when
he was reading.
9. Reaction to time-out - Reported that it was a kind of
rest period
and made him easier to read further.

SUBJECT K

- | | | |
|--|---|--|
| 1. Case history | - | File No. 19970 |
| 2. Age | - | 19Years |
| 3. Sex | - | Male |
| 4. Age of onset | - | Not reported |
| 5. Family history | - | Nil significant |
| 6. Therapies given | - | Prolongation therapy |
| 7. Description of
stuttering behaviour | - | It was characterized by
repetitions and prolongations
of sound and syllables. Tremors
of the lower lip. |
| 8. Awareness of con-
tingency -
presented | - | Reported that the stimuli were

after the stuttering blocks when he
was reading. |
| 9. Reaction to time-out
period | - | Reported that it was a kind of rest

and made him easier to read further. |

SUBJECT G

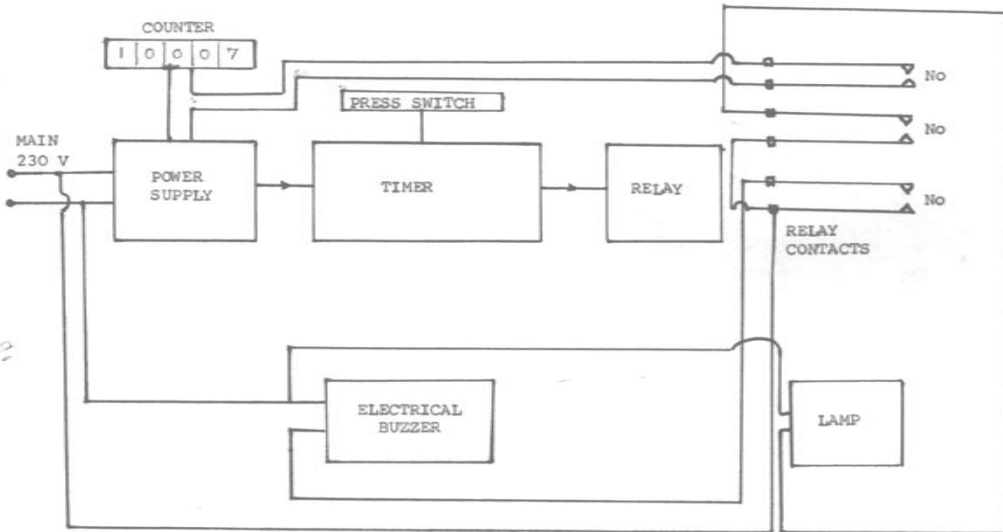
1. Case history - File No. 24190
2. Age - 13 Years
3. Sex - Male
4. Age of onset - 8 years
5. Family history - Nil significant
6. Therapies given - Prolongation therapy
7. Description of
stuttering behaviour - It was characterised by repetitions
hesitations of initial or medical sounds;
(silent pauses) and interjection of
'Kh' or 'Ku' sounds.
8. Awareness of con-
tangency- Reported that the sound or light
stimuli were used to come while he was
reading.
9. Reaction to time-out - Reported that it was a kind of rest
period and made him easier to read further.

SUBJECT M

1. Case history - File No. 26036
2. Age - 19 Years
3. Sex - Male
4. Age of onset - Not reported
5. Family history - Nil significant
6. Therapies given - Prolongation therapy
7. Description of
stuttering behaviour - It was characterised by repetitions
and hesitations Hard contacts and
initiation difficulty was also
present.
8. Awareness of con-
tangency- Reported that the signals used to come
while he was reading.
9. Reaction to time-out - Reported that it was a kind of rest
period
and made him easier to read further.

SUBJECT A

1. Case history - File No. 179
2. Age - 17 Years
3. Sex - Male
4. Age of onset - Not reported
5. Family history - Nephew is a stutterer
6. Therapies given - Shadowing and Prolongation therapy
7. Description of
stuttering behaviour and - It was characterised by repetitions
and
prolongation of initial sounds and
syllables. Word repetitions are
present. Sometimes tight closure of the
lips, protrusion of the lower lips
8. Awareness of con-
tiguity- Reported that the signals used to come
in between while he was reading.
9. Reaction to time-out - Reported that he wanted to avoid the
further presentations of time-out.



BLOCK DIAGRAM OF AUTOMATIC RESET TIMER-CUM-COUNTER