

HIGHLIGHTING OF FLUENCY IN STUTTERERS

SRINIVAS, P. S.

Attempts have been made to explain stuttering using learning principles (Wischner, 1950; Sheehan, 1958; Shoemaker, 1967; and Shames and Sherrick, 1963).

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 behaviour, fluency, and decrease the undesirable dysfluencies (stuttering) concomittantly. Hegde (1978), 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 concomittant 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 behaviours 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 minimise 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 'ze hu' 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 indicate 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.

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.

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

Methodology

The following experiments were conducted. Subjects were 5 adult male stutterers, who show proficiency in reading Kannada.

Pre-experimental Condition: The subject was asked to read a passage from a text-book for a period of 5 minutes. The reading was recorded using a tape-recorder. Similarly, two more samples of reading were obtained for a duration of 5 minutes, with an interval of 24 hours between each session. The subject was made to read different passages from the same text in each of the session. All the subjects underwent this pre-experimental condition.

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.

Two post-graduate students of Speech Pathology analyzed the tape to note the number of stuttering blocks in each reading for each subject. Wingate's (1971), definition of stuttering was used to note the stuttering blocks. The average of number of blocks in all the three readings for each subject was considered as the base rate.

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 frequency of occurrence of fluent utterances of various lengths were also determined. The fluent utterance is defined as the number of syllables uttered by the subject in between two consecutive dysfluencies. This was done using the concept of response unit based measure of fluency proposed by Hegde (1978). Using this information; the length of fluent utterance falling on the 75th percentile point in the total range of fluent utterances. Thus for each subject the length of fluent utterance (the number of syllables in the fluent utterance falling on 75th percentile point) were obtained. These fluent utterances varied for each subject depending the severity of stuttering. These fluent utterances were considered as the criterion for highlighting the fluency in the experimental session.

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.

The subject was instructed to read the passage from the text and the subject was also told that whenever he reads without stuttering for the required length of time the experimenter would underline one of such utterances using a pencil on the text that he is reading and also say (ನೋಡಿ) note. Further he would also be permitted to see the text, after completing the reading for 10 minutes and he can note the markings.

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 'ನೋಡಿ' (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 behaviour 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 behaviours meeting the criterion set were highlighted in five different Sessions, each of ten minutes duration experimental condition.

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

(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.

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

Results and Discussion

The experiment was conducted to study the effect of sampled highlighting of fluency on dysfluencies in stutterers. The experiment was conducted using A, B and A' design.

	A	B	A'
Conditions	Pre-experimental condition	Experimental condition	Post -experimental condition
No. of sessions in each	3	5	3
Presence or absence of highlighting	No sampled highlighting of fluency	Sampled highlighting of fluency	No sampled highlighting of fluency

The pre-experimental condition consisted of three sessions of five minutes with a time interval of twenty-four hours between each. The occurrence of dysfluencies in these three sessions were considered as the base rate. To find out the stability of base rate, the Wilcoxon-matched-pairs-signed rank test was used. The following table show the number of dysfluencies in each segment and their comparison between sessions.

Thus, the application of the Wilcoxon-matched-pairs-signed rank 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.

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 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.

Further inspection 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-

Thus, the comparison of syllable output in sessions I and II, II and III, and I and 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 and II, II and III, and I and 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 and II, II and III, and I and III have shown a T-value greater than Table Value. Therefore, hypothesis (null hypothesis)— H_0 stating

that there is no significant difference between any two sessions is accepted. Hence, it can be concluded that the syllable output in post-experimental condition was also stable;

To vary 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 showing the Mean Syllable Output in Pre- 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
S,	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 fluency behaviour 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 per cent of published research in the area of dysfluent behaviour is concerned with fluency investigations on dysfluency are plenty.

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 Brutton, 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.

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.

An attempt has been made by Vijayalakshmi (1973), to explain the responses of Stutterers to three verbal stimuli on fluency, who showed a decrease in stuttering by using the highlighting phenomenon advanced by Siegel and Martin (1968). According to Siegel and Martin, 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).

Thus, this notion of highlighting a particular behaviour has been extended to fluency by Vijayalakshmi (1973) and she tries to explain the decrease in stuttering in response to contingent presentation of good ', ' no ' and' zehu ', in her subjects by stating that,' the fluency of stutterers are potential carriers of their own reward such that increase in the subject's attention to the response evokes the rewarding property and thus fluency will be increased or in other words, stuttering will be decreased.'

In the present study, sampled highlighting of fluency has been made, by underlying, once in 30 seconds, the fluent utterance of the subjects, meeting the set criterion and by saying the word 'ನೋಡಿ' (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 behaviour 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 behaviours.

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.

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