

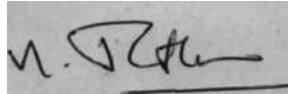
highlighting of fluency
in
S T U T T E R E R S

Reg. No. 11.

**A Dissertation submitted in part fulfillment
for the Degree of Master of Science
(Speech and Hearing) of Mysore
University — 1982**

CERTIFICATE

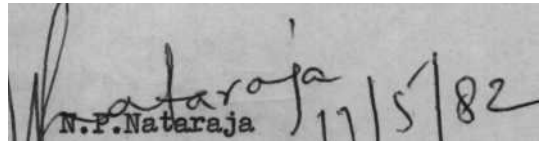
This is to certify that this Dissertation entitled "Highlighting of Fluency in Stutterers" is the bona fide work in part fulfilment for M.Sc. Speech and Hearing of the student with the Reg. No.



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CERTIFICATE

This is to certify that this Dissertation entitled "Highlighting of Fluency in Stutterers" has been prepared under my supervision and guidance.

A rectangular box containing a handwritten signature in black ink. The signature appears to be 'N.P. Nataraja' followed by the date '17/5/82'. Below the signature, the name 'N.P. Nataraja' is printed in a smaller font.

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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 & Hearing, Mysore, and has not been submitted earlier at any University for any other diploma or degree.

Mysore

Date:

17.5.82

Reg.No.11

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Investigator

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CHAPTER I

INTRODUCTION

Attempts have been made to explain stuttering using learning principles (Wischner, 1950; Sheehan, 1958; Shoemaker, 1967; and Shames and Sherrick, 1963). "Much of the experimental work done on stuttering within the operant conditioning framework was designed to evaluate the effects of various punishing stimuli delivered contingent on the occurrence either of stuttering moments or of specified speech dysfluencies. Some studies have shown that under the influence of punishing contingencies, stuttering may either increase or show no significant change" (Frick, 1951; Hansen, 1955; Timmons, 1966; Webster, 1968; Starkweather, 1970; Hegde, 1971; Brutten and Shoemaker, 1972).

There have been few studies, which have applied positive reinforcement procedures to enhance the fluency among stutterers (Richard and Mundy, 1966; Leach, 1969; Bar, 1971). These studies have shown that it is possible to increase the desirable behavior, fluency, and decrease the undesirable dysfluencies (stuttering) concomitantly. Hegde (1973) while reviewing these studies states that, "Like most clinical studies, they lack appropriate control procedures. In addition one or other of the following features was also missing from these studies: (1) Specific description of

dysfluencies and their frequencies before and after therapy; (2) Definitions of fluency; (3) Operational specification of the reinforcement procedure used; and (4) A description of the final target criterion of fluency". In spite of these drawbacks, most of the studies that have been conducted to enhance fluency have shown that it is possible to find an increase in fluency with concomitant decrease in dysfluency.

An early study by Martin and Siegel (1966b) had two adult stutterers as subjects who were reinforced with a verbal stimulus "good" for every 30 seconds of fluency. However, the subjects also received a verbal stimulus "not good" for every instance of stuttering. Although the frequency of stuttering was found to decrease, the study did not permit statements regarding the possible effects of rewards alone on fluency. Another experimental study involved three stuttering children aged 9 to 10 (Shaw and Shrum, 1972), and demonstrated that the frequency of specified intervals of fluent speech can be increased with the positive reinforcement procedures while obtaining a decrease in the frequency of dysfluencies.

Manning et al (1976) has attempted to find the effect of tangible and verbal reinforcers of fluent behaviors in stuttering children. The study also included 'a mark on a sheet of paper for every fluent utterance'. Manning et al have concluded that the tangible and verbal reinforcers increased fluency equally.

Hegde (1977) has concluded, based on his study in which the

fluency was reinforced using a dime, that all his subjects showed an increase in fluency. Hegde (1977) further considers that "if the result of the kind obtained in the present investigation are extended and replicated, clinically useful procedures for fluency manipulation may be established". Such an outcome would certainly minimize the need for punishment procedures directed against dysfluencies, which have so far yielded contradictory data. Therefore, he recommends studies involving other reinforcers such as verbal stimuli, delivered contingent on fluency may be conducted.

In another study three verbal stimuli "good", "no" and "zehu" were presented contingent upon fluency of a fixed duration and found that in all the three conditions there was reduction dysfluency, (Vijayalakshmi, 1973)* The investigator has attempted to explain the findings of the study, on the basis of highlighting hypothesis Siegel and Martin (1970). According to Vijayalakshmi (1973), the fluency of stutterers are potential carriers of their own reward, such that, increase in the subject's attention to the response evoker the rewarding property and thus fluency will be increased or in other words, stuttering will be decreased.

Thus a review of literature indicates that there are studies suggesting that the fluency can be increased by highlighting. Therefore the present study was planned to find out the effect of sampled highlighting of fluency on dysfluency and fluency in stutterers.

Need for the Study

Knowing the effect of highlighting will be useful in developing simpler and economical therapy techniques for stuttering and such a knowledge may also help in understanding of the etiology, development and maintenance of stuttering.

Statement of the Problem

The present study attempted to find out the effect of sampled highlighting of fluency on dysfluency and fluency in stutterers.

Methodology

Five stutterers were used as subjects in the present study. All the subjects underwent pre-experimental, experimental and post-experimental conditions.

In pre-experimental condition, the subject read a passage for five minutes which was recorded and analyzed using two trained judges. The recording was also further analyzed to note the range of fluent utterances in terms of number of syllables and total syllable output. Three such sessions with a gap of twenty four hours between each were conducted for each subject.

In the experimental condition, the subject read a passage, the experimenter underlined the first fluent utterance in every their thirty second period, which was meeting the pre-set criterion using a

pencil on the text and also uttered "शुन" (to note). Each subject underwent five such sessions.

The post-experimental session was similar to that of pre-experimental session.

The syllable output and the number of dysfluencies in pre and post-experimental conditions have been compared using suitable statistical tests.

The Purpose of the Study

The study was conducted to test the following hypotheses.

1. Hypothesis I

The sampled highlighting of fluency has no effect on frequency of dysfluency in stutterers, i.e., there is no significant difference in frequency of dysfluencies in pre- and post-experimental conditions when sampled highlighting of fluency is done in the experimental condition.

2. Hypothesis II

The sampled highlighting of fluency has no effect on the syllable output in stutterers, i.e., there is no significant difference in syllable output in pre- and post-experimental conditions when sampled highlighting

of fluency is done in the experimental condition.

Limitations of the Study

1. Only five subjects have been used.
2. Only reading has been considered.
3. The marking and the utterance "ನೀತಿ" have not been separated.
4. The severity of stuttering was not considered as a variable.
5. The therapies that the subjects previously have undergone were not considered as a variable.
(However, no subject had undergone therapies based on conditioning principles.)
6. Only the primary behaviors of stuttering were considered.
7. The frequency of dysfluency and syllable output during experimental condition have not been considered.

Definitions

1. stuttering - "The term stuttering means I. (a) Disruption in

the fluency of verbal expression, which is (b) characterised by involuntary, audible or silent, repetitions or prolongations in 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- Some times the disruptions are (a) 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 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".

The terms stuttering and dysfluencies have been used interchangeably.

2. **Fluency** - defined as ongoing speech or oral reading behaviors that are devoid of all forms of dysfluencies, silent prolongations and silent pauses.
3. **sampled highlighting of fluency** - is highlighting of only the first fluent utterance meeting the set criterion by underlining using a pencil and by uttering "شَرِبَ" (criterion was that the number of syllables uttered must be equal to number of syllables occurring on the 75th percentile point on the total range of fluent syllable utterances as noted in the pre-experimental condition. This varied from subject to subject.)

Implications of the Study

1. The sampled highlighting of fluency can be used to increase the fluency and decrease of dysfluency, concomitantly, in stutterers.
2. This can be used as a therapeutic procedure.

CHAPTER II

REVIEW OF LITERATURE

"Stuttering has attracted considerable interest for centuries. Over a span of more than 2,000 years many different ideas have been offered to explain its nature, cause and treatment. In spite of this, the disorder is still not very well understood."

Wingate, M.E., 1976.

This problem is not very well understood because no systematic attention has been paid to some of the basic questions, for example, concerning the definitions. Hegde (1973) has grouped the available definitions into following categories and has made an attempt to evaluate these definitions.

- 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 behaviors;
- 4) Definitions in terms of unspecified molar movements; and
- 5) Definitions couched in terms of hypothetical variables.

Further, he concludes that the definitions of stuttering are results of various theoretical positions on that behavior. The validity of these theoretical positions is itself a controversial matter. In addition to being too theoretical, the available definitions of stuttering are either too restrictive or somewhat irrelevant. Therefore it becomes difficult to find an appropriate definition of stuttering. However, descriptive definition of stuttering, proposed by Wingate, which has been found to be used most often, is used in the present study.

According to Wingate (1964). "The term stuttering means -

- I (a) Disruption in the fluency of verbal expression, which is (b) characterised by involuntary, audible or silent, repetitions or prolongations in 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 some times the disruptions are (a) 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

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".

Several theories have been proposed in an attempt (1) to identify the etiology of the problem, (2) to develop suitable therapy technique for stuttering, and (3) to describe the process of stuttering. The explanations offered or the so-called "theories" of stuttering are divergent to each other 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".

This may be because of the speculations made by different people regarding stuttering which Wingate points out by stating that -

"Speculation has always figured prominently in what has been said and written about stuttering, and this practice continues. Undoubtedly speculation is encouraged by the fact that the vast literature on stuttering contains many partial truths, equivocal findings, puzzling observations, dramatic testimonies, and apparent contradictions. But

after more than 50 years of presumably scientific investigation of stuttering, there is no justifiable basis for so much continued conjecture. Speculation has value when it stimulates investigation, but when it restricts the range of inquiry, determines what facts are to be considered, becomes circular and reinforcing, it has congealed into dogma. Dogma currently is concealed in the euphemism of "theory" (Wingate, M.E., 1976).

Several theories have been proposed and some are still coming. Bloodstein (1975) tries to group these theories as belonging to three types by stating that -

(1) "Theories of the etiology of stuttering" which offer an account of the etiology, or so-called onset of stuttering". For example, Johnson's diagnosogenic theory (1942), Orton-Tavis theory (1927, 1931).

(2) "Theories of the moment of stuttering", which are "concerned primarily with the nature of discrete instances of stuttering behavior". For example, West's (1958), Eisenson's (1958) and Glauber's (1958) 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 example, Cybernetic models of stuttering (Mysak,

1960; Lee, 1951) and learning theory interpretations (Wischner, 1950; Brutten and Shoemaker, 1967 and others).

Wingate (1976), while reviewing the criticisms levelled at the existant theories of stuttering, states that these criticisms "can be incorporated into two general statements". They are, "First, present theories of stuttering do not deserve that label in a serious sense of the term; for they are little more than favoured speculative notions supported by partial observations, preferred facts, and contrived explanations. Many widely accepted view points embody concepts and principles which are internally inconsistent contrary to many facts, lacking in support from either research findings or therapeutic results, and most regrettable of all, seemingly impervious to reasoned analysis", and "Secondly, existant theories of stuttering have unwarranted eminence, and influence. We are concerned here mainly with the matter of influence, for theory eventually affects the development and conduct of therapy, regardless of its validity."

In spite of these criticisms, several theories more optly explanations regarding stuttering are existing.

The explanation that stuttering as an organic disorder is as old as Aristotle (384 B.C.), who speculated that there was something wrong with the tongue of the stutterers. The Hyoid bone, tonsil and uvula, palate and respiratory apparatus were held responsible for stuttering in the later part of the 19th century and the beginning of the 20th

century. Some attributed it to certain parts of the nervous system.

Orton (1927), Travis (1931) and Bryngelson (1935) have advocated the theory of cerebral dominance. Kopp (1934) and West (1943) forwarded bio-chemical theory. Eisenson (1958) believes that in majority of cases stuttering is based on a constitutional predisposition to motor and sensory perseveration.

Cherry et al (1956) related stuttering to an instability in the auditory feedback loop. Recently, Schwartz (1974) suggested that the core of the stuttering block was the inappropriate vigorous contraction of the posterior crico-arytenoid muscle in response to subglottal pressure required for speech. Zimmerman (1960) finds stuttering as disordered articulatory movement patterns associated with perceptually judged disfluencies.

During the latter half of the 19th century, psychologists began viewing stuttering as a neurosis, as a form of hysteria, with its neurotic core in the traumatic early childhood experience. Fenichel (1945) regarded it as a pre-genital conversion neurosis. Glauber (1953) and Travis (1959) considered stuttering as an ego, defense mechanism to prevent unacceptable and anxiety provoking instinctual impulses reaching consciousness and being actually or symbolically expressed. Bloodstein (1957) considered the moment of stuttering as a reaction of tension and fragmentation resulting from the threat of failure in the performance of an automatic, serially ordered activity.

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.

According to Wischner (1950) "stuttering is an instrumental avoidance response reinforced by anxiety reduction".

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.

Brutten and Shoemaker (1967) consider that "stuttering is 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 various therapies for stuttering.

Starting from placing pebbles in the mouth and shouting at the sea, the various techniques tried include oral surgery and prosthesis, relaxation technique, various ways of modifying the speech act like vocal phrasing and blending, slowing the speaking rate (for example, prolongations), masking, shadowing and various rhythm methods. Recently behavior therapists with their learning principles have made

attempts at achieving normally fluent speech, reliably, effectively and in a systematic way. Some of these include reciprocal inhibition, systematic desensitization, assertive training, negative practice, reinforcement, punishment techniques and time-out. Ingham and Andrews (1973) after reviewing the behavior therapy approach to stuttering conclude that -

"Masking and shadowing now seem limited in therapeutic promise and the negative practice and anxiety reduction have yet to be demonstrated to have powerful therapeutic potential. Rhythmic speech and prolonged speech appear to have greater therapeutic promise, although they rely on changing the pattern of speech, which in turn should be changed toward normal speech. Operant conditioning procedures appear to be useful for effective therapy. In general, however, reports of behavior therapy for stuttering are disappointing in their absence of concern for appropriate and systematic evaluation of the outcome."

Thus the review on therapy shows that several therapies have been developed based on learning principles. These therapies were attempted as stuttering was considered as a learnt behavior. Amman (1700) stated that stuttering is a bad habit. Darwin (1800) considered stuttering as conditioned emotional interruption of motoric speech. Attempts have been made in the early decades of 19th century to train the stutterers to break the bad habit, i.e., stuttering (Frank 1818; Leish, 1825). The concept that stuttering is a learnt

bad habit got strengthened gradually. Bell, A.M. (1853) was of the opinion that since speech is learnt, so much is its defects, and he believed that, "speaking is an artificial process - an acquirement, not a natural instinct and its defects can only be amended by the same means through which its exercise is first obtained." Similar ideas have been expressed by many others (Wyneken, 1868; Denhardt, 1890; Sandov, 1898; and Dunlop, 1932).

Applications of the learning principles to the systematic study of stuttering came only in the middle of this century, closely following the growth of behavior therapy. Several theories using these principles have been proposed to explain stuttering (Wischnor, 1950; Sheehan, 1953; Shames and Sherrick, 1953; Brutton and Shoemaker, 1967). The review of literature shows several studies supporting and rejecting each of these theories. Even though the approach of these theories are different, the basic principles are same. "There is thus essential agreement among theorists that stuttering is more accurately construed as a behavioral response. They also agree that acquisition of stuttering behavior is not a unique process; stuttering is acquired in accordance with the same learning principles as other responses. These theorists believe therefore that, the learning and maintenance of stuttering depend on some form of reinforcement" (Brutton and Shoemaker, 1967).

Unfortunately no stuttering theory is accepted by all or even most of the workers in the field as a satisfactory explanation of the

onset, development and maintenance of stuttering or as leading to effective treatment is available. "Neither classical nor operant conditioning nor their combination (as in Brutten and Shoemaker's two factor theory) are completely explanatory. Each of these accounts for some of the phenomena of stuttering but not for all" (Van Riper, 1971). This may probably be due to the existing confusion in the field of learning theory itself. Van Riper says, ". the present state of behavioral science as it applies to learning and unlearning still leaves much to be desired". And further he continues to state that ". the situation with regard to stuttering merely reflects the confused state of current learning theory, which has been in great flux. No learning theory as yet seems to account for all the facts of learning, so we should not be surprised to find different explanations of how stuttering is learned, shaped and maintained."

Numerous and studies with varied aims and techniques have been conducted on verbal behavior. Thorndike, E.L. (1933) experimented with the effect of saying 'right' and 'wrong' after a subject's response. His data indicated that he could, in this way, influence the subsequent emission of verbal responses. Greenspoon (1955) reports that a class of verbal responses increased when a verbal stimulus was made contingent upon this class of words.

Information regarding normal verbal behavior has been used to manipulate deviant verbal behavior (Salzinger and Pisoni, 1960;

Stasai, 1961; Siegel and Martin, 1968; Brookshire and Martin, 1967; Siegel and Martin, 1965; Sooper, Cady and Robbins, 1970; Siegel and Hanson, 1971).

It is important to note in this connection that from the point of view of learning theory there is no basic difference in the way maladaptive and adaptive behaviors are learned. The same learning principles apply to both, (Brutten and Shoemaker, 1967). Thus, occurrence of both fluency and dysfluency have been explained using learning principles and their modifications have been attempted.

In spite of these controversies, regarding the application of learning principles to stuttering behavior, several have attempted to decrease frequency of occurrence of stuttering blocks or to increase the fluency by reinforcing either positively or negatively by making use of various kinds of stimuli, (verbal or non-verbal) (Van Riper, 1937; Frick, 1931; Goldiamond, et al, 1958; Martin and Siegel, 1969; Quist and Martin, 1967; Curlee and Perkins, 1967; Vishwanath, 1972; Nessel, 1958; Soderberg, 1959; Adamezyk, 1959; Neeley, 1961; Chase, Sutton and Rapin, 1961; Logne, 1962; Goldiamond, 1965; and Gross and Nothanson, 1967).

For the present purpose, all these studies can be grouped under two headings, i.e., (1) reinforcement and stuttering; and (2) reinforcement and fluency.

The literature shows that the study conducted by Van Riper (1937) to note the effect of punishment on stuttering, is the first one. In this study, each of the 16 stutterers read a passage. After three readings, the subjects were given a sample shock, using the electrodes attached to neck of the subjects and told that they would receive as many shocks as there were stuttering blocks in the 4th reading, after completion of that reading. Similarly, the subjects were told that after the 5th reading that they would receive a shock for each stuttering block that had occurred during the initial reading in the series, after the completion of the 6th reading. All the subjects except for one, showed increase in stuttering, when the readings three and four were compared. A similar increase was found, when the 5th reading was compared to 6th, though lesser in magnitude and fewer subjects. Thus the study showed that the punishment, of course, non-contingent, increases stuttering. These results had a great influence on therapy procedures. Even some went to the extent of advising that stutterers should not be punished at any cost (Johnson, 1967; Van Riper, 1954; Brutten and Shoemaker, 1969; and siegel, 1967).

Friek (1951) attempted to similar study by subjecting 48 stutterers to four different conditions, i.e., all the subjects were made to read a list of words and subjects belonging to group I were not given shock or threatened of shock, the II group of subjects received shock for each stuttered word; shock was theratened and were given for every stuttered word, after the completion of reading for the subjects

belonging to group III; subjects of group IV received shock after each stuttered and non-stuttered word. The results of the study showed that there was no significant difference between conditions I and II, between conditions I and III, between conditions IV and H, and between conditions IV and III. However, Friek reanalyzed the data by recombining the shock conditions (II, III and IV) and comparing it with no shock condition (I). There was significant difference, with more stutterings in combined shock conditions than the no-shock condition.

Flanagan, Goldiamond and Azrin (1953) have attempted to find out the effect of punishment using aversive period and escape period. Results of the experiment suggest that the stuttering response is an operant behavior and can be manipulated using operant principles.

In a similar study, Biggs and Sheehan (1969), using a similar stimulus, have attempted to find out the effect under three conditions, i.e., presenting contingently with the stuttering block, presenting randomly, withdrawing the stimulus when the stuttering block occurred. Since they found that the stuttering decreased under all these conditions, they attributed the decrease mainly to distraction.

A series of studies at Minnesota laboratory were conducted by Martin, Siegel and their associates. In general, these studies show that stuttering responses specified, either molarly or in terms of molecular components, decrease in their frequency, when punished

contingently. But when the punishing condition is removed stuttering reappears. Martin and Siegel (1965) also found that stuttering can be brought under discriminative stimulus control. In one of the studies by Martin and Siegel (1966b), fluency was rewarded and stuttering was punished contingently. They concluded that reward may not be essential to the decrease in stuttering.

Vishwanath (1972) has concluded, based on his study, that the contingent negative stimulation on selected responses in moments of stuttering reduces the selected responses significantly.

Bharath Raj, J. (1972) has reported a decrease in stuttering when shock was used as aversive stimulus contingent upon stuttering.

Haroldson, Martin and Starr (1968) used time out as a punishment for stuttering. Time out from speaking operated as a punishing stimulus when presented contingent upon stuttering and produced a decrement in stuttering.

Curlee and Perkins (1969) combined the DAF technique and the time out procedure and evolved a therapy technique called 'conversational rate control therapy'. Their preliminary results suggested a decrease in stuttering.

There are also many other studies with the findings contradictory to the findings of the above studies. They show that stuttering or certain aspects of stuttering increase when punished. Frederick (1955)

gave a continuous steady shock and increased the shock intensity contingent on stuttering. He found an increase in stuttering. Martin et al (1964) found that response contingent shock suppressed the non-verbal (nose wrinkling) and verbal behavior (ah-ah) but also suppressed the word output. Thus, the decrease in the response may be due to the decreased word output. And they also found that prolongations increased. Webster (1968) in his subjects with differentially defined classes of stuttering behavior as "voluntary" and "involuntary", found that the word "wrong" contingent on stuttering decreased "voluntary" behavior and increased the "involuntary" behavior. Stark Weather (1969) and Hegde (1971) have reported similar results.

Recently, verbal stimuli as reinforcers of disfluency both in stutterers and non-stutterers have gained importance, as it is thought that they are more 'natural' reinforcers on the probability of their occurrence in outside clinic situation is also higher.

Cooper et al (1970) used the words "Right", "Wrong" and "True" contingent on interjections, part word repetitions and word repetitions, and found a decrease in the dysfluencies in all the three conditions.

Stassis (1961) studied the effect of a pre-determined schedule of reward - the word 'right', the word 'wrong' upon the verbal behavior of normal speakers. Subjects read a series of nonsense words under four reinforcement schedules. The results indicated that normal

speakers became disfluent when their verbalizations were punished. The effect of reward and punishment upon verbal behavior was consistent within a short time.

Siegel and Martin (1965) studied the effect of verbal punishment on dysfluencies in normals and results indicated that dysfluencies constituted a discriminial class of verbal behavior and that they may be modified within a punishment paradigm. They also conducted another study to know the effect of verbal stimuli on dysfluencies during spontaneous speech.

In this study four conditions were arranged:

- 1) 100% schedule of reinforcement with the word 'wrong' on disfluencies
- 2) 2% schedule
- 3) instructing the subject to reduce dysfluencies
- 4) Instruction plus 100% reinforcement

The first and the fourth conditions brought a decrease in dysfluencies, decrease being more in the fourth condition. The authors also suggested that "it is possible that the contingent presentation of 'wrong' in this experiment served to 'alert' the subject to the dysfluencies in his reading rather than to punish them".

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 significantly.
- 3) There were no significant differences between the effects of continuous contingent and random contingent negative stimulation.

Timmons (1966) used the word 'wrong' as punisher and presented it contingently on stuttering and found no significant increase or decrease in stuttering.

Brookshire and Martin (1967) have attempted to note the effect of contingent presentation of words 'wrong', 'no' and 'huh-uh' and found that contingent 'wrong' produced greatest decrement in dysfluency, 'no' the least and 'huh-uh' occupied a midpoint. The control group and the group of subjects who had received stimulus randomly did not show any change in dysfluencies.

Similar reports have been made by Quist and Martin (1967).

Thus, several attempts have been made to find the effect of

negative (non-verbal and verbal) reinforcement on dysfluencies.

There are controversial reports regarding the effect of these negative reinforcements, i.e., some have reported an increase in stuttering, whereas some have found decrease in stuttering and still some others have found no change.

Fluency and reinforcement

The operant methodology, however, is not restricted to punishment procedures. There are positive reinforcement procedures that can be applied to desired behaviors. "As a result, incompatible, and undesirable, behaviors might show a concomitant decrease in frequency. Neither is stutterer's speech restricted to dysfluencies. Indeed, on an average, stutterers are known to be fluent on better than 90% of the words they read (Bloodstein, 1944). Fluency, the target, in other words, does exist, albeit at a less than desired level. Consequently, one need not resort to such time-consuming procedures as shaping in order to manipulate fluency. Purely from a clinical standpoint, it would seem more appropriate to directly enhance the fluent behaviors of stutterers than to modify stuttering. It is therefore surprising that fluency has not received much systematic attention. As pointed by Culatta (1976), while less than 45% of published research in the area of dysfluent behavior is concerned with fluency". (Hegde, 1978).

Attempts have been made by few to note the difference between

the fluencies in normals and stutterers (omitting stuttering in stutterers).

In the study by Wendahl and Cole (1961) stutterers were distinguished from non-stutterers at a statistically significant level by the judges who listened to recorded samples from which stuttering responses had been omitted.

Similar studies conducted to note the differences in fluency between stutterers and normals have reported controversial reports, i.e., according to some (Few and Lingwall, 1972; Goldiamond, 1958; Love, 1958; Love and Jeffers, 1971). the listeners were able to identify the stutterers by listening the fluent part of speech of stutterers, whereas others have reported no differences between stutterers and normals (Young, 1964).

While considering the definitions of fluency and its disorders, Hegde (1978) states that "at present fluency cannot be defined in positive terms. This is largely due to the fact that the dimensions and the controlling variables of fluency have not been systematically analyzed", and he suggests that fluency may be defined as "on going speech or oral reading behaviors that are devoid of all forms of dysfluencies, silent prolongations and silent pauses". Further, Hegde considers that there are no systematic efforts to measure fluency and suggests that a form of duration measure and a form of utterance measure are practical at present (1) time based measures of fluency

and (2) response unit of measure of fluency. The time based measures are defined as a duration for which fluency is sustained by the subject and it is measured in terms of seconds or minutes and this varies with the severity of subject's dysfluency.

Response unit based measure of fluency is based on a specific unit of response that is devoid of dysfluencies, silent prolongations and silent pauses. Utterance measures are obtained usually in terms of syllable per utterance whereas the response unit measure may not be restricted to syllable count, i.e., it may be syllable or single word or number of words. Therefore a response unit used for measure of fluency can be defined as 'any unit of fluent utterance that the subject presents most frequently in his speech. This measure has been used in the present study.

There have been few studies which have demonstrated the practical usefulness of reinforcement procedures in obtaining an increase in the units of fluent speech.

Rickard and Mundy (1965) manipulated stuttering behavior. In their study, stuttering behavior was identified as the dependent variable in a 9-year old boy. The subject showed few deficits in other areas. Social reinforcements and 'points' leading toward extrinsic rewards were administered following the production of non-stuttering behavior in the experimental setting; stuttering behavior was ignored. The subject progressed successfully from very simple units of behavior, i.e., free conversation with the parents serving

as experimenters. The criteria of change were samples of verbal behavior on three levels: performance on a reading task, verbal behavior in the home, and school environment. The subject showed marked improvement on the first two criteria. Initially, success generalized to the home and school situations, but a six-month follow up indicated that the environmental gains had been only partially maintained.

While discussing the application of response contingent procedures, Leach states that -

"It has been pointed out that stutterers exhibit both fluent and dysfluent responses, using a suitable reinforcer and basing treatment on counterconditioning procedures, the clinician might approach stutterer's high dysfluency. Since fluency is incompatible with dysfluency and the rate of fluency should increase under reinforcement, dysfluency should decrease as fluency increases. The treatment program could progressively introduce new stimulus conditions in an attempt to increase the likelihood of generalization (Leach, 1965).

He arranged a treatment programme with a twelve-year old stutterer.

During the first of those sessions, the examiner explained to the boy that he would earn two cents a minute for each minute he talked to the examiner. An upper limit of thirty minutes was placed on these sessions. . . . Beginning on the seventh session, the

thirty minutes period was divided into two fifteen minutes periods. The first fifteen minutes was a free conversation period in which he conversed freely while earning two cents a minute for doing so. During the second fifteen minutes period, he also earned two cents a minute for talking, but a fluency contingency consisting of an additional penny for each fifteen seconds period of fluent speech No direct statement was made concerning the fluency contingent reinforcement. Data reflected a reduced rate of dysfluency (Leach, 1965).

These two pioneer attempts at manipulating the fluency aspect of the stutterer's verbal behavior is indeed valuable. But they also have limitations. They appear more like case studies with little possible generalisation to other stutterers. Both the studies had single subject of a younger age group (9-year old and 12-year old).

An early study by Martin and Siegel (1966b) had two adult stutterers as subjects who were reinforced with a verbal stimulus "good" for every 30 seconds of fluency. However, the subjects also received a verbal stimulus "not good" for every instance of stuttering. Although the frequency of stuttering was found to decrease, the study did not permit statements regarding the possible effects of reward alone on fluency.

Shames (1969) used verbal reinforcements during therapy interviews with stutterers. He used two stutterers. With one stutterer, he conditioned the thematic content during the therapeutic

interview with verbal reinforcement like 'good', 'right' and 'that sounds sensible, reasonable, like a good deal or decision' etc. The thematic aspects of stutteeer's speech was reinforced keeping in mind the hypothesis that "relationships exist between different modes of responses dealing with similar content, or that the way people behave and act in social contexts, may be related to the way they talk about the way they act in those contexts".

As a consequence of verbal reinforcement, an increase in the response which was reinforced was observed. Along with this there was also reduction in stuttering.

In the second case, the stutteeer was reinforced with the verbal stimuli, 'fine', 'good', and 'that is right', when the subject attempted to modify his stuttering behavior following the eight step procedure given in Van Riper's cancellation therapy. There was a marked drop in stuttering frequency. Carry over into outside interview session was also observed.

Another experimental study involved three stuttering children aged 9 to 10 (Shaw and Shrum, 1972) and demonstrated that the frequency of specified intervals of fluent speech can be increased with the positive reinforcement procedures, while obtaining a decrease in the frequency of dysfluencies.

Vijayalakshmi (1973) studied the effect of 'good', 'no' and 'zehu'

on fluency in eight stutterers following a 100% contingent reinforcement schedule. The verbal stimulus was presented contingent on a fixed duration of fluency. This duration differed from subject to subject but was kept the same for a subject throughout the experiment. The subjects were classed into two groups for the discussion. The first group of five subjects were those who showed a decrease in stuttering for all the three stimuli. The highlighting hypothesis - advanced by Siegel and Martin (1968) - was adopted to explain the results of this group of subjects. Insufficient highlighting was offered as a possible explanation for the maintenance of stuttering. The second group, who showed an increase in stuttering, the possible explanations could not be provided. In general, she concluded that stuttering can be reduced by 'highlighting' fluency.

According to Siegel and Martin (1968), the highlighting hypothesis regarding dysfluencies is that, any stimulus which highlights, dysfluencies will cause them to decrease. Further, they try to explain by stating that it may be "that dysfluencies of normal adult speakers are potential carriers of their own punishment, such that increase in the subject's attention to the response evokes the punishing property" (Siegel, 1970). Vijayalakshmi (1973) tries to explain her findings based on this.

Manning et al (1974) made an attempt to determine the relative effects of tangible and verbal reinforcers on fluent behaviors in stuttering children. The experimental design used in the study was

not appropriate to determine the relative and interactive effects of the two treatment variables. The study also had a third variable, which constituted a mark on a sheet of paper for every fluent utterance. In the manipulation of these variables, the authors did not adhere to the rule of changing one variable when proceeding from one phase of the experiment to the next (Hersen and Barlow, 1976). As a result, different treatment conditions did not have appropriate control conditions. Therefore, the authors' conclusion that both verbal and tangible reinforcers can be equally effective in increasing fluency in children should be considered as being only suggestive.

Further research with adults (Martin and Haroldson, 1969; Adams and Popelka, 1971; James and Ingham, 1974; Martin Gavisser, 1971; Shames and Seltzer, 1971; Castello, 1975) and with children (Martin and Berndt, 1970; Martin, Kuhl and Haroldson, 1972) support this finding. James (1976) reported that duration of time-out is relatively unimportant.

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; Vijayalakshmi, 1973).

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 may also 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 dysfluencies of stutterers.

A question would arise that, why should aversive and non-aversive stimuli produce similar effects on stuttering? One possibility considered by Wingate (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 dysfluencies in normal speakers. They reasoned that dysfluencies may be behaviors that "carry their own punishments" and that any stimulus which serves to highlight or alert speakers to these behaviors, will result in response reduction. That means the reduction in stuttering may be due to highlighting of stuttering behavior also (Siegel, 1970).

Basavalingappa (1980) studied the effect of stimuli with and without time-out on stuttering on five stutterers. His results indicated that stuttering increased when - (1) when light with time-

out; (2) light without time-out; and (3) sound with time-out, was made contingent on stuttering. But stuttering decreased when sound without time-out was made contingent on stuttering.

Thus, several studies have been attempted to reinforce fluency and dysfluency, using various kinds of stimuli (shock, noise, time-out, verbal stimuli). The results have been confusing and contradicting. However, as Hegde (1978) states "the available clinical and experimental data, demonstrate the feasibility of fluency reinforcement procedure". Thus, in recent years, the emphasis has been shifted away from the procedures designed to modify stuttering to those directly designed to enhance fluency and such therapies have been vigorously advocated. Most of the studies which have attempted to enhance fluency have considered the stimuli used, as positive reinforcers. However, as vijayalakshmi (1973) points out, these stimuli may be bringing about highlighting effect. The literature on studies attempting to enhance fluency has shown no study considering the effect of highlighting of fluency on dysfluency in stutterers. Therefore, the present study was planned to find out the effect of highlighting of fluency on dysfluency in stutterers. It was decided to highlight the fluency by undertiming, using a period, the fluent reading of the stutterer which would meet the set criteria, i.e., the number of syllables that would be occurring on the 75th percentile point on the total range of fluency, exhibited by the subject. In other words, response unit based measure of fluency, proposed by Hegde (1978).

Further, it was decided to use variable schedule of reinforcement for highlighting the fluency, i.e., to highlight only the fluent utterance meeting the 75th percentile criterion in every 30 second segment and not all the fluent utterances meeting the criterion. This was done as it has been reported that variable schedule of reinforcement (in this case highlighting) is more effective in altering the behavior than any other schedule and also is more resistant to extinction (Ferster and Skinner, 1957). This variable schedule of highlighting has been designated as 'sampled highlighting of fluency' in the present study.

CHAPTER III

METHODOLOGY

The following experiment was conducted to study the effect of sampled highlighting of fluency in case of stutterers.

Subjects were selected from the cases who had come to the All India Institute of speech and Hearing Clinic with the complaint of stuttering and seeking therapy.

Subjects - Five adult males who were diagnosed as stutterers by Speech Pathologists at A.I.I.S.H. and were considered for the study who were willing to undergo experimentations. These subjects were also selected as they showed proficiency in terms of reading Kannada. The following table shows the age, sex and severity of stuttering as reported in case histories of the subjects.

These cases had no history of hearing loss, psychological problems or any other illness or disorders.

Experiment was conducted in a room of the Department of Speech Pathology. This room was selected as it was a quiet room and had no distractions.

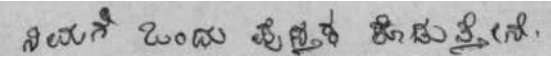
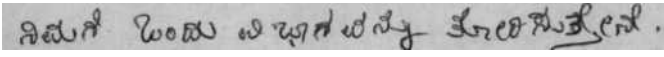
Material - A Kannada book entitled "Mudrana Samikshe" (Letter press process) was used as reading material. This contained various

Table I - showing the age, sex and severity of the stutterers

Sl.No.	Case No.	Age & Sex	Severity of stuttering
1	28210	18 M	Severe stuttering
2	28212	19 M	Severe stuttering
3	5583	21 M	Moderately severe stuttering
4	28697	18 M	Moderately severe stuttering
5	29115	20 M	Moderately severe stuttering

chapters regarding printing technology. This was selected as it had non-emotional content and as it was not difficult to read, i.e., the standard of the material was not above the standards of subjects' reading proficiency.

Assessment of base rate - (pre-experimental) - The subject was seated comfortably in a chair with the investigator sitting across the table. The subject was given the following instructions in Kannada:

1. 
(I will give you a book.)
2. 
(I will show you a chapter.)

3. ನಾನು, 'ಕುರುಮಾಡಿ' ಎಂಬ ಪಾಠ, ಸೀಮಿತ ನಿಯಮಗಳಿಗಿಂತಲೂ, ಕೂಡಲೆ ಕುರುಮಾಡಿ.
(When I say 'start', you start reading as you would do usually.)
4. ಈ ಲೇಖನ ನಾನು ಕೇಳುವವರೆಗೂ ಕುರುಮಾಡಿ.
(Keep reading till I ask you to stop.)

After giving the instructions, the subject was asked to read a passage from a particular chapter for a period of five minutes. A stop watch was used to note the time.

Recording - The reading of the subject was recorded using a Philips Cassette tape recorder with a Sony C-90 cassette which was placed on the table. The microphone of the tape recorder was approximately 3 feet from the mouth of the subject.

Thus, a reading sample for a duration of five minutes was obtained to assess the base rate.

Similarly, two more reading samples were obtained from the same subjects, using the same procedure with an interval of twenty four hours between each session. The subject was made to read different passages in each session from the same book.

Thus, totally three reading samples were obtained for each subject to assess the base rate. All the subjects were made to undergo this experimental session, i.e., for each of the subjects three reading samples were obtained. All the subjects read the same three passages from the book in the same order.

While the subject was reading in each session the experimenter was masking the words which were dysfluent, using another copy of the passage. This was done in all the three sessions for the purpose of noting the length of fluent utterances.

Further all the recordings were analysed using two judges. Two senior post-graduate students of speech pathology were used as judges. The judges were requested to listen to the tapes carefully and to note the number of stuttering blocks, using Wingate's (1971) definition of stuttering. The recording was played to the judges in the same experimental room. Thus, the number of stuttering blocks for each stutters, while reading, were obtained. This was considered as the base rate.

The following table shows the mean values of dysfluencies and the mean number of syllables read in five minutes. Total number of syllables uttered during each five minutes samples by each stutters was also counted to assess the rate of reading.

Further, using the text on which the investigator had noted the dysfluencies for each subject in each session, the length of fluent utterances were obtained. The fluent utterance is defined as the number of syllables uttered by the subject in between two consecutive dysfluencies. They were further classified as follows:

Table II - Pre-Experimental - showing the Mean Values of Dysfluencies and Mean Number of Syllable Output

sl. No.	Mean Values of Dys- fluencies/5 minutes	Mean Number of Syllables read in 5 minutes
1	59-6	983
2	39-2	1387
3	57.8	937
4	67-4	1010
5	55.3	1067

Table III - Showing Computation of Frequency of Fluent Utterance

Number of fluent syllables uttered	Frequency of utterance in the passage
Below 10	
11 - 20	
21 - 30	
31 - 40	
41 - 50	
51 - 60	
61 - 70	
71 - 80	

Further, the 75th percentile and median are calculated using the formula,

$$Q_3 = l + \frac{i(3N/4 - \text{Cumf}_1)}{f_q} \text{ and}$$

$$Q \text{ (median)} = \frac{Q_3 - Q_1}{2}$$

- Where l = the exact lower limit of the interval in which the quartile falls
 i = the length of the interval
 cumf_1 = cumulative 'f' upto the interval which contains the quartile
 f_q = the 'f' on the interval containing the quartile

This permits a comparison across the subjects with varied degree of severity of stuttering. Therefore this procedure is recommended.

Thus, for each subject the length of fluent utterance (the number of syllables falling on 75th percentile point) were obtained. The following table shows the number of fluent utterances for each subject.

Table IV - Showing Number of Syllables of Fluent Utterances falling on 75th percentile

Case No.	Number of syllable utterance (75th percentile)
1	35 - 41
2	54 - 60
3	19 - 24
4	36 - 43
5	45 - 53

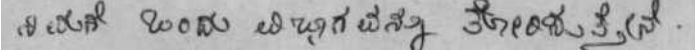
These fluent utterances were considered as the criterion for highlighting. This varied for each subject depending on the severity of stuttering.

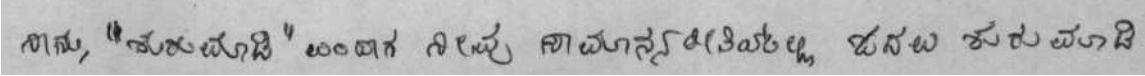
Experimental Session - This session was carried out after 24 hours of the last session of base rate assessment for each subject. This part of the experiment was conducted in the same situation as was done earlier.

Instruction to subject - Subject was asked to sit comfortably.

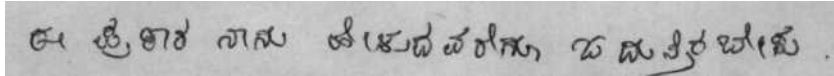
The following instructions were given.

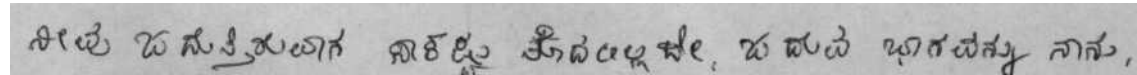
(I will give you a book.)

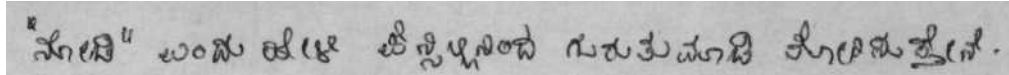
2. 
(I will show you a chapter.)

3. 
(When I say 'start', you start reading as you would

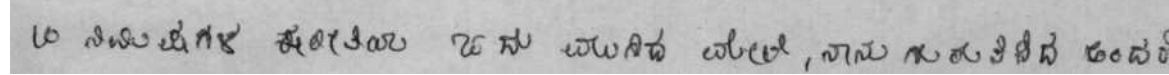
do usually.)

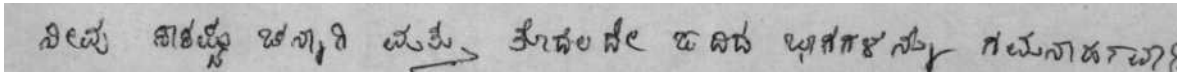
4. 
(Keep reading till I ask you to stop.)

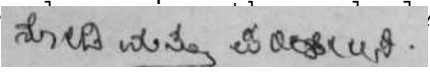
5. 
(When you read sufficiently longer without stuttering,



I will say 'ನೀನು', show and underline it with a pencil.)

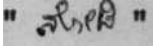
6. 
(After reading for 10 minutes, you will carefully see



ing markings, which show your

fairly fluent utterances.)

After the instructions, the case was asked to read a passage from the same text book that was used earlier to see that no variability occurs in terms of reading materials. Care was also taken to see that the passages were not repeated.

The experimenter highlighted the fluent utterances which were meeting the criterion set earlier by underlining such utterances in the passage the subject was reading using a pencil and by uttering a word "  " (subject to note). This was done only once in every thirty seconds of reading. Thus, during 10 minutes session, twenty fluent utterances were highlighted.

The subjects showed the occurrences of fluent utterances meeting the criterion set more than once in each thirty seconds of reading. The first fluent utterance which occurred meeting the criterion set was highlighted. Whenever no fluent utterance meeting the criterion occurred, no highlighting was done in that 30 seconds of reading.

This was done with the intention of highlighting the sampled fluent behavior which was occurring in each thirty seconds of reading. In this session subject read for 10 minutes.

The subject underwent the same experimental condition using the same procedure for five times with an interval of approximately twenty four hours between each session.

Each subject underwent five experimental sessions, i.e., for all the five subjects, the fluent behaviors meeting the criterion set were highlighted in five different sessions, each of like ten minutes duration experimental condition, without highlighting, were obtained with the purpose of studying the effect of sampled highlighting fluent behavior in stutterers by comparing the number of dysfluencies in pre- and post-experimental conditions.

The recordings obtained in the post-experimental condition for all the subjects were analysed to obtain (a) number of dysfluencies, and (b) number of syllables uttered.

Post-experimental condition - For each subject, the same instructions were given as was done in pre-experimental condition. Each subject was asked to read a passage from the text, which was used earlier for five minutes. Care was taken to see that the subject did not read the passage which was read earlier. The reading was tape recorded, using the same procedure as mentioned in pre-experimental condition. Similarly, with an interval of twenty four hours between each, two more reading samples on different chapters of the same text were recorded.

All the five subjects were made to undergo three such sessions and thus three reading samples, each for a duration of five minutes for each subject after experimental condition, without highlighting, were obtained, with the purpose of studying the effect of sampled

highlighting fluent behavior in stutterers, by comparing the number of dysfluencies, in pre- and post-experimental conditions.

The recordings obtained in the post-experimental condition for all the subjects were analysed to obtain (a) number of dysfluencies, and (b) number of syllables uttered, i.e., syllable output.

(a) Number of dysfluencies - The same two judges who had analysed the recordings of pre-experimental condition, analysed the recordings of this post-experimental condition, using the same procedure. Thus, the number of dysfluencies in post-experimental condition for each subject were obtained.

(b) The total number of syllables uttered during each five minutes session, by each stutterer, was also counted to assess the rate of reading in post-experimental condition.

The same has been depicted in the following table - Table V.

Thus, the experiment was conducted to study the effect of sampled highlighting of fluent utterance of a set criteria on dysfluencies in stutterers.

Table I - Showing the Average Number of Dysfluencies during Sessions I and II of pre-Experimental Condition

Case No.	No. of dysfluencies shown in session		Session I-II	Rank
	I	II		
1	97-5	40.0	57-5	5
2	65-5	22.5	43-0	4
3	57-0	58-0	- 1.0	-1
4	76.5	44.5	32-0	3
5	48-5	46.5	2*0	2

Note - No. of dysfluencies shown in each session are average of ratings given by two judges.

GTable Value 0 T 1

H_0 - There is no significant difference between sessions I and II

H_1 - There is significant difference between sessions I and II

H_0 is accepted at all levels of significance.

Table I - Showing the Average Number of Dysfluencies during Sessions II and III of Pre-Experimental Condition

Case No.	No. of dysfluencies shown in Session		Session II-III	Rank
	II	III		
1	40-0	41-0	- 1.0	-2
2	22.5	29-5	- 7-0	-3
3	58.0	58.5	- 0.5	-1
4	44-5	81-0	-36.5	-5
5	46.5	71-0	-24-5	-4

G Table Value 0

T 15

H_0 - There is no difference between sessions II and III

H_1 - There is difference between sessions II and III

H_0 is accepted at all levels of significance.

Table I- - Showing the Average Number of Dysfluencies during Sessions I and III of Pre-Experimental Condition

Case No	No. of dysfluencies shown in Session		Session I - III	Rank
	I	III		
1	97.5	41.0	56.5	5
2	65.5	29.5	36.0	4
3	57.0	58.5	- 1.5	-1
4	76.5	81.0	- 4.5	-2
5	48.5	71.0	-22.5	-3
G Table Value		0	T	6

H_0 - There is no difference between sessions I and III

H_1 - There is difference between sessions I and III

H_0 is accepted at all levels of significance.

test shows that the base rate is stable in pre-experimental condition.

Similarly, to find out the stability of dysfluencies in post-experimental conditions, the Wilcoxon test was applied in the following tables.

Table II._A - Showing the Average Number of Dysfluencies during Sessions I and II of Post-Experimental Condition

Case No.	No. of dysfluencies shown in Session		Session I-II	Rank
	I	II		
1	37.5	23.0	14.5	5
2	18.0	10.0	8.0	2
3	27.5	17.5	10.0	3
4	32.5	21.5	11.0	4
5	45.0	47.0	- 2.0	-1

G Table Value 0

T 1

difference

H_0 - There is no significant/between sessions I and II

H_1 - There is significant difference between sessions I and II

H is accepted at all levels of significance.

Table II - Showing the Average Number of Dysfluencies during Sessions II and III of Post-Experimental Condition

Case No.	No. of dysfluencies shown in Session		Session II-III	Rank
	II	III		
1	23-0	8.5	14.5	4.0
2	10.0	1.0	9.0	2.5
3	17.5	20.5	- 3.0	-1.0
4	21.5	12.5	9.0	2.5
5	47.0	29.5	17.5	5.0

G Table Value 0 T 1

H_0 - There is no significant difference between sessions II and III

H_1 - There is significant difference between sessions II and III

H_0 is accepted at all levels of significance.

Table II- - Showing the Average Number of Dysfluencies during Sessions I and III of Post-Experimental Condition

Case No.	No. of dysfluencies shown in Session		Session I - III	Rank
	I	III		
1	37.5	8.5	29.0	5
2	18.0	1.0	17.0	3
3	27.5	20.5	7.0	1
4	32.5	12.5	20.0	4
5	45.0	29.5	15.5	2

G Table Value 0 T 0

H_0 - There is no significant difference between sessions I and III

H_1 - There is no significant difference between sessions I and III

H is rejected.

Thus, the dysfluencies shown by the subjects in pre- and post-experimental conditions were found to be stable. However, when a comparison was made between I and III sessions of post-experimental condition, there was a significant difference which indicates that the dysfluencies were decreasing gradually. Further, this fact was substantiated when a comparison of number of dysfluencies in sessions I and III was made. However, a comparison of conditions I and II and conditions II and III has shown no significant difference. Therefore, it can be concluded that the base rate was stable even in post-experimental condition.

To determine the effect of sampled highlighting of fluency, satisfying the set criterion, a comparison of number of dysfluencies in pre- and post-experimental conditions, shown by the subjects, was made by using t-test.

Table III - Showing the Mean Values of Dysfluencies during Pre-Experimental and post-Experimental Conditions

Case No.	Pre-Experimental Condition I	Post-Experimental Condition II
1	59.6	23.0
2	39.2	9.7
3	57.8	21.9
4	67.4	22.2
5	55.3	40.6

t	4.483	Table Value	-	0.05	2.132
				0.01	3.747

H_0 - There is no significant difference between Condition I (pre-experimental) and Condition II (post-experimental)

H_1 - There is significant difference between Condition I (pre-experimental) and Condition II (post-experimental)

As per the 't'-values, H_1 is accepted, i.e., there is significant difference between conditions I and II at 0.01 and 0.05 levels of significance.

Further inspection of the above table also indicates that there is difference in dysfluencies with less number of dysfluencies occurring in each case in post-experimental condition.

Therefore, it can be concluded that the sampled highlighting of fluency had an effect on dysfluency in case of stutterers, i.e., the frequency of dysfluencies can be decreased by sampled highlighting of fluency in case of stutterers. Thus, hypothesis I stating that the sampled highlighting of fluency has no significant effect on dysfluencies in stutterers is rejected.

Further, to find out the effect of sampled highlighting of fluency on syllable output, a comparison of syllable output in pre- and post-experimental conditions, it was decided to find out the stability of syllable output in pre- and post-experimental conditions using Wilcoxon-matched-pairs-signed rank test.

sessions

Thus, the comparison of syllable output in I & II, II & III and I & III have shown that there is no significant differences between sessions. Therefore, it can be concluded that the syllable output in pre-experimental condition was stable.

Further, a comparison of syllable output in sessions I & II, II & III, and I & III of post-experimental condition was made using the same procedure as earlier to find out the stability of syllable output.

All the three comparisons of syllable output in post-experimental conditions, i.e., between sessions I & II, II & III and I & III have shown a T-value greater than Table Value. Therefore, hypothesis (null hypothesis) - H_0 stating that there is no significant difference

Table IV_A - Showing the Average Number of Syllable Output during Sessions I and II of Pre-Experimental Condition

Case No.	Average Number of Syllable Output in Session		Session I-II	Rank
	I	II		
1	1059	951	109	5
2	1508	1424	84	4
3	918	1025	-107	-3
4	1022	1058	-35	-1
5	1008	1081	-73	-2

G Table Value 0 T 6

H_0 - There is no significant difference between conditions I and II

H_1 - There is significant difference between conditions I and II

H_0 is accepted at all levels of significance.

Table IV^B - Showing the Average Number of Syllable Output during Sessions II and III of Pre-Experimental Condition

Case No.	Average Number of Syllable Output in Session		Session II-III	Rank
	II	III		
1	951	938	13	1
2	1424	1229	195	5
3	1025	867	158	3
4	1058	949	109	4
5	1081	1113	- 32	-2

G Table Value 0 T 2

H_0 - There is no significant difference between conditions II and III

H_1 - There is significant difference between conditions II and III

H_0 is accepted at all levels of significance.

Table 17- - Showing the Average Number of Syllable Output during Sessions I and III of Pre-Experimental Condition

Case No. No.	Average Number of Syllable Output in Session		Session I - III	Rank
	I	III		
1	1059	938	121	4
2	1508	1229	279	5
3	918	867	51	1
4	1022	949	73	2
5	1008	1113	105	-3

G Table Value 0 T 3

H_0 - There is no significant difference between conditions
I and III

H_1 - There is significant difference between conditions
I and III

H_0 is accepted at all levels of significance.

Table V_A - Whowing the Average Number of Syllable Output during Sessions I and II of Post-Experimental Condition

Case No.	Average Number of Syllable Output in Session		Session I-II	Rank
	I	II		
1	1566	1511	55	1
2	1818	2011	-193	-5
3	1204	1308	-104	-3
4	1434	1344	90	2
5	1422	1313	109	4

G Table Value 0 T 8

H_0 - There is no significant difference between conditions I and II

H_1 - There is significant difference between conditions I and II

H_0 is accepted at all levels of significance.

Table V_B - Showing the Average Number of Syllable Output during Sessions II and III of Post-Experimental Condition

Case No.	Average Number of Syllable Output in Session		Session II-III	Rank
	I	II		
1	1511	1427	84	2
2	2011	1739	272	5
3	1308	1167	121	3
4	1344	1309	35	1
5	1313	1482	-169	-4
G Table Value		0	T	4

H₀ - There is no significant difference between conditions II and III

H₁ - There is significant difference between sessions II and III

H₀ is accepted at all levels of significance.

Table V_c - Showing the Average Number of Syllable Output during Sessions I and III of Post-Experimental Condition

Case No.	Average Number of Syllable Output in Session		Session I - III	Rank
	I	III		
1	1566	1427	139	5
2	1818	1739	79	3
3	1204	1187	17	1
4	1434	1309	125	4
5	1422	1482	60	-2

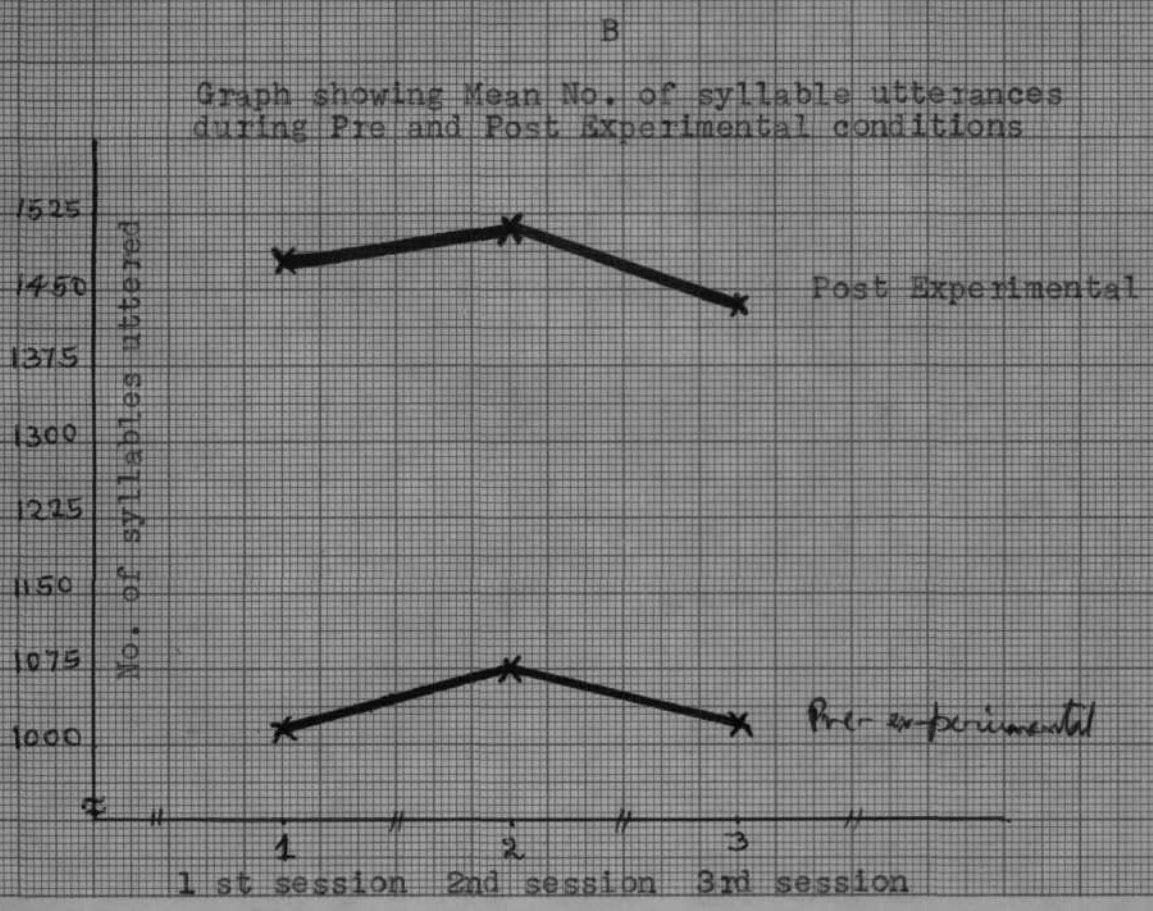
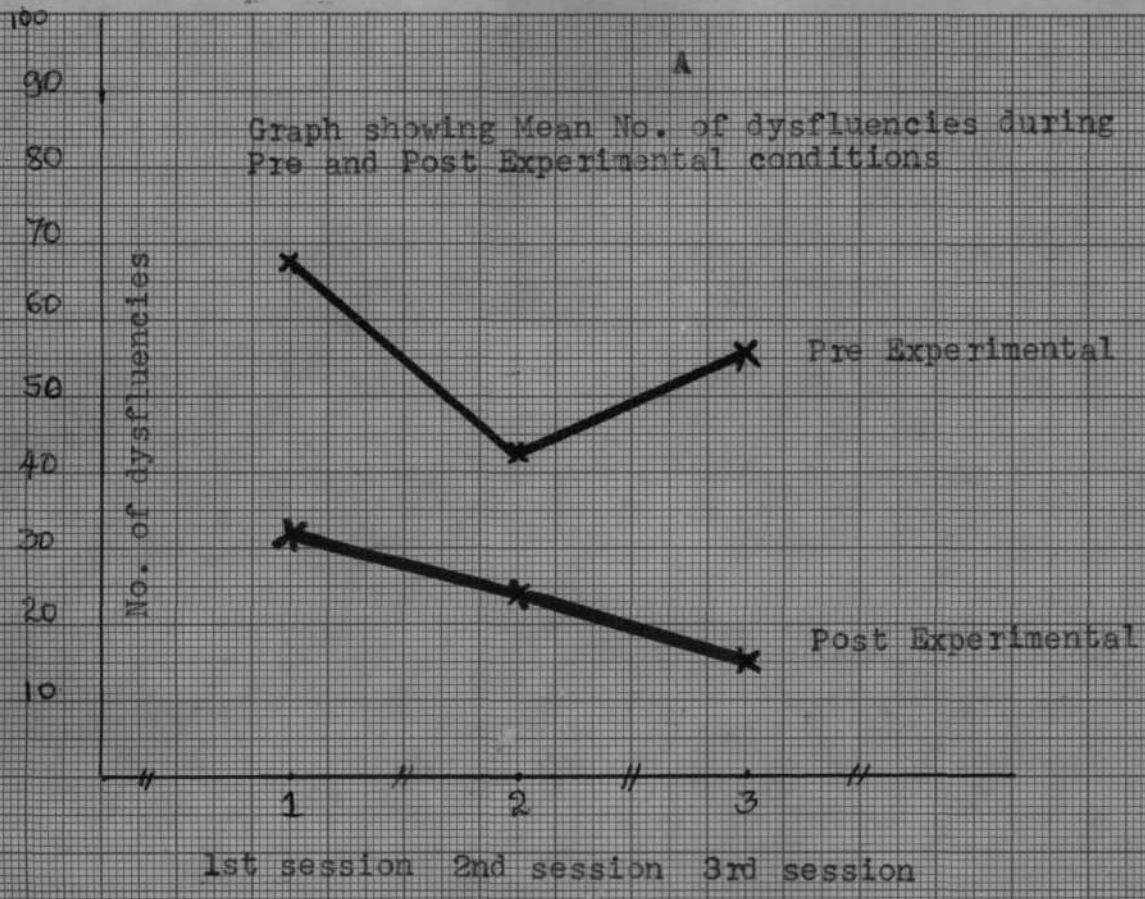
G Table Value 0 T 2

H_0 - There is no significant difference between conditions I and III

H_1 - There is significant difference between conditions I and III

H_0 is accepted at all levels of significance.

between any two sessions is accepted. Hence, it can be concluded that the syllable output in post-experimental condition was also stable.



To verify the hypothesis, stating that the sampled highlighting of fluency has no effect on syllable output, a comparison of mean syllable output in pre- and post-experimental conditions of all the subjects was made using t-test.

The following Table shows the mean syllable output in pre- and post-experimental conditions.

Table VI - showing the Mean Syllable Output in Pre-Experimental and Post-Experimental Conditions

Case No.	Mean Number of Syllable Output during	
	Pre-Experimental Condition	Post-Experimental Condition
1	983	1501
2	1387	1856
3	937	1233
4	1010	1362
5	1067	1406

t 20.10

The results of the t-test reject the hypothesis II, i.e., the results indicate that there is significant difference in the mean syllable output of the pre- and post-experimental conditions.

Thus, the results of the experiment have shown that the sampled

highlighting of fluency, meeting the set criterion, reduces the frequency of occurrence of stuttering blocks (dysfluencies) and also increases the syllable output in case of stutterers. Therefore, it can be concluded that the sampled highlighting of fluent behavior in case of stutterers -

- 1) decreases the stuttering blocks or dysfluencies and increases fluency
- 2) increases syllable output.

As pointed by Culatta (1976), while less than 4*5% of published research in the area of dysfluent behavior is concerned with fluency investigations on dysfluency are plenty.

Hegde (1977) points out that the operant methodology is not restricted to punishment procedures. There are positive reinforcement procedures that can be applied to desired behaviors, as a result, "incompatible, and undesirable, behaviors might show a concomitant decrease in frequency. Neither is stutterer's speech restricted to dysfluencies. Indeed, on an average, stutterers are known to be fluent on better than 90% of the words they read (Bloodstein, 1944). Fluency, the target, in other words, does exist, albeit at a less than desired level. Consequently, one need not resort to such time-consuming procedures as shaping in order to manipulate fluency, purely from a clinical standpoint, it would seem more appropriate to directly enhance the fluent behaviors of stutterers than to modify stuttering.

It is therefore surprising that fluency has not received much systematic attention."

In recent years, the emphasis is shifted away from the procedures designed to modify stuttering to enhance fluency (Ryan, 1971; Shaw and Shrum, 1972; Culatta and Rubin, 1973; Manning, et al, 1976; Culatta, 1976; Hegde and Brutten, 1977). Fluency therapy has been vigorously advocated by many. There have been few clinical studies, which have demonstrated the practical usefulness of reinforcement procedures in obtaining an increase in the units of fluent speech, i.e., attempts have been made to reinforce fluency positively to achieve fluent speech in stutterers.

Martin and Siegel (1966) reinforced two adult stutterers by using verbal stimulus for every thirty seconds of fluency and by using 'not good' for every stuttering block, and they found decrease in stuttering blocks.

Shaw and Shrum (1972) have demonstrated that the frequency of specified intervals of fluent speech can be increased with the positive reinforcement and a decrease in frequency of dysfluency.

Manning et al, (1976) have suggested that the verbal and tangible reinforcers can be equally effective in increasing fluency in children, based on their study in which they had reinforced the fluency by tangible and verbal reinforcers and also by making a mark on a sheet of paper for every fluent utterance.

made, by underlying, once in 30 seconds, the fluent utterance of the subjects, meeting the set criterion and by saying the word "नक्षत्र" (note). An increase in fluency and a decrease in dysfluency has been found, and thus the results of the present study are in support of the earlier studies, as stated above. All the five subjects who had undergone such an experimental condition have shown a significant decrease in syllable output in post-experimental condition.

Further, in the present study, it may be noted that the fluency which is meeting the 75th percentile criterion in terms of syllable output in a segment of thirty seconds is highlighted only once, and not all the fluent utterances, which are meeting the criterion of 75th percentile of syllable output are highlighted, within the thirty seconds segment. As pointed out by Vijayalakshmi (1973), the occurrence of fluencies when highlighted may act as 'potential carriers of their own reward' and thus increase fluency and decrease dysfluency in stutterers.

This procedure of highlighting the desired behavior only once in a given segment of time, which has been termed 'sampling', here, seems to be an economical one, when compared to highlighting or reinforcing all the occurring fluent behaviors.

Many have recommended the procedures used to increase the fluency which concentrate fluency than to use the procedures to decrease dysfluencies. Van Riper and others (1976) have recommended such

therapies particularly in case of children as more useful. Therefore, the present technique of sampled highlighting of fluent syllable output seems to be a useful and economical therapy technique in case of stutterers, particularly with children having stuttering.

CHAPTER V

SUMMARY AND CONCLUSIONS

Attempts have been made to manipulate dysfluency and fluency using various kinds of stimuli as negative and positive reinforcers, in stutterers. The results have been confusing and contradicting. Some studies have shown that the fluency can be enhanced with concomitant decrease in dysfluencies by highlighting fluency.

The present study was conducted to find out the effect of sampled highlighting of fluency. The study consisted of five male stutterers who underwent the following stages.

1. Pre-experimental condition
2. Experimental condition - and
3. Post-experimental condition

In pre-experimental condition, the subject was made to read a non-emotional passage in Kannada from a text for a duration of five minutes. The readings were recorded using a tape recorder and analysed with the help of two trained judges to obtain the frequency of dysfluencies. Each subject underwent three such sessions. The recorded reading samples were further analysed by the experimenter to determine the syllable output and the number of syllables in each fluent utterance in each session.

The number of syllables in fluent utterances occurring on the 75th percentile points, in the range of fluent utterances were determined for each subject, which varied from subject to subject. This was considered as one of the criterion for highlighting. Further, it was decided to highlight only the first fluent utterance meeting the above said criterion in every 30 seconds period, in the experimental session. This has been termed as 'sampled highlighting of fluency'.

In the experimental session, the subject was made to read another passage from the same text which was used earlier; for a period of ten minutes. The experimenter underlined and uttered the word " whenever the fluency occurred meeting the above said criteria. Thus, sampled highlighting of fluency was done during the experimental condition. Each subject underwent five such sessions of 10 minutes each, with an interval of twenty four hours between each session.

After twenty four hours of conducting the last session of the experimental condition, post-experimental condition was conducted. The procedure and analysis used in the post-experimental condition were same as in pre-experimental condition.

The stability of frequency of dysfluency and syllable output in pre- and post-experimental conditions have been studied using suitable statistical procedures. Further, a comparison of frequency of dysfluencies and syllable output in pre- and post-experimental conditions have been compared using t-test.

The following conclusions have been drawn based on the results of the study.

- 1) After the sampled highlighting of fluency, there will be decrease in the number of dysfluencies in stutterers.
- 2) After the sampled highlighting of fluency, there will be increase in the number of syllable output in case of stutterers.

Thus, it can be further concluded that the sampled highlighting of fluency can be used as a therapeutic procedure to reduce the frequency of dysfluency (stuttering) and to increase the frequency and length of fluent utterances.

Recommendations

- 1) To repeat the study with a larger group of stutterers.
- 2) To study the effect of verbal and non-verbal stimuli used to highlight the fluency on stuttering.
- 3) To study the effect of highlighting of fluency after using the same for longer duration.
- 4) To study the effect of highlighting of fluency in spontaneous speech.
- 5) To use this technique as a therapy procedure in the clinic and follow up studies may be conducted to note the long-term effect.
- 6) Theoretical implications of the results may be explored.

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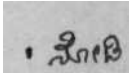
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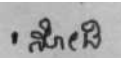
Subject No.2

- | | |
|-------------------------------------|--|
| 1. Case File No. - | 28212 |
| 2. Age - | 19 yes |
| 3- Sex - | M |
| 4* Age of onset - | Since childhood |
| 5* Family history | - NIL significant |
| 6. Previous therapy - | NIL |
| 7. Therapy given - | Highlighting of fluency |
| 8. Stuttering behavior and severity | - Severe stuttering with secondaries, Mainly repetition of sounds and syllables, Secondary signs like closing of eyes, head movement with struggle behavior. |
| 9. Sequence of stimuli presentation | - '  ' (to look),
Highlighting |
| 10. Fluency to be reinforced | - 75th percentile of single fluent utterance in every 30 seconds of duration. |

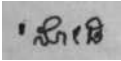
Subject No.3

- | | |
|--|--|
| 1. Case File No. - | 5583 |
| 2. Age - | 21yrs |
| 3. Sex - | M |
| 4. Age of onset - | 4 yrs |
| 5. Family history - | NIL significant |
| 6. Previous therapy - | Prolongation therapy with
no benefit (5 yrs back) |
| 7. Therapy given - | Highlighting of fluency |
| 8. Stuttering behavior -
and severity | Moderately severe stuttering
with secondaries,
Silent and audible pauses,
Repetition of initial sounds
and syllables accompanied by
puffing of air, clinching of
facial muscles, abrupt
opening of lip. |
| Sequence of stimuli
presentation | - 'अने' (to look)
Highlighting |
| 10. Fluency to be reinforced | - 75th percentile of single
fluent utterance in every
30 seconds of duration. |

Subject No.4

- | | | |
|--|---|--|
| 1. Case File No. | - | 28697 |
| 2. Age - | | 18 yrs |
| 3. Sex - | | M |
| 4. Age of onset | - | 8 yrs |
| 5. Family history - | | NIL significant |
| 6. Previous therapy | - | NIL |
| 7. Therapy given - | | Highlighting of fluency |
| 8. Stuttering behavior -
and severity | | Moderately severe stuttering
Mainly repetitions,
Occasional prolongations.
No significant secondaries,
However irregularity in
breathing noticed. |
| 9. Sequence of stimuli -
presentation | | '  ' (to look)
Highlighting |
| 10. Fluency to be reinforced - | | 75th percentile of single
fluent utterance in every
30 seconds of duration. |

Subject

1. Case File No. -	29115
2. Age -	20yrs
3. Sex -	M
4. Age of onset -	7 yrs
5. Family history -	NIL significant
6. Previous therapy -	NIL
7. Therapy given -	Highlighting of fluency
8. Stuttering behavior and - severity	Moderately severe stuttering with secondaries Repetitions, hesitations accompanied by secondaries like hand movements, flaring of nostrils, raising the eyebrows
Sequence of stimuli - presentation	'  ' (to look) highlighting
10. Fluency to be reinforced -	75th percentile of single fluent utterance in every 30 seconds of duration