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Steven H. Spiro

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THE REDUCTION OF LONG LATENCY VERBAL RESPONDING
IN A MULTIPLIHANDICAPPED ADOLESCENT UTILIZING AN AVOIDANCE-
POSITIVE REINFORCEMENT PROCEDURE

by

Steven H. Spiro

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of the
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Steven Spiro

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INTRODUCTION

Recent research has indicated that operant techniques can be successfully applied to a variety of vocal verbal aberrations and deficits in markedly heterogeneous populations. For example, Cook and Adams (1966) utilized candy and a puppet in conditioning vocalization rate in speech deficient children while extinguishing animal-like sounds. Wilson and Walters (1966) increased the speech output of near-mute schizophrenics by combining a positive reinforcement-modeling technique. Ayllon and Haughton (1964) decreased the symptomatic verbal responses of mental patients by systematically manipulating social reinforcers of the ward personnel. Other studies have demonstrated effective techniques in modifying various dimensions of vocal verbal behavior such as the speech of echolalic children (Risley and Wolf, 1966), bizarre and inappropriate speech in a retarded child (Barton, 1970), and articulation errors in pre-delinquents (Bailey, Timbers, Phillips, and Wolf, 1971).

The majority of these operant techniques have utilized positive reinforcement paradigms. To date, there have been few studies utilizing punishment techniques in eliminating undesirable vocal verbal behavior. Those that have utilized behavior-weakening consequences have, for the most part, relied on time-out (Sanders, 1971, Sloane and Macaulay, 1968), and combined punishment-reinforcement paradigms (Kircher, Pear, and Martin, 1971).

The use of avoidance paradigms in modifying vocal verbal behavior is represented by an even smaller number of studies than is the pun-

ishment paradigm. An avoidance paradigm was utilized by Davison and Kirkwood (1968) to produce verbal responses of adequate intensity and duration. Shaw (1967) utilized escape from the threat of aversive medicinal shots to negatively reinforce vocalizations in an elective mute.

The present study deals with the reduction of long latency verbal responding in a mentally retarded, emotionally disturbed boy utilizing an avoidance procedure. Latency of verbal responding, although not dealt with extensively in the literature, represents an important property of emitted verbal behavior. According to Skinner (1957), "In general we accept the implication that strong verbal behavior is rapid and that hesitant speech indicates little strength. A ready answer is one which the speaker is 'Strongly inclined to make'; a delay in answering leads us to suspect that something is possibly amiss in the controlling circumstances...we sometimes infer the strength of the verbal behavior of a correspondent from the speed with which a letter is answered, and traces of speed in handwriting supply similar evidence." There are also circumstances where a long latency response may be construed as a lack of a particular response within the subject's repertoire as in timed portions of tests such as those found in the Wide Range Achievement Test (Jastak and Jastak, 1965), the Wechsler Adult Intelligence Scale (Wechsler, 1955), and the Wechsler Intelligence Scale for Children (Wechsler, 1949). A number of studies have indicated that latencies may be effectively shortened by utilizing an avoidance paradigm (Solomon and Wynne, 1954, Lovibond, 1970, Hoffman and Fleshler, 1962). In fact, shortened latencies are often taken as one criterion of well developed avoidance behavior (Hoffman, 1966).

The need for more applied research concerning punishment has been pointed out by Baer (1970). Baer suggests that there are people who think punishment is, because of its nature, an undesirable technique for accomplishing desired behavior changes, but that in the last analysis, what is needed is a, "Careful and extensive study of the punishment of human behavior." Without this, "Careful and extensive study" of human behavior in relation to punishment, the discovery and precise specification of practical and widely applicable punishment techniques may be seriously inhibited. This investigation sought to ascertain whether a modified form of a discriminated avoidance procedure, utilizing a simple, inexpensive, and widely applicable stimulus, could effectively reduce the long latency of vocal verbal responding in a mentally retarded, emotionally disturbed boy, and, if so, how effectively.

Method

Subject

The subject of this study was a 17-year old male diagnosed as emotionally disturbed and mentally retarded (I.Q. 56) enrolled in the Kalamazoo Valley Intermediate School District Multihandicap Program. His speech problems included echolalia, vocal verbal responses with tonal qualities that varied between falsetto and stilted tenor, and unusually long latencies of vocal verbal responding. These unusually long latencies occurred even when verbal stimuli were presented to which the subject had previously responded appropriately; thus, the long latencies did not appear to be due to an absence of a particular vocal verbal response from the subject's repertoire.

Setting

The experiment took place in a classroom with numerous other therapists and students present. The subject sat at a desk with the experimenter facing him. The therapy was individual and was carried out in the late morning for approximately 50 days. Each session lasted for one-half hour.

Apparatus

The only apparatus employed was a Meylan Stopwatch with an inaudible on-off switch.

Discriminative Stimuli

Five Peabody Picture Vocabulary Cards, level P, eight inches by 11 inches, and displaying various animals were used. These five cards were chosen randomly from a pool of 30 cards to which the subject responded with latencies over 30 seconds. In addition to the presentation of the cards, the verbal discriminative stimulus, "Ricky, what is in this picture?" was given.

Procedure

The procedure consisted of nine phases: (1) baseline I, (2) 10-second avoidance for all five cards, (3) baseline II, (4) 10-second avoidance for cards one, two, and four only, (5) 10-second avoidance for all five cards, (6) CRF 10-second limited-hold, (7) CRF five-second limited-hold, (8) generalization and (9) follow-up.

Prior to baseline, the subject was shown 30 cards, one at a time, and asked, "Ricky, what is in this picture?". The subject had previously been taught to respond appropriately to the combined question and card for each of the 30 cards. Latencies for all cards were above 30

seconds. A set of five cards was chosen to act as discriminative stimuli during the experiment.

Baseline. During each baseline session, the subject was shown each card and asked, "Ricky, what is in this picture?". The order of presentation of the cards was randomized each day and attempts were made to keep the length of the question between 1.8 and 2.0 seconds by periodically recording the length of the question each phase. At the moment the word, "Ricky" was spoken, a stopwatch was turned on and continued running until the initiation of the vocal verbal response from the subject, regardless of what he said. Any vocal verbal response of sufficient intensity as to be heard by the experimenter would result in the stopwatch being turned off. If, at the end of 30 seconds, the subject did not initiate a vocalization, the stopwatch was also turned off. The latency for each card was recorded by the experimenter before the following card was introduced. Latencies were taken in this manner for each of the five cards once each day for a total of seven days.

10-Second Avoidance. During the 10-second avoidance phase, the subject continued to be shown the randomized cards and asked, "Ricky, what is in this picture?", the only change being that if the subject did not initiate a vocalization within 10 seconds from the beginning of the experimenter's question, a loud, "No!" was spoken and the table was loudly slapped by the experimenter. This phase was continued for seven days. The 10-second avoidance schedule was introduced to ascertain whether the long latency responding could be reduced effectively by utilizing these consequences, a loud, "No!" and a table slap, in an avoidance procedure, with the hypothesis that the consequences were

aversive stimuli.

Baseline II. The avoidance contingency was then removed for all cards, and the baseline condition was reinstated. The order of presentation of the cards continued to be randomized. This phase lasted for seven days.

10-Second Avoidance, Cards One, Two, and Four. During this phase, the same pictures and verbal cues were presented, but the avoidance contingency was reinstated for cards one, two, and four, while cards three and five remained in the baseline condition. Cards continued to be presented in random order. This manipulation was implemented to further assess whether the avoidance procedure was responsible for any decreases in the length of the latencies. This phase lasted for seven days.

10-Second Avoidance. Cards one, two, and four continued on the avoidance contingency while this same contingency was reinstated for cards three and five. This phase was implemented to assess whether, in fact, the avoidance contingency accounted for any possible decreases in the length of the latencies, and, also, as a replication of manipulation number one. This phase lasted for seven days.

CRF 10-Second Limited-Hold. During this phase, the avoidance contingency was dropped and replaced by the delivery of tactual stimuli, hand touching, and verbal stimuli, "Good boy" if the subject initiated a vocal response within 10 seconds from the initiation of the experimenter's question. Previous work with the subject had indicated that both hand touching and the phrase, "Good boy" functioned as reinforcers. The order of the cards was randomized. This manipulation was for all

cards and lasted seven days. This manipulation was implemented in an attempt to transfer control of latencies from one of aversive to positive consequences.

CRF Five-Second Limited-Hold. In this phase, the subject had to initiate a vocal response within five seconds after the initiation of the experimenter's question in order to receive the tactual and verbal consequences. If the subject did not respond within the five second period of time, no consequences were delivered; but after 10 seconds the next card was shown and the question asked. As usual, cards were randomized. The phase lasted for seven days. This manipulation was an attempt to further reduce already shortened latencies utilizing a positive reinforcement paradigm.

Generalization

Forty-six days after the completion of the CRF five-second limited-hold phase, generalization was tested by employing a new set of 10 cards to which the subject could respond with the correct answer but had responded with long latencies prior to the experiment. The subject was shown each of five cards and asked the usual question by the experimenter with no programmed contingencies other than the removal of one card and the presentation of a subsequent card when either a vocalization occurred within a 30 second period of time or 30 seconds or above was allowed to elapse.

That same day, without the experimenter present, another therapist showed the subject a set of five different cards and asked the subject what was in each picture, also without programmed contingencies other than the removal of one card and presentation of another

when either a vocalization occurred within 30 seconds or 30 seconds or more elapsed. Latencies were recorded for the cards which were presented by the experimenter and the therapist. Still later in the same day, the experimenter and therapist exchanged cards and repeated the procedure. Latencies were once again recorded for both the experimenter's and therapist's cards. The experimenter was never present in the room at the same time with the therapist when cards were being shown to the subject.

Follow-up. The subject was tested 47 days after the termination of the CRF five-second limited-hold phase using exactly the same cards but with no programmed consequences in force. This phase was implemented to assess the durability of the effects of the previous manipulations.

Measurement Reliability

Reliability checks were conducted once during each phase of the experiment. Reliability was assessed by an independent observer from video-tapes made once during each phase, nine times in all. The observer viewed the tapes in a room with no other people present, to preserve the independence of the recording. Latencies were recorded to the nearest one-half second. A percent agreement between latencies obtained by the experimenter and observer was calculated for each card by dividing the larger latency into the smaller latency and multiplying by 100. Throughout all checks, excepting one in which agreement was 94%, reliability was 100%.

Results and Discussion

The major results of this study are presented in Figure 1 (pages 10-11). Each data point represents one latency of one response to one presentation of a card. During baseline, no latency for any card was below 20 seconds. The mean latencies during baseline for five cards, respectively, were as follows: (1) 29 seconds, (2) 27.6 seconds, (3) 28.4 seconds, (4) 26.4 seconds and, (5) 29.1 seconds. Because recording was stopped at 30 seconds, it is not possible to assess how long the latencies would have been without this constraint.

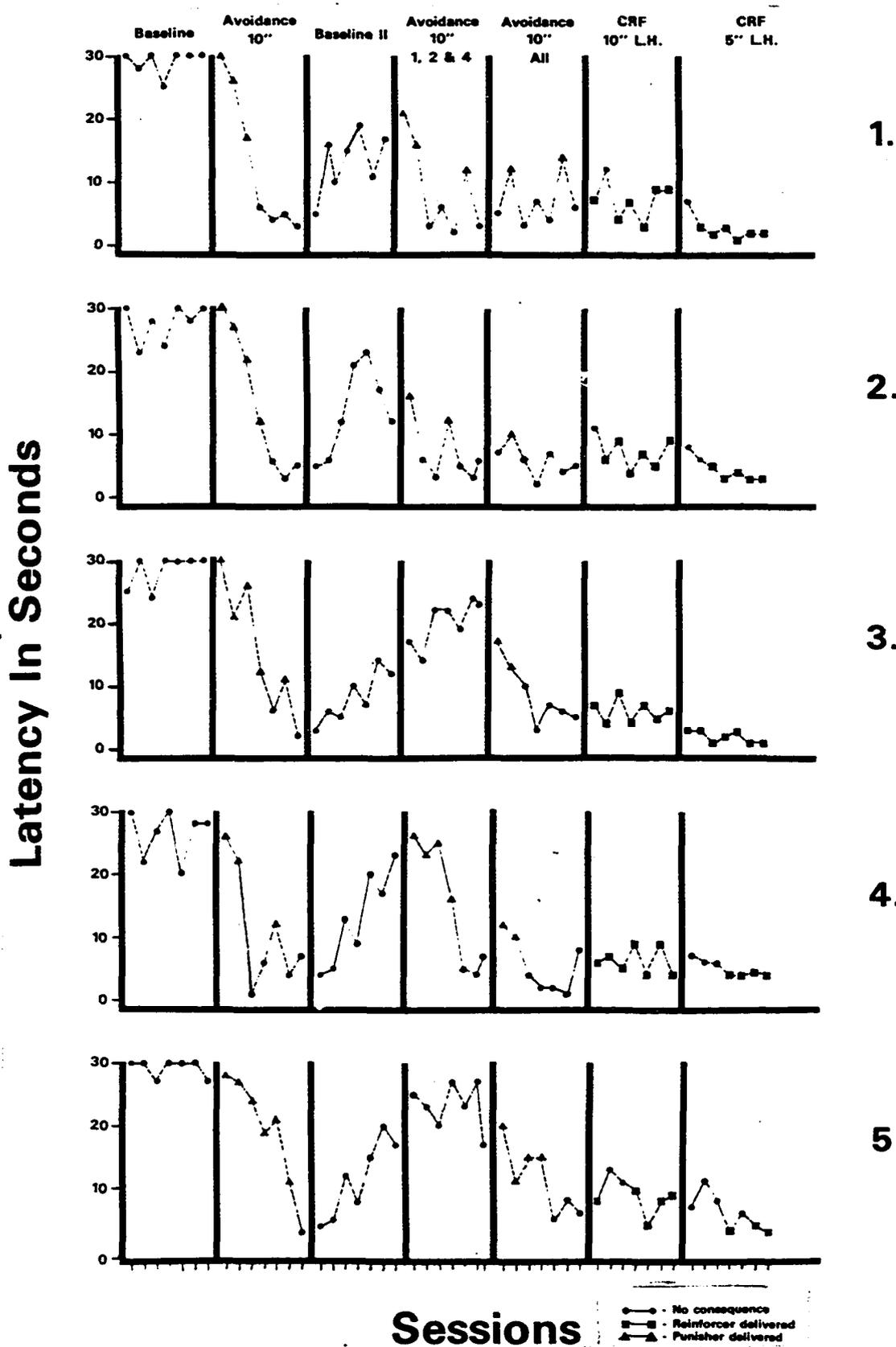
A dramatic and substantial change is shown when the 10-second avoidance contingency was introduced for each card. The means for each card during the avoidance contingency were as follows: (1) 13 seconds, (2) 15.4 seconds, (3) 11.1 seconds, (4) 15.4 seconds and, (5) 19 seconds.

In baseline II, where the avoidance contingency was terminated and baseline conditions reinstated, increases in latencies can be seen for every card although the latencies did not rise to the baseline levels. During the 10-second avoidance for cards one, two, and four, rapid reductions can once again be seen, while responses to cards three and five show continual increases in latencies. When the avoidance contingency was reinstated for cards three and five (during 10-second avoidance II), latencies once again showed a dramatic decrease while latencies to cards one, two, and four remained fairly constant.

During the CRF 10-second limited-hold, latencies remained stable at levels, generally, below 10 seconds. No significant decreases in

FIGURE 1

Latency in seconds per session for five Peabody Picture Vocabulary cards under baseline, 10-second avoidance, baseline II, 10-second avoidance cards one, two, and four, 10-second avoidance, CRF 10-second limited-hold, CRF five-second limited-hold, and follow-up phases. Each card was presented only once per session.



latencies occurred as compared to the preceding phase. During the CRF five-second limited-hold, cards one, two, three, and five showed minor decreases in latencies while card four remained fairly stable. Thus, control was effectively transferred from an aversive paradigm to a positive reinforcement paradigm.

In the generalization phase presented in Figure 2 (pages 13-14), five cards from a set previously shown to the subject but not used in training were presented once by the therapist, and then later in the same day by the experimenter. The results are shown in the top part of Figure 2. Another five cards from the same set were shown first by the experimenter and then later by the therapist. These results are shown in the bottom part of Figure 2. As can be seen, the latencies were quite low in all of these generalization conditions. The strength of the generalizations could possibly be due to the fact that immediately preceding the generalization phase were four consecutive manipulations, two of which, included positive reinforcement for low latency responding.

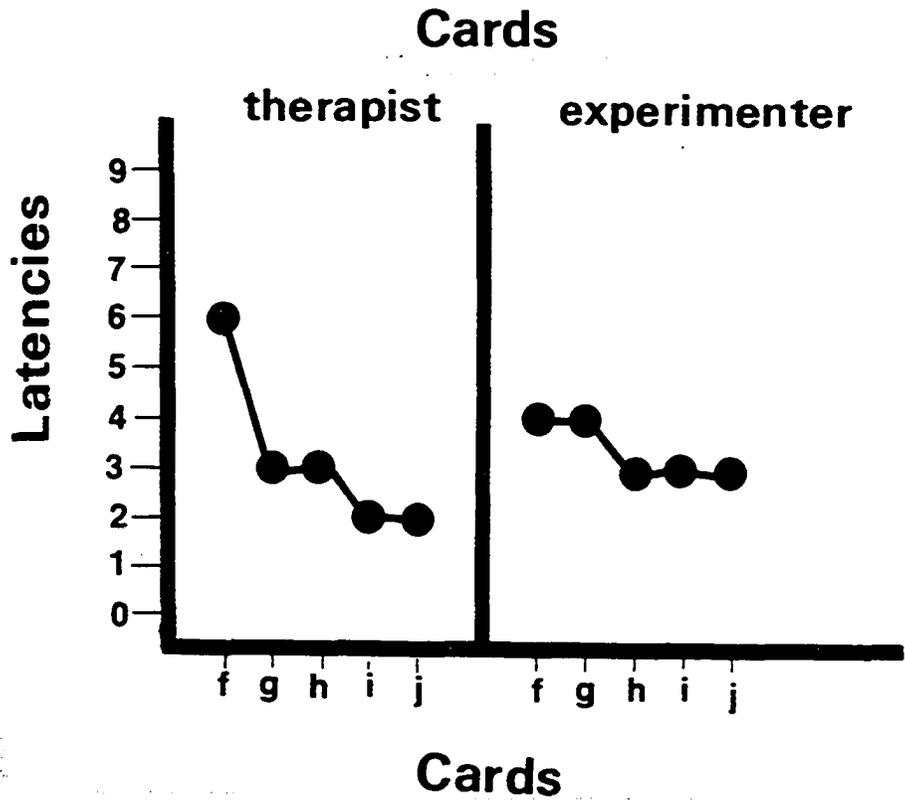
In the follow-up phase, low latencies were maintained for each card after a period of 47 days from the termination of the CRF five-second limited-hold phase. All follow-up latencies were below five seconds.

Another interesting point bears mentioning. Although any vocalization emitted by the subject, audible to the experimenter, and within specified temporal constraints could meet the criteria of a correct response, the subject, whenever he vocalized, emitted the correct response in terms of the question asked.

FIGURE 2

Latencies of responses to cards previously not employed in training (a, b, c, d, e, f, g, h, i, and j) in the presence of the experimenter and a different therapist. Only five cards are presented in each figure for ease of comparison.

GENERALIZATIONS



The results indicate that the 10-second avoidance procedure was effective in reducing long latency vocal verbal responding, and that the CRF limited-hold phases were effective in maintaining the resultant shortened latencies. Generalization was shown to occur to cards previously unmanipulated, a different person, and a different time of day. Follow-up, 47 days after the termination of the CRF five-second limited-hold phase, demonstrated the durability of the effects of the various experimental manipulations.

It is interesting to note that both the avoidance and limited-hold procedures utilized simple, inexpensive, widely available, and easily applicable consequent stimuli, however, before these stimuli are utilized, care should be taken that they are, in fact, functioning as either aversive stimuli or positively reinforcing stimuli. Their unusual effectiveness in Ricky's case conceivably could have been a function of a rather idiosyncratic conditioning history. In addition to the positive characteristics of the consequent stimuli, other desirable features include the rapid and dramatic decrements in long latency vocal verbal responding by the subject. In the first 10-second avoidance phase, latencies began decreasing substantially by the delivery of the third aversive stimulus per each card. At the end of seven days, latencies had dropped for each card from over 20 seconds to under 10 seconds. This rapidity in shortening latencies may make the avoidance procedure more desirable than the shaping of short latency responding with positive reinforcement, however, a word of caution is in order. The avoidance contingency was quite rapid and effective in reducing long latencies with a subject who had previously

emitted some short latency responses. In other words, some short latency responses were in the subject's repertoire. This limited short latency repertoire allowed the experimenter to set criteria at a rather demanding level (10-second avoidance). In dealing with a subject who emitted only long latency responses, it is questionable that such a high avoidance criterion would be as rapid or effective since the probability of occurrence of a previously established short latency response would approach zero.

Also, the use of the avoidance procedure could conceivably make various aspects of the stimulus situation in which it occurred aversive, for example, the examiner within a testing situation. It is possible that responding could be suppressed. Further research on the effects of the avoidance procedure may shed some light on this question.

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