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A PRELIMINARY INVESTIGATION
OF THE EFFECTS OF PUNISHMENT AND NO-PUNISHMENT
ON THE VERBAL DISFLUENCIES OF STUTTERERS

By

Marilyn M. Pearson

B. S. University of Wisconsin, 1964

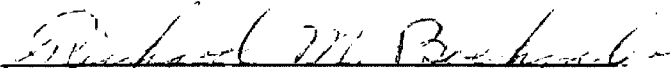
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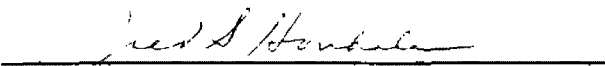
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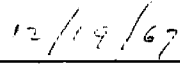
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A special note of thanks is expressed to the graduate students in the Speech Pathology and Audiology Department who assisted in the analysis of this study, to my mother who aided in the typing, and to my husband, Tom, for his patience and assistance in this study.

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CHAPTER I

INTRODUCTION

Within the past 30 years, a great deal of research has been done in the field of stuttering, and although defined differently by many authors, it has generally been explained by three different theories, or concepts. One of the first assumptions made about stuttering was that it was primarily a neurological organization disorder. Travis (1937), through his studies of brain potentials and handedness, attempted to show that stuttering was a manifestation of some neurological disorganization. Bryngelson (1935) also carried out studies along a similar theme. He attempted to show that sidedness was an etiological factor. Both of these men, however, were able to establish strong evidence to indicate that neurological disorganization was a precipitating factor in stuttering, and after the late 1930's, researchers turned to a new concept as a means of explaining the enigma of stuttering.

In the '40's, the concept that stuttering was a basic personality disorder was advanced and researched by men such as Glauber (1958) and Johnson (1958). Although both of these theories explained stuttering as a learned disorder, they

differed considerable in details. Glauber proposed a broad view that it was an:

arrest in ego naturation, otherwise stated as fixation at an early ego state. The fixation is manifested in the speech symptom and in the total personality. (Glauber, 1958, p. 93).

Glauber felt that stuttering was a family disorder in that the mother of the child had serious conflicts, not only within herself, but with the father and the child. Johnson's (1955) narrower view of stuttering as a personality disorder pointed out that:

the speaker (the child) responds to what the listener (the adult) does. And what the listener does seems to be more or less un-nerving to the speaker, so that, while the responses and effects appear to be quite subtle and slow working in most cases, the speaker's reactions to the listener's evident evaluations come in time to be marked by noticeable hesitation and tension. (Johnson, 1955, p. 11).

Johnson's concept, which he referred to as the diagnosogenic theory of stuttering, stimulated further research in this area. Within the past twenty years, learning, as a factor of stuttering, has become an increasingly popular concept with Johnson's students and with others. Bloodstein, for example, stated:

even the most articulate child who is subjected to pressures to exceed his speech or language capabilities may learn to evaluate his speech attempts as failures and acquire that assumption of basic inadequacy at speaking which appears to underlie the tendency to stutter. (Bloodstein, 1958, p. 37).

Sheehan (1958) attempted to integrate clinical and research information about stuttering and developed what is known as

a conflict of theory stuttering. According to Sheehan's theory:

the stutterer has a goal, that of communication, but also a fear, arising from several possible sources as levels. The avoidance gradient is steeper than the approach gradient. What any organism does when caught in approach-avoidance conflict is to go part way and then stop. Repetition and prolongation as the usual initiating symptoms in child stutterers and as the chief symptoms common to all stutterers, probably represent the oscillations and fixations found in approach-avoidance conflict. (Sheehan, 1958, p. 128).

Sheehan further stated that "stuttering may become a closed system, functionally autonomous, a vicious circle continuing to operate long after the extinction of the forces which originally set it in motion" (Sheehan, 1958, p. 146). Even more recently, stuttering as learned behavior has been pursued further by such people as Hill (1954), Frick (1951), Savoye (1955), Diedrichs (1962), and Boehmler (1965). All of these authors were investigating the more specific aspects of stuttering, namely, whether verbal disfluencies in both stutterers and non-stutterers could be manipulated by means of verbal criticism or electrical stimulation. They felt that if these disfluencies could be manipulated, this would lend support to the concept that certain aspects of stuttering are learned behavior. These studies differed significantly from the earlier studies in that before this time the referent for "stuttering" was seldom specified or operationally defined. The assumption underlying this approach is that verbal disfluencies are an important aspect of the

communication disorder associated with the label "stuttering", and therefore a legitimate focus for their investigations.

Hill's (1954) study attempted to show that threat of penalty would produce disorganization of propositional speech of non-stuttering adult speakers similar to the disfluency found in "primary stuttering."¹ Hill subjected his subjects to non-contingent shock without regard to their speech behavior, and found that threat of penalty (shock) produced a disorganization (disfluency) in the speech of non-stuttering subjects. Hill stated that:

the incorporation of disorganized speech reactions into the individual's everyday behavior, however, would probably require learning or circumstances similar to conditioning. (Hill, 1954, p. 304).

Frick (1951) also employed the use of non-contingent shock and studied its effects on verbal stuttering behavior. He concluded that:

threat and administration of punishment has been established as another antecedent-stimulus condition with which frequency of stuttering and, we infer, anxiety are functionally related. This is believed to constitute further evidence for the belief that stuttering is anxiety motivated behavior and that the greater the expected penalty for stuttering, the greater the frequency of stuttering.² (Frick, 1951, p. 73).

However, Frick's study was criticized by other researchers because he only utilized a list of forty words. It was felt

¹Primary stuttering is defined by Van Riper (1963) as "short, effortless repetitions and prolongations of the syllable or sound." (Van Riper, 1963, p. 328).

²The author assumes that "stuttering" in the Hill and Frick studies refers to verbal disfluencies.

that the increase in disfluencies, during production of the stimulus words by the subjects, was so small that Frick's conclusions were questionable.

More recently, Boehmler (1965) conducted a study of "Word Fluency Following Punishment of Word Production" of non-stutterers. Boehmler chose ten words out of a reading passage given to the subjects. Each subject took part in two conditions, each consisting of five trials each. In condition I, the subjects received no shock. In condition II, each subject was administered a shock for the chosen ten words without regard to the subject's verbal behavior. The subjects had been given a set that shock would be given for inadequate speech. Results indicated that there were fewer disfluencies in trial one of the shock condition compared to the no-shock condition, but disfluencies increased during the remaining trials of the shock condition compared to the no shock condition. These results suggest a complex relationship between pre communication set; threat of punishment, punishment and the frequency of disfluencies.

Savoie, in 1955, also employing shock in her study, measured its effect on fourteen non-stuttering males and females while reading a passage aloud. She concluded that, under arbitrary shock, her subjects were more disfluent than the control subjects who did not receive shock. Her study tended to support the evidence presented by Frick and Hill's studies.

Similarly, Stassi (1961), like Savoye, evaluated the effects of four different schedules of reward and punishment on non-stutterers' verbal behavior. The subjects were asked to read a list of nonsense words, and the experimenter replied either right or wrong. Stassi concluded from his subjects that there was an increase in disfluencies as punishment increased.

Jensen's (1966) study, similar to that of Stassi, explored the effects of approval versus disapproval by a listener on the production of hesitant speech in normal children. Utilizing a list of tri-syllable, nonsense words, reward and punishment was given on different schedules. His results indicated that reward and punishment don't have differential effects on latency of verbal responses, but it did have an effect on duration of responses. Females differed from males in that the females' responses for reward were shorter, and responses for punishment were longer. No difference was noted in males between the two conditions.

Diedrichs (1962), however, in her study, "An Investigation of the Effect of Verbal Criticism Upon Speech Fluency of Normally Fluent Male Subjects," found that oral criticism produced no significant increase in disfluencies. It was felt that the use of artificial, taped, criticism may have influenced the results of the study. In her pilot study, using 'live' criticism, the subjects showed an increase in disfluencies.

All of the previous studies concerned with stuttering as learned behavior found that punishment, or threat of punishment, increased disfluencies. However, in 1959 Flanagan found that stuttering decreased during aversive periods (when presentation of tone is contingent upon stuttering), and that:

the data presented suggest that the stuttering response is an operant which occurs in the context of another operant, namely, verbal behavior. (Flanagan, 1959, p. 176).

More recently the studies done by Martin and Siegel (1965, 1966) supported Flanagan's findings that threat of punishment may improve speech and stressed the importance of contingency of shock on the disfluencies of both non-stutterers and stutterers. Martin and Siegel's studies differed from those of Frick, Savoye and Hill, in that they found that through the use of contingent shock on specific stuttering disfluencies, those disfluencies would decrease. They stated:

Frequencies of stuttering behaviors can be manipulated by the response contingent presentation of an aversive stimulus. (Martin and Siegel, 1966, p. 350).

It would appear from Martin and Siegel's studies, that contingency of shock may be the determining factor in the reduction of disfluencies, whereas, arbitrary, or random punishment seemingly, results in an increase of disfluencies.

An interesting observation was pointed out by Martin and Siegel in their most recent study (1966). They found

that when they punished nose wrinkling, it decreased, but the interjection, "uh-uh," appeared in one of their subject's verbal behavior. Thus, although punishment may decrease one behavior (nose wrinkling), another behavior (disfluency) may occur or increase as a result. This finding of Martin and Siegel may suggest an explanation for the differing relationships between punishment and disfluencies. Although contingent shock may decrease specific different behavior, other behavior, other behaviors, such as other types of disfluencies may increase.

Statement of Purpose

This, then leads us to the purpose of this study, which is to measure the effects of shock on a specific type of disfluency and other disfluencies not associated with the shock. So far as can be determined by this author, Martin and Siegel are the only ones to present any evidence that disfluencies other than those contingent with shock will increase, and this was indicated by only one subject. This study would then pursue this area further to ascertain whether other stutters show an increase in other types of disfluencies when a specific type of disfluency is punished. This study will not attempt to evaluate the effects of shock on other stuttering behavior such as pitch and voice quality change. Presentation of shock in this study differs from that of Martin and Siegel in that Martin and Siegel presented shock at the same time the disfluency was exhibited. In this

study shock was presented immediately after the subject produced a word in which a specific disfluency was exhibited. It was felt, by the experimenter, that this procedure more closely conformed to the way in which punishment is presented in a non-experimental situation by clinicians and parents.

Since a number of adaptation studies have shown that frequency of disfluencies on successive readings of the same material become stable on the fifth reading, five conditioning trials were considered sufficient to demonstrate the effects of the extraneous variables and shock.

For this study, a group of subjects was selected on the basis of their showing a significant number of disfluencies. Significant was defined by the author as 3% disfluencies on a total of 400 words.

It is hypothesized that a disfluent group of stutterers will exhibit significantly fewer shock associated disfluencies on the fifth conditioning trial, compared to the no-shock condition, and that the total number of all other types of disfluencies will increase on the fifth trial under the shock condition compared to the no-shock condition.

CHAPTER II

PROCEDURE

This study was composed of a pre-experimental trial and two experimental conditions: Condition I (no shock), and Condition II (shock). Each condition consisted of five successive trials with a five-minute interval between trials.

A list of 400 words, derived from Thorndike and Lorge combined word lists, was used to elicit responses from the subjects. (See Appendix A). The words were chosen from a list of words which occur less than 50 times per million words in number of occurrences, and were also selected on the basis of being more difficult and more likely to elicit disfluent responses. These words were pronounced correctly by three adult, male, non-stutterers. Each word was printed, by means of a primary typewriter, on a 3½" by 2½" card. The cards were randomized after each trial by means of shuffling to prevent the subject from knowing what card succeeded another.

Pre-experimental Trial

On the basis of the pre-experimental trial each individual's pattern of stuttering behavior was determined. The pre-experimental procedure was as follows: The subject was

seated in a room at a large table. The experimenter was able to observe the subject from an adjoining room by means of a one way mirror. A microphone was placed in the room with the subject, and was connected to a Rheem Califone, A. V. Series Solid State magnetic tape recorder in the room with the experimenter. 400 cards, each with a word printed on it, were placed face down in a box to the left of the subject. An empty box was placed on the right of the subject. A tone oscillator was connected to a speaker in the room, allowing a tone to be presented to the subject. The tone acted as a signal to the subject to draw a card and read aloud the word printed on it. The following instructions were given orally to each subject:

"You are going to take part in an experiment in which we are studying speech behavior. In front of you is a large box full of cards on which words are printed. When you hear the following tone (present tone), I want you to draw a card, read the word on the card aloud, and place the card in the other box to your right. When you hear the next tone, draw another card and repeat the process until you have completed all the cards in the box. Do not draw another card until the tone is presented. You may begin when you hear the tone. Do you understand the instructions?"

The tone and the subject's responses were recorded by means of the magnetic tape recorder. Each time the subject prepared to draw a card, an assistant to the experimenter presented a tone. The purpose of this procedure was to allow for the measurement of latency, or pause time, between the presentation of the stimulus word and the subject's response. A pause was operationally defined, for the purpose of this

experiment, as a three second delay before production of any sound associated with the stimulus word after the tone was presented. The length of a pause was determined by having had three, adult, male, non-stutterers read the cards. It was found that all three non-stutterers produced all the words within $2\frac{1}{2}$ seconds after the presentation of a tone.

Subjects

Since administrative policy omitted subjects under 14 years of age, and subjects who were just initiating therapy from experimental studies, only seven possible subjects, six males and one female, ranging in age from 15 years to 35 years of age were available from the cases at the University of Montana Speech and Hearing Clinic for this study. Those selected were given a pre-experimental trial which involved the individual production of 400 words after each was cued by the experimenter. Subjects were chosen on the basis of having disfluencies on more than 3% of the stimulus words during the pre-experimental trial, and on their willingness to be subjected to electrical stimulation. Two of the seven subjects were omitted from the study after the pre-experimental trial because of an insufficient percentage of disfluencies on the stimulus words. All of the remaining five subjects were receiving speech therapy, primarily desensitization therapy, at the time of this study. Duration of this treatment ranged from 12 weeks to 2 years. Four of the remaining subjects were judged, by the experimenter, as having

stuttering behavior to a moderate degree, and one to a severe degree. (Johnson, Darley, Spriestersbach, 1952, p. 281).

After each of the seven possible subjects completed the pre-experimental trial, the experimenter replayed the subject's responses by means of the magnetic tape recorder, and recorded on paper, the number and types of disfluencies each stuttrer exhibited in his verbal behavior. A reliability check of the experimenter's judgements was done by a graduate student in Speech Pathology, trained in fluency disorders. The reliability coefficient of the total disfluencies for each of the seven possible subjects was .99. (See Appendix B for individual totals). The per cent of agreement in types of disfluencies was 96%.

The following criteria were used as a means of defining disfluencies for this study:

1. "Interjections of sounds, syllables. This includes extraneous sounds such as "uh", "er", and "hum", and extraneous words such as "well".
2. Part word repetitions - Repetitions of parts of words--that is syllables and sounds--are placed in this category.
3. Broken words - This category is typified by words which are not completely pronounced and which are not classifiable in any other category, or in which the normal rhythm of the word is broken in a way that definitely interferes with the smooth flow of speech. "I was g-(pause) -oing home." is an example of a broken word.
4. Word repetitions - Repetitions of whole words.
5. Prolonged sounds - Sounds or parts of words that are judged to be unduly prolonged are included in this category." (Johnson, 1961, pp. 3-4).

6. Pause - Operationally defined by the author, for the purposes of this study, as being a 3-second maximum delay, or silence before the subject produced the stimulus word.

Experimental Procedure

The experimental conditions, I (no-shock), and II (shock), began two days after the pre-experimental trial. Each condition consisted of five successive trials with a five minute rest period after each trial. Conditions I and II were administered four days apart in the following order:

Subjects: 1, 2, 5

First day: Condition II (shock), 5 trials
Fourth day: Condition I (no-shock), 5 trials

Subjects: 3, 4

First day: Condition I (no-shock), 5 trials
Fourth day: Condition II (shock), 5 trials

The no-shock condition (Condition I), was conducted in exactly the same manner as the pre-experimental trial. A randomized selection of 400 words was used to elicit responses from the subjects. After each trial the words were again randomized, and responses for each trial were recorded by means of the magnetic tape recorder.

In Condition II, the shock condition, electrodes from the Grason Statler Galvanic Skin Response instrument, hereafter referred to as the G.S.R., were attached to the index finger and the middle finger of the subject's left hand. In one case, electrodes were placed on the inside of the subject's arm because he reported little sensation when the

electrodes were attached to his fingertips. This allowed the subject to use his right hand to draw a card. (All subjects were right handed.) The G.S.R. instrument was placed in the adjoining room with the experimenter. Shock intensity level was determined for each individual subject before the actual shock condition began. The subject was informed that he was going to be given a very mild shock at first, and that then the experimenter was going to slowly increase the intensity of each shock. When the subject announced that he did not wish the intensity of the shocks to be increased beyond a certain level, the experimenter maintained that intensity of shock throughout Condition II. Each of the subjects' level of shock intensity was the maximum output of the G.S.R., 2.5 microvolts.

After intensity level of shock was determined for the individual subject, the experimenter gave the same instructions as for Condition I. In Condition II the experimenter purposely did not inform the subject of what he was being shocked for. This was done in an effort to minimize the subject's "set", and to reduce the number of variables operating in this condition.

A shock of one-half second duration was presented to each subject immediately after he produced a word exhibiting his most frequent disfluency as determined by his pre-experimental trials. All of the subjects, except subject 4,

received shock for part word repetitions. Subject 4 received shock for pauses.

The subjects' responses were recorded on the magnetic tape recorder.

After each subject had completed both experimental conditions, the experimenter asked the subject the following questions:

1. "Why do you feel you were shocked?"
2. "Do you think the shock changed your speaking behavior? If so, how?"

Judging Procedure

Both the first and fifth readings of each condition were tape recorded during the experiment. These 20 samples were placed in random order and played back to two graduate students trained in fluency disorders, who were asked to record the type and number of each disfluency exhibited by the subject. A definition of each disfluency (see pages 13 and 14) was given, both written and orally, to the observers by the experimenter. The observers were asked to judge the tapes independently, and were allowed to play back any part of the recording when necessary. The number of each type of disfluency used in the study for each subject was the average of the two scores given by the respective judges.

CHAPTER III

RESULTS

It was hypothesized that a group of stutterers would exhibit significantly fewer shock-associated disfluencies on the fifth trial of the shock condition compared to the no-shock condition, and that the total number of all other types of disfluencies would increase on the fifth trial of the shock compared to the no-shock condition. The means for trials one and five of both conditions for shock-associated disfluencies are presented in Table 1. The statistical significance of the difference among the means was evaluated by means of a two dimensional analysis of variance with trials and conditions as the two variables, (see Table 2). All main effects were non-significant using the 5% coefficient of risk.

Although the results were not statistically significant, the obtained data does provide some information. There were fewer shock-associated disfluencies under the shock condition compared to the no-shock condition on trial five as hypothesized; shock 17.7, no-shock 25.4. All five of the subjects followed this group pattern.

TABLE 1
THE MEAN NUMBER OF SHOCK-ASSOCIATED DISFLUENCIES
FOR SHOCK AND NO-SHOCK CONDITIONS BY
FIVE STUTTERERS ON 400 WORDS

	Conditions	
	Shock	No-shock
Trial 1	70.2	64.4
Trial 5	17.2	25.4

TABLE 2

ANALYSIS OF VARIANCE FOR SHOCK-ASSOCIATED DISFLUENCIES
FOR SHOCK AND NO-SHOCK CONDITIONS DURING
TRIALS 1 AND 5 FOR 5 STUTTERERS

	Degrees of Freedom	Sum of Squares	Mean Squares	F. Test
Conditions	1	510	510	NS
Trials	1	3,150	3,150	NS
Cells	3	112,778
Conditions x trials	1	27,038	27,038	NS
Within	16	1,024,419	64,026	...
Total	19	1,137,197

The means for trials one and five for both conditions of the non-shock associated disfluencies are presented in Table 3. The statistical significance of the difference among the means was evaluated by means of a 2 dimensional analysis of variance as presented in Table 4. All main effects were not significant. All five of the subjects followed the group trend and had fewer non-shock-associated disfluencies on trial five of the shock condition compared to trial five of the no-shock condition. This did not support the hypothesis that subjects would increase in the number of non-shock associated disfluencies on trial five of the shock condition compared to trial five of the no-shock condition.³

In answer to the experimenter's questions, four of the five subjects indicated that they felt they were shocked for "stuttering." Three of the five thought the shock changed their speech by making them more careful, and one subject did not think the shock changed his speech. One subject reported he did not know why he was shocked.

The lack of statistically significant group differences was probably due to the limited number of subjects and large individual variability. It is not possible to generalize to the stuttering population on the basis of this data. The

³An analysis of variance design removing the order effect from the error term was utilized to evaluate the 4 male subjects for whom order was completely counterbalanced on the shock-associated trial five condition. This analysis showed no statistically significant differences.

TABLE 3

THE MEAN NUMBER OF NON-SHOCK-ASSOCIATED DISFLUENCIES
FOR SHOCK AND NO-SHOCK CONDITIONS

	Conditions	
	Shock	No-shock
Trial 1	74.6	83.6
Trial 5	41.6	61.6

TABLE 4

ANALYSIS OF VARIANCE FOR NON-SHOCK-ASSOCIATED DISFLUENCIES
FOR SHOCK AND NO-SHOCK CONDITIONS DURING
TRIALS 1 AND 5 FOR 5 STUTTERERS

	Degrees of Freedom	Sum of Squares	Mean Squares	F. Test
Conditions	1	1,043	1,043	NS
Trials	1	3,773	3,773	NS
Cells	3	4,975	1,658	...
Condition x trials	1	159	159	NS
Within	16	63,343	3,959	...
Total	19	85,412

consistant pattern of individual subjects would suggest that a disfluent group of stutterers will exhibit significantly fewer shock associated disfluencies after several conditioning trials under the shock condition compared to the no-shock condition. This is still a tenable position for further research.

CHAPTER IV

DISCUSSION

The analysis of the data indicated that punishment (shock) produced no statistically significant effect on the fluency behavior of the 5 subjects. However, inspection of each individual's behavior on the fifth trial does indicate that all of the subjects had fewer shock-associated disfluencies on the shock condition compared to the no-shock condition. Therefore, the data is consistent with the first half of the hypothesis which stated that a group of stutterers would exhibit fewer shock-associated disfluencies on the fifth trial of the shock condition compared to the no-shock condition. One cannot generalize these results to other stutterers however. The findings of this study are in agreement with those of Flanagan (1959), and Martin and Siegel (1965) (1966), who also found that stuttering behavior, specifically disfluencies, can be reduced by means of punishment (shock) when punishment is associated with a specific type of disfluency.

The data does not support the second half of the hypothesis which stated that the total number of all other types of disfluencies would increase on the fifth trial of

the shock condition compared to the fifth trial of the no-shock condition. All 5 of the subjects followed the group trend in the fifth trial of the shock condition, and showed a reduction in all disfluencies.

It is interesting to note, however, that 4 of the 5 subjects had more non-shock-associated disfluencies in trial 1 of the shock condition compared to no-shock condition. Several factors may have influenced this difference. It is possible that during trial 1 the subjects were not aware of why they were being punished. If this occurred, it would be expected that disfluencies would increase, as they had in the studies of Frick (1951) and Savoye (1955), where random punishment was employed. After trial 1, the disfluencies decreased, possibly as a result of the subjects' awareness of why they were being shocked. Anxiety also, may have been a determining influence in the increase in disfluencies. Threat of punishment, and also lack of awareness of why they were being punished may have increased the anxiety level of the subjects. Pennington and Berg (1947) have stated that anxiety may be beneficial and stimulating in many cases, but it may also be inhibitory in other situations such as those of insecurity. In this case, the anxiety level may have been high enough to impede the improvement of the subjects' responses. This would concur with the findings of Bloodstein (1956), who found that anxiety associated with threat of punishment would result in an increase of disfluent speech

behavior. However, this would not agree with the findings of Boehmler (1965), who stated that threat of punishment may result in improved fluency, while actual administration of punishment not associated with disfluencies may impede the improvement. It is also possible that in trial 1, the strength, or intensity of the shock itself caused an increase in disfluencies, while after adaptation to the shock took place, or was taking place, the disfluencies decreased.

There may have been other variables operating in trial 1 of the shock condition which are not immediately apparent. This would be a fruitful area for further research. More information concerning the effects of differing levels of shock, the effect of shock on the emotional behavior of the individual, and the differences between threat of punishment and actual administration of punishment on disfluencies is needed. Some factors inherent in the procedure may have influenced the results. The rate and duration of the tone presented to the subjects was a cue to draw a card were uncontrolled variables. The tone was presented to the subject when he, the subject, placed his hand on a card to be drawn and read, thereby allowing each subject to choose his own rate at which he read the cards. There were noticeable differences in rate among trials and subjects. This variable may have had some influence on the disfluent, verbal behavior of the subjects.

Another factor which may have influenced the results of the experiment was the shock intensity level selected by each of the 5 subjects. All of the subjects received shock at the maximum intensity level of 2.5 microvolts, and as a result, the noxious value of the shock may have decreased during the course of the shock condition. It would have been desirable for the experimenter to slowly increase the intensity level of the shock after every fifth shock to counteract the adaptation effect, but this was impossible due to the type of instrumentation used. All but one of the subjects stated that although they were aware of the shock, it was not "too strong," and they did not think the shock was as punishing at the end of the fifth trial of the shock condition as it was during the first trial of that condition. Only one of the subjects stated that the shock was as strong at the end of the shock condition as it was in the beginning of that condition. This subject's results did not differ from the results of the other subjects.

It is possible that all of the subjects were able to maintain a fluency "set" during the short duration of the shock condition. Van Riper (1963) has described how some stutterers utilize "anti-expectancy" devices (Van Riper, 1963, p. 342) to maintain fluency. It would have been desirable to investigate whether this device had been used by the subjects, and for how long a period it could be maintained. It would also be desirable for further research to

investigate whether fluency "sets" can be maintained in situations outside the experimental conditions which involve high levels of anxiety. This type of evidence is needed before we can attribute the reduction in disfluencies solely due to shock.

The results of this study have implications both for the clinical and the home environment. In both situations punishment is used as a means of manipulating the disfluencies of individuals. Verbal punishment, employed both by parents in the home and by clinicians in therapy, has been shown to be an effective tool with some individuals as a means of reducing disfluent verbal behavior. (Glasner & Rosenthal, 1957). However, this method of punishment has not always been successful with everyone.

The results from recent research carried on with shock as a means of punishment, have given us some clues as to why shock (or verbal punishment) may work in some cases and not in others. The contingency of shock (or punishment) appears to be a major determining factor in how disfluencies are manipulated. If punishment is given to an individual without his knowledge of why he is being punished, we may expect disfluencies to increase. (Savoie, 1955) (Frick, 1951). An example of this is when a child has a part-word repetition at the beginning of a sentence and his parents tell him to repeat the whole sentence correctly, the child is often unaware of why he was corrected, and therefore becomes more

disfluent. However, when the child is corrected immediately after or during the production of a disfluency, his disfluencies appear to reduce. It would appear that when punishment is used, that it is most effective when: (1) it is contingent on the disfluency, and (2) when the individual knows why he is being punished.

An important aspect of stuttering behavior which has not been studied in association with shock is the use of avoidance devices. Van Riper (1963, p. 503) has described methods utilized by stutterers as a means of maintaining fluency, which include the use of circumlocutions, synonyms and other devices. It would be of interest to study this phenomenon further in an effort to see if shock, in effect, reduces disfluencies, or if it results in the build-up of avoidance devices by the individuals.

Further study of the effects of shock on disfluent behavior is suggested, with particular attention focused on: (1) the effects of punishment (shock) on the emotional behavior as well as the disfluent, verbal behavior of the individual, (2) the effects of shock on the behavior of the individual after he leaves the experimental situation, and (3) the effects of differing levels of shock on verbal behavior.

CHAPTER V

SUMMARY AND CONCLUSIONS

It was hypothesized that a group of stutterers would exhibit significantly fewer shock-associated disfluencies on the fifth trial of the shock condition compared to the no-shock condition, and that the total number of all other types of disfluencies would increase on the fifth trial of the shock condition compared to the no-shock condition.

A group of five stutterers, four males and one female, was selected from a possible seven stutterers who were receiving therapy at the University of Montana Speech and Hearing Clinic. Subjects were chosen on the basis of having more than 3% disfluencies on a pre-experimental trial consisting of 400 words cued by the experimenter, and their willingness to be subjected to electrical stimulation.

Each subject was given a pre-experimental trial during which time he read a list of 400 words cued by the experimenter. After the trial the subject's responses were analyzed and his most frequent type of disfluency noted. Four days later, the subjects took part in the experimental conditions which consisted of two parts, Condition I, no-shock, and Condition II, shock. Each condition was four

days apart, and consisted of five successive trials. Subjects one, two, and five received the shock condition first, and Subjects three and four received the no-shock condition first. In the no-shock condition, the subject was asked to read 400 words, each word being printed on a card, and cued by the experimenter. In the shock condition, the procedure was the same except that the subject received a shock immediately after a word in which he produced his most frequent type of disfluency as previously determined by the pre-experimental trial.

The fifth and first trials of each condition were recorded, and the results were analyzed by 2 graduate students trained in fluency disorders. The difference among the means of trials 1 and 5 of both conditions for shock-associated and non-shock-associated disfluencies was evaluated by means of a 2 dimensional analysis of variance. All main effects were non-significant using the 5% level of significance. However, all subjects followed the group trend of having fewer disfluencies on the fifth trial under the shock condition compared to the no-shock condition. These data support the hypothesis that disfluencies would be reduced when associated with shock, but does not support the hypothesis that non-shock associated disfluencies would increase under the shock condition.

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APPENDICES

APPENDIX A

STIMULUS WORDS

abode	cinder	hesitation
abolition	cleavage	hideous
absolution	coventry	hippopotamus
absurd	crystalline	hospitable
adjust	Czechoslovakia	humanity
admonish	deciduous	hyacinth
actuality	depositor	icicle
advancement	desperado	immersion
affiliation	dimension	imperceptible
aggressive	distinctive	inaugurate
alibi	drizzle	inconspicuous
alight	elasticity	indestructible
allegory	eleventh	indignity
allure	eloquence	infectious
alto	eminence	infrequently
ameliorate	enamored	inheritance
amiss	enthusiasm	inscription
amnesty	evacuation	interaction
amphibian	evermore	intrusion
analogous	exhaustion	investment
ancestral	fanaticism	Iowa
annexation	fascination	irresponsible
annoy	forestry	itch
apologetic	freely	jacket
appliance	frenzy	jerky
apprehensive	futurity	jog
apprentice	gabble	joke
arduous	gage	joint
artillery	gallant	jumper
authenticity	gamester	junk
bacillus	gazette	kennel
baffle	generalize	kerchief
barbecue	genteel	keyhole
basilica	girth	kidnap
beau	glacial	killer
beehive	glacier	kingbird
befall	gleam	knockout
behoove	glimmer	knott
beneficiary	glove	laborer
besiege	goldfinch	lacy
biologist	gore	leech
blanch	graduation	lamb
bluish	gram	lame
boomerang	grange	lament
brink	graphic	laughter
bustle	gravely	leak
calculation	greedily	leash
capitulation	greenness	lecturer
celestial	gymnastic	legion
centralization	heiress	leisure
chrysanthemum	hemisphere	lemonade

leopard	positive	sincere
lessen	posse	simmer
lettuce	quail	sitting
level	quarrelsome	skull
liberal	quartz	sled
lice	queenly	sleeveless
license	queer	slender
lick	quicksilver	slid
lid	rabble	sly
lieutenant	rake	snowball
lighthouse	rapidly	sober
lightness	rarely	solid
lipstick	realism	somebody
loan	recipe	sordid
lobby	recorder	soundly
lobster	reef	spade
lookout	reestablish	speck
lowland	reflex	speedy
lung	reject	spinner
midget	remind	sprig
misfortune	repay	spruce
mist	repel	squad
misunderstand	repulsive	stairway
mixture	resemble	standstill
modest	retail	starlight
molest	reverse	startle
monarch	revue	stateroom
moonlight	rind	stepmother
motherhood	riot	stopper
mourner	roadside	stout
mountaineer	romantic	strand
mouse	rust	strap
muffin	sack	steamer
murderer	salon	stress
musical	salty	striker
napkin	sang	stubborn
natal	scholar	stumble
neatly	scrap	stump
needle	secondary	sub
needy	selective	suck
neighborhood	seller	sufferer
nephew	senseless	sullen
newly	serf	summary
noiseless	setter	sunk
normal	shady	sunless
nostril	shareholder	superb
obedient	shave	supernatural
obvious	shift	surf
plot	shy	swallow
poison	sideboard	swamp
porcupine	sightless	swap

sweetly	unused
sweetness	vacuum
swindle	vampire
swore	vanilla
seaboard	veal
tablecloth	vehicle
tablespoon	veil
tame	velocity
tasteless	venom
taxation	vibration
technique	victim
telescope	victor
tenderly	vine
tenth	violin
terribly	vital
text	void
thereby	voter
thicken	wage
thinker	wagoneer
thirteen	walker
thistle	washer
thoughtfully	wayside
threat	wept
timely	westward
tissue	wheelbarrow
tobacco	whiteness
tolerable	widely
tolerate	wiggle
toothbrush	windward
tormentor	windy
tragic	withstand
trail	workable
translucent	worthless
trapper	woven
tribute	wrestle
trousers	yacht
trusty	yank
tune	yarn
transform	yearly
turnip	yonder
typical	zebra
tyrant	zero
ugly	zone
unarmed	
unclean	
underline	
undertake	
unequal	
ungrateful	
unorganized	
unpopular	

APPENDIX B

PRE-EXPERIMENTAL TRIAL DATA

PRE-EXPERIMENTAL TRIAL
NUMBER OF DISFLUENT WORDS IN 400 WORD LIST

Subject	Judge 1	Judge 2
1	55	53
2	55	54
3	20	21
4	544	542
5	213	213
6*	12	12
7*	9	9

*Subject not used in final experiment.

APPENDIX C

RAW DATA OF THE INDIVIDUAL SUBJECTS

SUBJECT 1

Age: 18 years
Duration of Therapy: 12 weeks

Degree of Severity: Moderate
Received Shock For: Part-word
Repetitions

Condition I, no-shock

	Trial 1	Trial 5
Interjections	1	1
Part-word Repetitions	4	5
Word Repetitions	0	0
Broken Words	0	0
Prolonged Sounds	3	1
Pauses	0	0
Total Shock-associated Disfluencies	4	5
Total Non-shock-associated Disfluencies	4	2

Condition II, shock

	Trial 1	Trial 5
Interjections	1	0
Part-word Repetitions	7	1
Word Repetitions	5	0
Broken Words	1	1
Prolonged Sounds	1	0
Pauses	2	5
Total Shock-associated Disfluencies	7	1
Total Non-shock-associated Disfluencies	10	6

Answers to Questions Asked by Experimenter:

1. "I knew I was shocked for stuttering. I have all kinds of trouble--most of trouble is repeating."
2. "I was more careful. I think it could make speech get better, but also increase fear."

SUBJECT 2

Age: 16 years
 Amount of Therapy: 7 weeks

Degree of Severity: Moderate
 Received Shock For: Part-word
 Repetitions

Condition I, no-shock

	Trial 1	Trial 5
Interjections	1	1
Part-word Repetitions	2	1
Word Repetitions	0	1
Broken Words	2	1
Prolonged Sounds	1	1
Pauses	9	2
Total Shock-associated Disfluencies	2	1
Total Non-shock-associated Disfluencies	13	6

Condition II, shock

	Trial 1	Trial 5
Interjections	0	0
Part-word Repetitions	12	1
Word Repetitions	0	0
Broken Words	1	2
Prolonged Sounds	2	0
Pauses	20	3
Total Shock-associated Disfluencies	12	1
Total Non-shock-associated Disfluencies	23	5

Answers to Questions Asked by Experimenter:

1. I was shocked when "I stuttered on a word."
2. "more fear - I tried not to stutter."

SUBJECT 3

Age: 18 years
 Amount of Therapy: 6 weeks

Degree of Severity: Moderate
 Received Shock For: Part-word
 Repetitions

Condition I, no-shock

	Trial 1	Trial 5
Interjections	1	3
Part-word Repetitions	13	6
Word Repetitions	1	0
Broken Words	3	2
Prolonged Sounds	0	0
Pauses	193	7
Total Shock-associated Disfluencies	13	6
Total Non-shock-associated Disfluencies	198	12

Condition II, shock

	Trial 1	Trial 5
Interjections	0	0
Part-word Repetitions	10	1
Word Repetitions	1	0
Broken Words	0	0
Prolonged Sounds	0	0
Pauses	91	16
Total Shock-associated Disfluencies	10	1
Total Non-shock-associated Disfluencies	92	16

Answers to Questions Asked by Experimenter:

1. "I don't know why" (I was shocked).
2. "I don't know." (why I was shocked).

SUBJECT 4

Age: 34 years
Amount of Therapy: 6 months

Degree of Severity: Severe
Received Shock For: Pauses

Condition I, no-shock

	Trial 1	Trial 5
Interjections	3	1
Part-word Repetitions	64	48
Word Repetitions	1	0
Broken Words	108	87
Prolonged Sounds	22	18
Pauses	189	137
Total Shock-associated Disfluencies	189	137
Total Non-shock-associated Disfluencies	134	155

Condition II, shock

	Trial 1	Trial 5
Interjections	1	0
Part-word Repetitions	38	22
Word Repetitions	0	0
Broken Words	79	44
Prolonged Sounds	20	11
Pauses	77	57
Total Shock-associated Disfluencies	77	57
Total Non-shock-associated Disfluencies	138	77

Answers to Questions Asked by Experimenter:

1. "I was shocked everytime I hit a reasonably hard block."
2. "I don't think it affected my speech; it may have made me more relaxed."

SUBJECT 5

Age: 18 years
Amount of Therapy: 12 months

Degree of Severity: Moderate
Received Shock For: Part-word
Repetitions

Condition I, no-shock

	Trial 1	Trial 5
Interjections	3	0
Part-word Repetitions	114	127
Word Repetitions	0	0
Broken Words	49	27
Prolonged Sounds	5	5
Pauses	12	1
Total Shock-associated Disfluencies	114	127
Total Non-shock-associated Disfluencies	69	133

Condition II, shock

	Trial 1	Trial 5
Interjections	0	0
Part-word Repetitions	245	86
Word Repetitions	2	0
Broken Words	56	63
Prolonged Sounds	52	34
Pauses	1	7
Total Shock-associated Disfluencies	245	86
Total Non-shock-associated Disfluencies	110	104

Answers to Questions Asked by Experimenter:

1. (I was) "shocked for whenever I had a block."
2. "At first it affected my speech - I was bracing myself. I expected it to come. I tried to change my speech - I think I paused before I said the words, and I was more tense."