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A Classroom Investigation of Delayed Timeout with Educable Retarded Children

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A CLASSROOM INVESTIGATION
OF DELAYED TIMEOUT WITH
EDUCABLE RETARDED CHILDREN

by

Phillip Kent Duncan

A Thesis
Submitted to the
Faculty of The Graduate College
in partial fulfillment
of the
Degree of Master of Arts

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Phillip Kent Duncan

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The withdrawal of the opportunity for an organism to obtain positive reinforcement has been shown to serve as an aversive event, and is called "timeout." This procedure was developed in the animal laboratory (Ferster and Appel, 1961; Zimmerman and Bayden, 1963; Zimmerman and Ferster, 1963), but it has been effectively applied in the field of applied behavior analysis with humans to reduce or eliminate various undesirable behaviors, including aggressive behaviors (Bostow and Bailey, 1969; Hawkins, 1971), high-rate inappropriate behaviors of retarded persons (Pendergrass, 1972), and assaultive acts of delinquent adolescents (Tyler and Brown, 1967).

Renner's (1964) review of the extensive delay-of-reinforcement literature demonstrates that immediacy of consequence has been a dimension of interest to psychologists for many years, and it is not surprising that the research results in this area present advantages for both immediate and delayed consequences. The timeout studies mentioned above utilized a procedure in which timeout was delivered immediately following the response to be suppressed, a procedure based on research which suggests that immediate punishment has certain advantages over delayed punishment. For example, Azrin (1956) demonstrated that immediate punishment produces more enduring response suppression than delayed punishment. Kamin (1959) demonstrated that response-shock delays greater than 40 seconds were less effective than immediate shock in suppressing avoidance responses in rats. Estes (1944) pointed out that punishment should be given in the presence of discriminative cues for the response, so that these stimuli would acquire control over the response.

On the other hand, there is research which suggests that delayed punishment does facilitate learning. Bevan and Dukes (1955) demonstrated that rats acquired the criterion performance level faster as the delay between incorrect responses and punishment increased. A study by Brackbill and Kappy (1962) with humans as subjects, demonstrated that a delayed reinforcement procedure did not produce a decrease in serial learning. An important aspect in both of these studies was the inclusion of immediate response-produced cues. The authors postulated that these cues mediated the delay between response and consequence, thus preventing response decrement.

Combining aspects of immediate and delayed punishment, Ramp, Ulrich, and Dulaney (1971) used a timeout technique in a normal classroom to successfully suppress "out-of-seat" and "talk-out" behavior. In this study a light was placed on the desk of the subject. Each time a disruptive behavior occurred the light was immediately turned on for a few seconds, to notify the subject that the behavior had been detected. Each disruptive behavior produced 5 minutes of timeout for the subject later in the day, during gym or recess. The data show a clear decrease in disruptive behavior when the delayed timeout condition was initiated, with an increase in disruptions when the contingencies were removed. This procedure is comparable to that used by Bevan and Dukes (1955) and Brackbill and Kappy (1962), in that the subject's response produces a cue, indicating that punishment was to be delivered at a later time.

Frost (1973) demonstrated that a delayed timeout procedure was also feasible in the School Adjustment classrooms, although his

procedures did not permit conclusions as to the effectiveness of the procedure. According to Frost the advantages of using delayed timeout rather than immediate timeout include:

1. Immediately removing the child from the learning environment while class is in session decreases his opportunity to learn the academic material being covered.

2. The class is often disrupted when the teacher has to immediately remove the child, thus decreasing the learning time of the rest of the class.

3. Immediate timeout, like physical restraint, has the disadvantage of removing the child from the social situation and thus from the opportunity to immediately practice more adaptive behaviors to that same situation. Delayed timeout would enable the child to remain in the environment and perhaps to learn some self-control methods in the presence of the stimuli that had previously occasioned inappropriate behavior.

4. To avoid or escape a disliked activity or academic task, the child may find immediate removal from the situation more reinforcing than remaining in the classroom. In this case his inappropriate behavior would actually be strengthened by timeout.

5. Delayed timeout can be administered at times selected by the teacher rather than whenever the child is misbehaving. The teacher could, for example, defer timeout until recess or other more convenient times for her.

6. Delayed timeout can be individualized to the child more readily. The teacher can administer timeout for each child at the

most effective time for that child. For example, timeout for one child might be during recess, for another during music, and for another during physical education, the selection being based on the apparent reinforcing value of the activity for the child.

7. When timeout is delayed there is a possibility of restitution by a) certain desirable behavior for the rest of the day, b) working on a special task, or c) buying restitution with regular or special tokens or points earned during the day. This may also make timeout less likely to provoke angry retaliation by the child.

Related to points 1 and 3 above, Clark, Rowbury, and Baer (1973) demonstrated the effectiveness of immediate timeout when it is applied on a VR-3 schedule. These authors point out that one desirable effect of intermittent punishment is the reduction in the amount of time which the child spends away from the classroom. Clark et al. (1973) also demonstrated that two minutes of timeout was effective in reducing the aggressive behavior of a retarded child.

The present study demonstrates a procedure which further reduces the time a child spends away from the classroom. This procedure involves combining a VR-3 schedule with a delayed timeout procedure, utilizing 2 minutes of timeout as the basic unit of consequence. The present study also extends the investigation of delayed timeout to a population to whom it has not been previously applied--educable retarded children.

METHOD

Subjects

The two subjects were members of an early elementary classroom for eleven educable retarded children. Both subjects were eleven years old, and the teacher reported that both were easily distracted from their seat work, that they often did not finish their work on time, and that they often engaged in playground fights. During the course of the study subject 1, Ronald, was referred to the School Adjustment Program for the next academic year because of his playground fighting and his general disruptiveness in his home. Ronald was rarely belligerent in the classroom, however; more often he simply would talk rather than study.

Subject 2, Terry, had "perceptual problems" according to the school psychologist, such that he was unable to ride a bicycle. Terry was actively belligerent in the classroom, often threatening other students by shaking his fist at them and saying, "I'm going to hurt you, boy." Terry frequently carried out these threats by hitting smaller students.

Setting

The classroom was located in a public elementary school. The room was approximately 30 feet square, with an adjoining supply room which was approximately 15 feet square.

Three rows of student desks faced a chalkboard on which was

written the day's assignments. To the right of the student desks were the teachers' desks and work tables. The supply room was located at the rear of the classroom, and it contained work and play materials.

The supply room had previously been used as a timeout area by the teachers. In the present study the timeout area was a corner of this supply room approximately five feet by five feet. The corner was isolated with a five and one half foot high cardboard partition and a small chair was placed in the timeout area. There were no windows in the supply room, except for a small window at the top of the door.

In a "normal" day the students were given their assignments and paper on which to work them. They were then expected to work quietly at their seats. Typical assignments involved copying printed sentences from the board, computing simple addition and subtraction problems, and writing spelling words.

The classroom employed a point economy, utilizing teacher-awarded points as the medium of exchange, with a "store" as a source of back-up reinforcers, such as pencils and small candies. The frequency of point-awarding by the teachers was apparently extremely low, however, since many students were able only to buy the privilege of a pencil-sharpening and a bathroom privilege, each costing three points, before running out of points. The experimenter rarely saw the teachers award points, although the teachers did on several occasions subtract points from a student's account for disobedience.

Visitors frequently came to the class; these were mainly the school psychologist, social workers, or high school observers and helpers. The teaching staff for the classroom consisted of the regular

teacher, a student teacher, and a teacher's aide, all of whom delivered consequences according to the observer's instructions.

Data Recording

Response definition

The experimenter, in collaboration with the teacher, wrote a definition of attending-to-task. Attending-to-task included:

1) the subject's looking at the assignment chalkboard, 2) the subject's looking at his work material, 3) the subject's writing on his work material, and 4) the subject's looking at anything the teacher instructed him to look at. All other behaviors were considered non-attending. Some behaviors, such as picking a pencil from the floor, getting something from inside the desk, and arranging a new work paper on the desk were considered attending if they had been immediately preceded by attending behavior; otherwise these behaviors were recorded as non-attending. Appendix A presents the definition and instructions given to reliability observers.

Recording procedure

The experimenter sat in the front, right corner of the classroom so that he could easily see the subjects' eyes and desk tops. Ronald sat in the first seat in the row of desks farthest from the observer (approximately ten feet), and Terry sat in the third seat in the same row. No one sat between Ronald and Terry.

The experimenter recorded the frequency and cumulative duration

of non-attending behavior daily during 20-minute sessions, first recording Ronald, then Terry. The experimenter was equipped with a silent stopwatch, a pen, and a data sheet. The stopwatch was started whenever the subject being observed had been inattentive for 4 seconds, as determined by the experimenter's counting silently, "One-thousand one, one-thousand two." A non-attending response ended whenever the child was attending to task for 4 consecutive seconds, as counted above. Non-attending for fewer than 4 seconds was not considered a non-attending response. At the end of a response the experimenter put an "X" on the data sheet in the appropriate box, and stopped, but did not reset, the stopwatch. During baseline conditions this procedure was followed for every response. During all other conditions, except the immediate timeout conditions, the experimenter recorded in the same manner, except that at the end of the response preceding the response to be consequated, the experimenter recorded the time shown on the watch. Then, at the end of the next response (the consequated response) the experimenter again recorded the time shown on the watch. By subtracting these two times the duration of non-attending behavior per consequated response was computed. With these data the effect of token delivery on the response upon which they were contingent can be compared with the effect on those responses for which no tokens were delivered.

At the end of the 20-minute session the experimenter recorded the total frequency and the total elapsed time of non-attending behavior for the subject. During the immediate timeout conditions the duration of the consequated response was not recorded, since Terry

was placed into timeout immediately upon emission of the response, thus limiting its duration to 4 seconds. The duration for all non-consequated responses was still recorded as described above.

When the subject being observed raised his hand, spoke with the teacher, or left his seat, the experimenter suspended the 20-minute observation session since these behaviors usually occasioned teacher interaction with the subject, almost assuring attending behavior. The observation session was resumed when these behaviors ended. Thus, each subject was observed for 20 minutes per session, despite the number of interruptions.

The portion of the data sheet shown below was described by Clark et al. (1973). Each of the numbers one through five were randomly assigned to three sets of five rows and five columns on the data sheet. The first set of five rows and five columns is represented by the figure below. The number assigned to a given row indicated which response in that row would be consequated. Responses were recorded horizontally across the data sheet. The slash marks reminded the experimenter to signal the teacher to deliver tokens or timeout according to the VR-3 schedule. Thus, in the figure below, slash marks after the fifth box in the first row indicate that the fifth response in that row will be consequated, slash marks after the third box in the second row indicate that the third response in that row will be consequated, and so forth.

					///5
			////	////	3
		////	////	////	2
	////	////	////	////	1
				////	4

Reliability

Reliability checks were made by independent observers during each experimental condition for Ronald, and during all but the second delayed timeout condition and immediate timeout-plus-praise condition for Terry. Reliability observers were given a written definition, a blank data sheet (which did not indicate which responses would be consequated), and a silent stopwatch. The experimenter answered the reliability observer's questions and then allowed the observer time to watch the subjects for a few minutes before recording, in order to acquaint the observer with the actual recording procedures. No further practice recording was done. The experimenter and reliability observer sat in the front, right corner of the classroom. Independence of recording was assured by placing a cardboard partition between the experimenter and observer so that neither person could be influenced by the behavior of the other. The experimenter verbally prompted the observer to begin and end each session.

The reliability of frequency data was computed by forming the ratio of the smaller observed frequency over the larger, and multiplying by 100. The mean reliability for frequency data was 83.3%, based on 16 computations. The reliability of duration data was computed by forming the ratio of the smaller number of observed seconds of non-attending behavior over the larger number of seconds of non-attending and multiplying by 100. The mean reliability for these data was 81.5%, based on 16 computations. The range of reliability scores for both frequency and duration data was 0-100%. A 0%

score for both frequency and duration resulted when the experimenter recorded two responses lasting a total of eight seconds, while the reliability observer recorded no responses. Aside from this occasion, the range of agreement was 56.3%-100% for duration data, and 62.5%-100% for frequency data. Table 1 presents a summary of the reliability data.

Procedure

A reversal design was used for Ronald, consisting of 1) a baseline condition, during which no systematic intervention was implemented, 2) a contingent token condition, during which Ronald received a one inch by one inch cardboard token for non-attending behavior on the VR-3 schedule. During this condition Ronald received no explanation of why he received the token, and he received no back-up consequence. This condition was included in order to assess the effects of the feedback involved in token delivery independent of back-up consequences. A third condition was a delayed timeout condition, during which timeout was administered during the academic work period later in the morning.

A single-subject design was used for Terry, but no reversals were considered valuable because of the lack of effect of any condition. In addition to the three conditions used for Ronald, Terry received the following conditions: 1) delayed timeout from "going to lunch on time," during which Terry went to timeout when the rest of the class went to lunch, if Terry had received tokens that day, 2) delayed timeout from noon recess, during which Terry went to timeout when the rest of the class went to noon recess, 3) immediate timeout, during

Table 1. Percentage agreement for all reliability checks.

FREQUENCY DATA						DURATION DATA					
RONALD			TERRY			RONALD			TERRY		
Experi- menter	Second Observer	% Agree.	Experi- menter	Second Observer	% Agree.	Experi- menter	Second Observer	% Agree.	Experi- menter	Second Observer	% Agree.
12	10	83.3	18	20	90.0	2:45	2:45	100.0	13:00	13:97	95.4
13	13	100.0	13	16	81.2	5:22	4:40	86.9	15:47	15:47	95.0
9	11	81.8	16	15	93.7	5:13	6:12	84.1	7:46	8:35	90.0
15	12	80.0	15	13	86.9	6:57	5:24	77.6	15:49	14:53	94.0
8	8	100.0	9	12	75.0	3:19	4:21	76.3	17:41	17:28	98.7
2	0	0.0	11	12	91.6	0:08	0:00	0.0	12:58	11:24	89.3
16	16	100.0	9	9	100.0	6:04	5:16	86.8	17:24	17:06	98.2
5	8	62.5	9	12	75.0	0:40	1:11	56.3	10:55	8:20	76.3

Table 1. Reliability data for all reliability checks.

which Terry was immediately put in timeout according to the VR-3 schedule, and 4) immediate timeout plus praise, during which Terry received immediate timeout as above, but during which the teachers also praised him for his academic work when he did work.

The experimenter signalled the teachers by sounding a buzzer when it was time to deliver the tokens or to administer immediate timeout. A small button was connected to the buzzer, through a 6-volt battery. The wires, buzzer, and battery were placed behind a curtain and some books behind the teachers' desks. The buzzer was audible in all parts of the classroom. To assure that the teachers delivered the consequence to the proper subject, the experimenter wrote the first initial of each subject on a three inch by five inch index card. The card was placed where the teachers could see it. Thus, when the experimenter sounded the buzzer, the teachers could look at the card to see which subject was being observed. The teachers delivered the tokens to the subjects matter-of-factly, showing neither anger nor pleasure. When taking a subject to timeout the teachers said, "You received X tokens so you will go to the supply room for (X times 2) minutes." She would then grasp the subject by the arm, walk him to the timeout room, and place him in timeout. The teacher removed the subject from timeout similarly. The length of timeout was controlled by use of a kitchen timer which was kept on the teacher's desk.

Because delayed timeout offers the option of dispensing the timeout itself at a carefully selected time, it was of interest to assess the effects of delayed timeout from activities of varying reinforcement value. The subjects were asked to rank all classroom

activities as to their relative reinforcing values. All classroom activities were listed on a paper, and the teacher asked the subjects to place a "1" by the activity they liked most, a "2" by the activity liked next-to-most, etc. The first ranking was done early in the baseline condition. A second identical ranking was done at the beginning of the contingent token condition. The teacher also ranked the activities according to her observations of the subjects. The activities were then arranged into high, medium, and low reinforcing categories for each subject. Two activities were then selected from each of these categories. At the end of the contingent token condition the subjects were again asked to rank these six activities, but in the order in which they disliked them the most. This final ranking was consistent with the results of the earlier rankings. Since the rankings were only the verbal behavior of the subjects and teacher, they might not truly reflect the behavioral preference of the subjects for the various classroom activities. Appendix B presents the activities and rankings for each subject and the teacher.

Prior to each timeout condition the teachers told the subjects that in order to help them study better the teachers would give them a token whenever they were not paying attention to their work, and that they would have to go to the timeout room for a few minutes for each token they received. Similar instructions were given at the beginning of each new condition.

The experimenter instructed the teachers to remove the subjects from timeout on time unless they were disruptive (noisy, destructive) or they attempted to leave timeout early. When such events occurred

during the last minute of timeout, the timer was reset for two more minutes. When a subject was put into timeout the timeout room light was turned off and the door was closed.

RESULTS

The data in Figure 1 show a general decrease in the frequency and duration of non-attending behavior of Ronald through the experiment. The mean frequency during baseline was 12.0 responses per 20-minute session. The frequency of non-attending decreased to a mean of 8.0 during the first four sessions of the contingent token condition, although the mean frequency for the entire condition was 10.8. The mean frequency dropped to 5.8 during the first delayed timeout condition. The mean frequency increased to 9.6 during baseline II, and decreased again to 4.1 when the delayed timeout condition was reinstated. This tended to replicate the results from the previous baseline and timeout conditions.

Figure 1 also shows that the median duration during baseline I was 3 minutes and 12 seconds, increasing to 4 minutes and 50 seconds during the contingent token condition. The median value decreases to 1 minute and 45 seconds during the first delayed timeout condition, increases to 2 minutes and 36 seconds during baseline II, and finally decreases to 1 minute during the second delayed timeout condition.

Table 2, representing Ronald's performance, presents duration scores in terms of mean, median, and range per unconsequated and consequated response. The means presented in Table 2 are averages computed across all sessions in each condition. The medians presented are the median scores of session means in each condition. It is important to separate these data, since the sounding of the buzzer

Figure 1. Frequency and total duration of Ronald's non-attending behavior for each 20-minute session. The dashed line across duration data represents the median duration of non-attending for each experimental condition. The small triangles represent the second observer's data obtained during reliability checks.

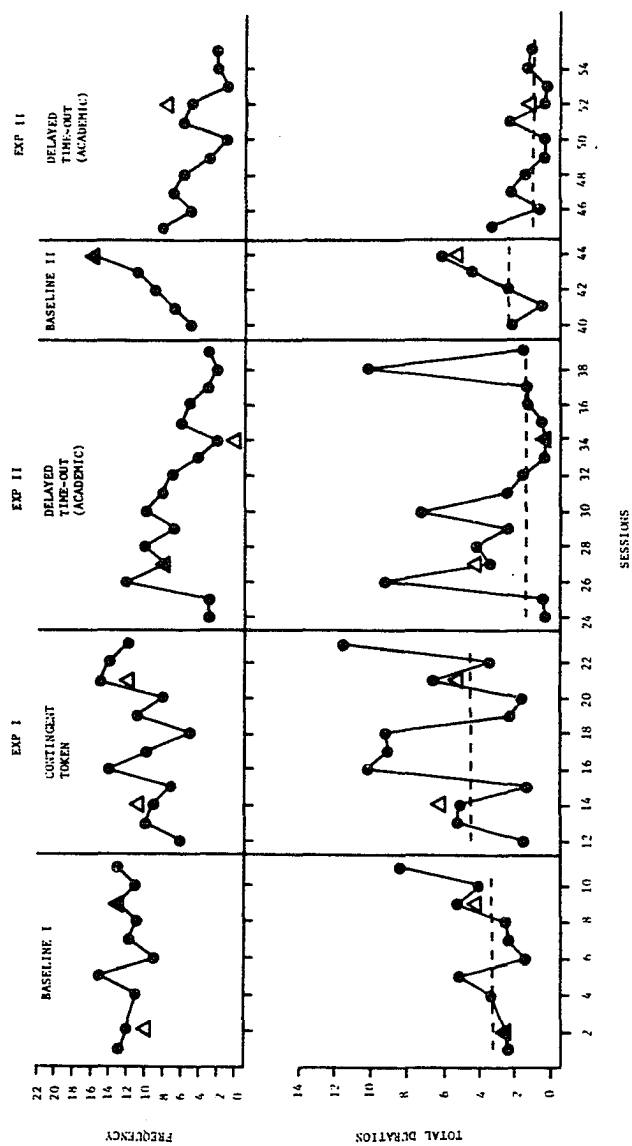


Figure 1. Frequency and total duration of Ronald's non-attending behavior.

Table 2. Mean, median, and range scores for unsequated and consequated responses across all experimental conditions for Ronald. The means presented are the averages of the session means across each experimental condition, and the medians presented are the medians of session means across each experimental condition. Range scores represent the most extreme session means within an experimental condition.

EXPERIMENTAL CONDITION	DURATION/UNCONSEQUATED RESPONSE IN SECONDS			DURATION/CONSEQUATED RESPONSE IN SECONDS		
	MEAN OF SES- SION MEANS	MEDIAN OF SES- SION MEANS	RANGE	MEAN OF SES- SION MEANS	MEDIAN OF SES- SION MEANS	RANGE
Baseline I	18.9	17.19	10.11-40.38	----	----	----
Contingent Token	26.23	18.45	13.87-59.62	55.60	33.00	5.5-261.00
Delayed Timeout (Academics)	20.00	17.45	4.00-52.88	58.60	27.00	0.0-600.00
Baseline II	19.70	22.75	6.85-26.09	----	----	----
Delayed Timeout (Academics)	18.78	18.20	6.50-34.50	18.31	17.00	0.0-45.00

Table 2. (Ronald) Mean, median, and range scores for unconsequated and consequated responses.

and the delivery of tokens following a response may have caused changes in the subjects' behavior which did not occur following un-consequated responses. Such changes could include a decrease in non-attending, or an increase due to angry or retaliatory behavior directed against the experimenter or teacher. Median scores for un-consequated responses vary around 20 seconds (± 3.0 seconds). The widest range for un-consequated responses, and the range which contains the most extreme scores, was 4.00 seconds to 52.88 seconds during the first delayed timeout condition. Median duration for consequated responses was higher than that for un-consequated responses, reaching 33.0 seconds during the contingent token condition, and 27.0 seconds during the first delayed timeout condition. The median duration for consequated responses decreased to 17.0 seconds during the second timeout condition. The range of per-response duration was greater for consequated responses, with the widest range and most extreme scores occurring during the delayed timeout conditions. This range was 0.0 seconds to 609.0 seconds.

The data in Figure 2, representing Terry's performance, show general stability throughout the first six conditions. The frequency of responding decreased from a baseline mean value of 15.8 to a low of 8.6 during experimental condition IV (delayed timeout from noon recess). The last two experimental conditions show an increase in mean frequency from 9.33 to 12.25.

Despite the decrease in the frequency of non-attending behavior across the first six conditions of the experiment, the duration data for Terry, although quite variable, are generally high throughout

Figure 2. Frequency and total duration of Terry's non-attending behavior for each 20-minute session. The dashed line across duration data represents the median duration of non-attending for each experimental condition. The small triangles represent the second observer's data obtained during reliability checks.

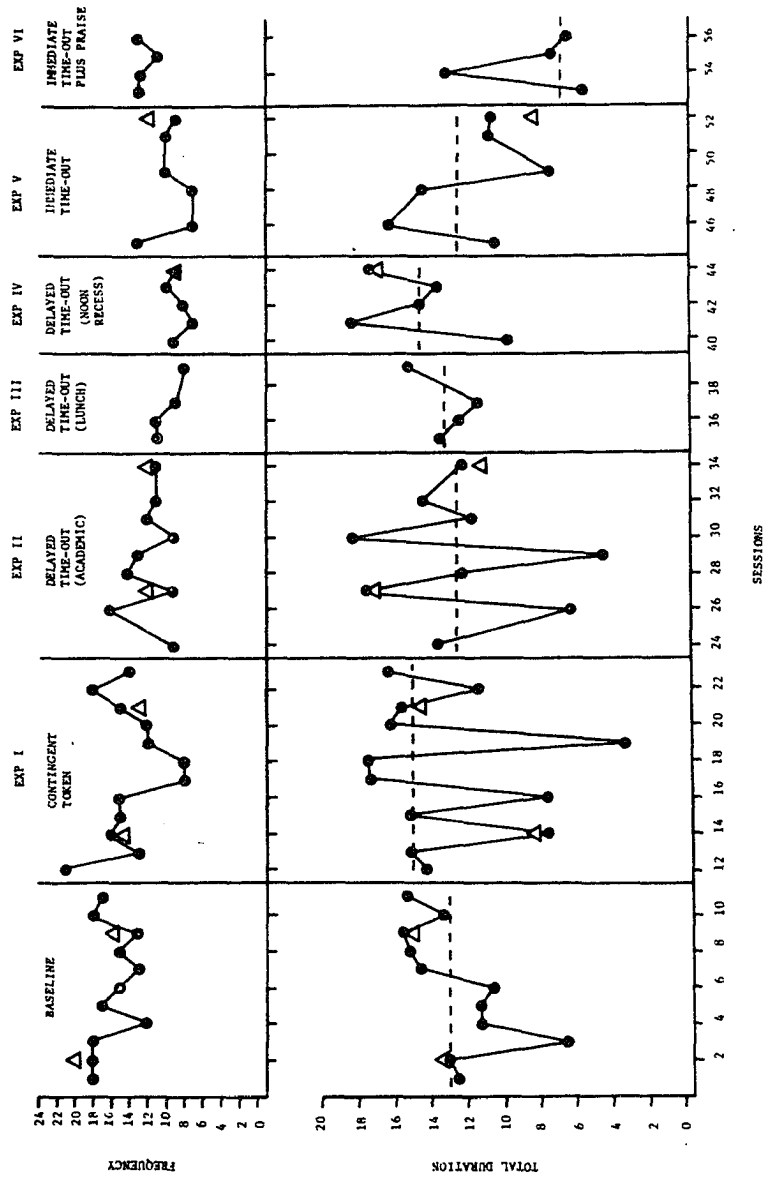


Figure 2. Frequency and total duration of Terry's non-attending behavior.

those same conditions. The median values for each condition were 13 minutes, 9 minutes and 36 seconds, 12 minutes and 48 seconds, 13 minutes and 12 seconds, 14 minutes and 48 seconds, and 10 minutes and 50 seconds, respectively. The median duration decreased to 6 minutes and 56 seconds during the final experimental condition.

Table 3, representing Terry's performance, presents mean, median, and range scores for unsequated and sequated responses. The median duration per unsequated response varied, with a gradual increase from 44.66 seconds during baseline to 106.5 seconds during the immediate timeout condition. The median value decreased to 46.1 seconds during the immediate timeout-plus-praise condition. Range scores also fluctuated, although the lower and upper scores increased from the first three conditions to the fourth, fifth, and sixth experimental conditions. There is a decrease in the lower and upper scores during the final experimental condition. Median duration per sequated response increased from 43.0 seconds during the contingent token condition to 150.0 seconds during experimental condition IV. These scores are higher than scores for unsequated responses, except for the contingent token condition. There is no consistent change in range scores for sequated responses.

Table 3. Mean, median, and range scores for unsequated and consequated responses across all experimental conditions for Terry. The means presented are the averages of the session means across each experimental condition, and the medians presented are the medians of session means across each experimental condition. Range scores represent the most extreme session means within an experimental session.

EXPERIMENTAL CONDITION	DURATION/UNCONSEQUATED RESPONSE IN SECONDS			DURATION/CONSEQUATED RESPONSE IN SECONDS		
	MEAN OF SES- SION MEANS	MEDIAN OF SES- SION MEANS	RANGE	MEAN OF SES- SION MEANS	MEDIAN OF SES- SION MEANS	RANGE
Baseline I	50.34	44.66	22.22-72.84	----	----	-----
Contingent Token	65.06	115.65	10.75-147.14	55.48	43.00	16.00-116.33
Delayed Timeout (Academics)	59.55	63.50	13.25-120.66	96.69	82.75	25.60-201.00
Delayed Timeout (Lunch)	80.93	62.37	58.37-130.60	92.23	83.66	82.25-119.33
Delayed Timeout (Noon Recess)	82.57	91.80	39.14-122.16	173.53	150.00	103.66-327.50
Immediate Timeout	114.66	106.50	64.14-193.00	----	----	-----
Immediate Timeout Plus Praise	55.66	46.16	32.80-97.50	----	----	-----

Table 3. (Terry) Mean, median, and range scores for unconsequated and consequated responses.

DISCUSSION

The data on Ronald suggest that the delayed timeout procedure had a moderate suppressive effect on non-attending behavior. The short-lived decrease in frequency during the contingent token condition suggests that token presentation, even without back-up consequences, had a slightly punishing effect. This brief suppression might be due to the novelty of the buzzer and token delivery, combined with the subject's history of being scolded by teachers for general non-attending behaviors, such as talking to other students and staring out the windows. By the end of the condition, however, the frequency of responding was near the frequency during baseline. The introduction of the first delayed timeout condition produced a gradual decrease in frequency of responding for Ronald. A reversal to baseline occasioned an immediate increase in the frequency of non-attending. The reinstatement of delayed timeout again suppressed the frequency of non-attending somewhat.

Changes in the duration of Ronald's non-attending behavior correspond to the changes in the frequency of non-attending, decreasing during the first delayed timeout condition, increasing during baseline II, and then decreasing when delayed timeout was reintroduced. The steady decrease in the duration of non-attending during the first delayed timeout condition is interrupted only by a dramatic increase in duration during session 38. On that day Ronald received a token for his second response. For the remainder

of the session (10 minutes and 9 seconds) he stared at the floor or at the experimenter, whereas up to that point in the session Ronald had made only one response of 10 seconds duration. This may reflect a general problem with total duration as a measure of the effects of these or other interventions.

Subjective observation of Ronald also suggested that the delayed timeout procedure was aversive to him. During the initial experimental conditions he refused to keep the tokens, either throwing them on the floor, giving them to other students, or putting them on the teacher's desk. Later Ronald accepted the tokens, but he wrote crude words on them. On several occasions he made obscene gestures at the experimenter. Ronald often said, "That's not mine, it's his (Terry's)," when the teacher was giving him a token.

On two occasions when Ronald had nearly completed his session he left his desk, walked to the experimenter and said, "Do you think I'll make it today?" When told that he would not be receiving tokens, at the beginning of the second baseline condition, Ronald came to the experimenter, smiled broadly, and offered a handshake. Receiving no response from the experimenter, Ronald patted the experimenter on the back.

The data in Table 2 suggest that consequating a response might actually prolong that response, since the mean values during the experimental conditions for consequated responses are more than twice as large as the values for unconsequated responses. There is little doubt that Ronald's writing and gesturing behavior following token delivery contribute to the greater duration per consequated response.

The 58.6 second figure, reported for consequated response duration during the first delayed timeout condition may be misleading, however, since it contained the session in which Ronald ceased to work for the second half of the session, as mentioned earlier. When this session is eliminated the mean duration per consequated response is 21.91 seconds, well within the range of the unconsequated responses. The median values for consequated responses are also greater than those for unconsequated responses.

Data on Terry suggest that timeout, whether delayed or immediate, had no effect when applied independent of positive procedures. Although the frequency of Terry's non-attending decreased across the first six conditions of the study, the duration data show no corresponding decrease. Indeed, the data in Table 3 show that mean time per unconsequated response increased through the first six experimental conditions; this trend is repeated for consequated responses, but at even a higher level. These data, similar to those for Ronald, lend support to the notion that the buzzer and token delivery procedure tends to prolong non-attending.

From a practical standpoint, duration data would logically appear to be more valuable than frequency data, since duration more accurately reflects the amount of time the subject is off task and cannot be learning the assigned material. The lack of correlation between frequency and duration data, which is evident in Figure 2, suggests the need for an investigation of the relative advantages and disadvantages of these and other response measures. Probably the ultimate criterion for selecting the appropriate measurement

would be its correlation with task productivity and accuracy.

A possible explanation for Terry's sustained performance is that the timeout procedure did not remove him from reinforcing activities. That is, Terry's ranking of school activities gave only their relative positive reinforcing value, while the absolute reinforcing value of all school activities may have been negligible. The data for the final experimental condition lend some support for this contention. When the teachers began to praise Terry for working on his assignments his mean time per unsequated response decreased to near baseline level, and the total duration of non-attending dropped to the lowest mean value of any condition applied to him. Thus, it may be that during this final condition Terry was being removed from the opportunity to receive positive reinforcement, in the form of teacher praise. The increase in frequency of Terry's non-attending responding during the immediate timeout-plus-praise condition occurred because he was attending more often than he had been in previous conditions. In other conditions Terry went off task and seldom came back on, resulting in lower frequencies and higher durations. During the final experimental condition, he attended more often, thus increasing the availability of non-attending responses. Further evidence of the combined effectiveness of the immediate timeout-plus-praise condition was the sudden occurrence of enthusiastic statements like, "I got another paper done," and "I only have one more to do."

Certain program restrictions also may have limited the effectiveness of delayed timeout for Terry. Because of his "perceptual problems," Terry was required to attend gym class, thus precluding the

possibility of administering delayed timeout during gym class, a high-ranked activity for Terry. Future research on delayed timeout should be conducted in a setting which permits flexibility in the application of the procedure, especially regarding when the timeout is administered.

Questions could be raised regarding the population used and the behavior consequated in the present study. It may be that educable retarded children do not respond to delayed consequences as rapidly as they do to immediate consequences, or it may be that intermittent, delayed timeout is not effective with retarded children. It may also be that non-attending behavior is more subtle than "talk-out" or "out-of-seat," therefore providing the subject fewer cues that he is emitting an "inappropriate" behavior. Regardless of the applicability of these explanations to the present study, they are questions which future research should answer.

One way to assess the effects of delayed timeout from activities of varying reinforcing value would be to structure a situation in which the reinforcement density for different activities was precisely controlled. Forms of token economies would lend themselves most easily to such structuring. A subject could then be timed out of an activity whose reinforcing value could be quantitatively stated.

From the present results, which do not replicate those of Ramp et al. (1971), it seems wise to proceed with caution in employing delayed timeout. The apparent advantages of delayed timeout are nullified if the procedure is ineffective in reducing the target behavior. From a practical point of view, a behavior analyst may

wish to try manipulating variables such as the way to signal the subject of an inappropriate response, the length of timeout per response, schedules of punishment, length of delay between the occurrence of the behavior and timeout, and the use of restitution to offset the accumulated timeout liability. Then if the procedure still produces equivocal results, serious consideration must be given to the idea that, despite its theoretical and practical appeal, delayed timeout is not a practical tool of the behavior modifier.

Although this study does not present compelling evidence regarding the effectiveness of delayed timeout, it does offer data for thought. First, the data for Ronald suggest that delayed timeout, even from an activity rated as "most-disliked" can be effective. This seems to indicate that the teacher can be somewhat arbitrary in deciding when to administer delayed timeout. Second, the data for Terry suggest that delayed timeout, even when applied during an activity rated as "most-liked" may have no effect.

This would seem to indicate that the teacher should not rely solely on the subject's verbal report of what he considers reinforcing. Furthermore, when timeout from the "most-liked" activity has no effect, the teacher should attempt to increase the general reinforcing atmosphere of the classroom by awarding more praise, points, and privileges. The last experimental condition for Terry attempted to make the classroom more enjoyable for Terry (and to facilitate his academic learning). These points lead to the reiteration of a profound but sometimes overlooked fact: individual subjects are different, and blanket procedures may not work equally for all.

APPENDIX A

Definition of "Not Attending-to-Task"

Attending-to-task is occurring whenever the subject is:

1) looking at the assignment chalkboard, 2) looking at his work material, 3) writing on his work material, or 4) looking at anything the teacher instructs him to look at.

All other responses constitute non-attending. Examples of non-attending are: 1) the subject's looking toward the sides or back of the room, 2) the subject's looking at the top of his desk, but rolling his pencil up and down with his fingers while watching the pencil, or 3) the subject's playing with any other object or work material.

Behaviors such as picking a pencil from the floor, getting something from inside the desk, and arranging a new work paper on the desk will be considered as ATTENDING if they are preceded by attending behavior. These same behaviors will be considered NON-ATTENDING if they are preceded by non-attending behavior.

One response will occur each time the subject emits a non-attending response for at least 4 seconds as counted by the observer "One-thousand one, one-thousand two" as soon as the subject begins to emit the response. The response will terminate and be recorded when the subject attends to task for 4 seconds, as counted above.

The cumulative duration of non-attending will be measured by the observer. Using a stopwatch the observer will begin timing the subject's non-attending after the "One-thousand two" count. The

watch will continue to run until the subject is again attending for the "One-thousand two" count, at which time the observer will stop BUT NOT RESET the watch.

The observer will record an X in the appropriate box for each non-attending response, recording horizontally across the data sheet. The observer will also record the cumulative elapsed time as shown on the stopwatch at the end of each response.

The observer will record each subject for 20 minutes per session, beginning at 9:30 a.m. or as soon thereafter as 1) the subject is in his seat, and 2) the teacher finishes presenting the work for the day.

The subject must be seated in order to record. No response will be recorded when the subject raises his hand, or when the teacher is talking to him.

The observer will begin recording subject 2 as soon as subject 1's session is completed.

APPENDIX B

Activity Ranking Form: Terry

Ranking #			<u>Teacher's Ranking</u>	<u>Activity</u>
<u>1</u>	<u>2</u>	<u>3*</u>		
18	18		18	1. Copying 5 sentences from the board.
14	13	3	17	2. Doing clock dittos.
16	15	1	16	3. Doing dictionary words.
17	17		15	4. Doing spelling words.
13	14		13	5. Doing the perception dittos.
15	16		14	6. Doing rhyming pictures dittos.
4	12		12	7. Doing the arithmetic dittos.
10	3	4	3	8. Going to lunch right on time.
12	11	5	2	9. Having noon recess.
11	9	6	8	10. Having free time.
8	4		1	11. Going to gym.
9	6		9	12. Going to music class.
7	10		5	13. Listening to stories.
2	8		10	14. Doing art projects.
6	7		7	15. Watching movies.
1	2		11	16. Having a spelling bee.
5	5	2	6	17. Playing games.
3	1		4	18. Going to the "store."

*For this ranking "1" denoted the least-liked activity, and "6" denoted the most-liked activity.

Activity Ranking Form: Ronald

Ranking #			<u>Activity</u>	
<u>1</u>	<u>2</u>	<u>3*</u>	<u>Teacher's -Ranking</u>	
18	17		18	1. Copying 5 sentences from board.
16	14	2	14	2. Doing clock dittos.
18	17		17	3. Doing dictionary words.
8	13	1	16	4. Doing spelling words.
13	16		13	5. Doing the perception dittos.
15	12		15	6. Doing the rhyming pictures dittos.
5	15	3	12	7. Doing the arithmetic dittos.
1	8	5	2	8. Going to lunch on time.
3	7		1	9. Having noon recess.
14	1	6	6	10. Having free time.
2	4		4	11. Going to gym class.
9	5		11	12. Going to music class.
4	2		7	13. Listening to stories.
10	3		8	14. Doing art projects.
7	6		3	15. Watching movies.
6	10		10	16. Having a spelling bee.
12	11		9	17. Playing games.
11	9		5	18. Going to the "store."

*For this ranking "1" denoted the least-liked activity, and "6" denoted the most-liked activity.

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