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Teaching developmentally disabled children to play by themselves

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TEACHING DEVELOPMENTALLY DISABLED CHILDREN TO PLAY BY THEMSELVES

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ABSTRACT

The effectiveness of a training procedure designed to teach developmentally disabled children to play by themselves was examined. In addition, the influence of the frequency of probing was investigated. Baseline data showed low levels of self-amusement. The generalization training procedure produced moderate increases in self-amusement when probes were conducted frequently. The same treatment procedure produced higher levels of self-amusement when probes were conducted intermittantly. Some strategies for more successfully programming self-amusement are suggested.

Teaching leisure time or play skills to developmentally disabled children has received increasing attention in recent years. The focus of a number of these studies has been on teaching cooperative or social play skills (Buell, Stodderd, Harris & Baer, 1968; Hart, Reynolds, Baer, Brawley & Harris, 1968; Knapczyk & Yoppi, 1975; Morris & Dolker, 1974; Strain, 1975; Wehman, 1978). While these studies have focused on an important need of developmentally disabled children, i.e., the lack of social play skills, studies concerned with teaching developmentally disabled children to play by themselves have not been reported.

Teaching self-amusement skills may be helpful in several ways. First, "attention seeking", annoying aggressive and disruptive behaviors displayed by severe problem children have likely contributed to many of these individuals being institutionalized. Many developmentally disabled children might be more readily accepted in the community if they could be taught to amuse themselves in appropriate ways during portions of the day.

Another frequently noted problem of developmentally diabled children is self-stimulatory behavior, or what Foxx and Azrin (1973) have referred to as "repetitive, stereotyped behavior that has no apparent functional effects on

the environment" (p.1). This type of responding has also likely contributed toward individuals being labeled as developmentally disabled or retarded. If these individuals could be taught to amuse themselves in other ways, the label of retarded might be less readily applied and the associated embarrassment less frequently felt by the individuals or their care providers.

The teaching of appropriate self-amusement skills may also benefit developmentally disabled children by affording them greater learning opportunities. Manipulating objects in the environment would appear to provide opportunities for learning useful skills that would certainly be absent in situations where a child was doing nothing or engaging in repetitive, stereotyped behaviors.

Regardless of these potential advantages, problems may occur when teaching self-amusement. Implied in self-amusement is a lack of nearby adults and a lack of social and other extrinsic reinforcers. Thus, a training procedure which gradually fades external contingencies needs to disquise a declining reinforcement frequency and, in effect, program for a generalized play repertoire.

Problems may also occur in the use of validation or recording procedures which will tend to produce discriminable features to the subject. For example, the use of data sheets and other recording apparatus correlated with the absence of reinforcement might result in a cessation of responding when data are being collected. That care may need to be taken in

isguising contingencies in such situations is not surprising since there are indications in the literature that fairly subtle features in the environment can enter into the contingency relation. For example, Rincover and Koegel (1975) found that some autistic children selectively responded to incidental stimuli in the treatment room. Redd and Birnbrauer (1969) showed that retarded children selectively discriminated between adults who dispensed reinforcement and those who did not. In addition, Redd (1969) showed that retarded children could discriminate different contingencies of reinforcement. Withholding reinforcement from a retarded child in the absence of cooperative play generated cooperative play, while non-contingent reinforcement of the same child did not generate play. Preliminary studies by Solot, Dahlkoetter, Mabry and Lutzker (Note 1) also indicated that consideration of the discriminative features in the environment may be important while training and also when collecting data if the collection techniques are easily correlated with the presence or absence of reinforcement.

A study by Stella and Etzel (Note 2) provided further evidence that data collection procedures can influence results. This study found that children probed frequently at criterion level developed error patterns and performed poorly on a posttest while children who were not probed frequently performed much better on the posttest.

The present study, using a combined multiple baseline - reversal design, was designed to answer two questions. First,

can generalized play by a child be achieved through gradually increasing the distance of a trainer from the child and the subsequent attenuation of the frequency of reinforcement? Second, does the frequency of proving influence the acquisition of generalized play responses?

Method

Subjects

The subjects were two male children. John was 10 years old and had been placed in a state institution approximately three years earlier. He had a reported IQ of 35 and a score of 3 years, 6 months on the Vineland Social Maturity Scale. He was characterized by hospital staff as aggressive, hyperactive and attention seeking. He was noted to hit, bite, scratch, pull others' hair, regurgitate food, smear feces and refuse to obey commands. Robert was 12 years old and had been in institutions for approximately 8 years. He had a reported IQ of 17 and a score of 2 years on the Vineland Social Maturity Scale. Hospital staff noted that he sought their attention by smearing feces, screaming and running away. In addition, he was noted to frequently refuse to obey commands and to talk in an echolalic fashion. Both children had already learned to play in a desirable manner prior to this experiment when given only occasional instructions, frequent reinforcement and a nearby trainer. In addition, both children displayed low rates of desirable play when alone, thus justifying the need for self-amusement training.

Setting

All phases of the experiment were conducted in the dayroom of a unit of a residential treatment program for developmentally disabled children. This room, approximately 12 m x 12 m, was divided in half by a 6 m wide partition. Five tables were situated at various places in this room during both probe and training periods, the subjects were seated at one of these tables, which was located next to the partition. Usually no other children were present when a child was involved in the experiment. However, in about six or seven instances other children wandered into the experimental area when doors were left unlocked, children were returning from or going to the dining room, etc. In addition, a child in a wheelchair was also occasionally present in the area during experimental sessions.

Observation Procedures and Behavioral Definitions

Two skilled observers recorded the occurrence or non-occurrence of the behaviors described below.

Desirable play. Desirable play was defined as occurring when there was physical contact between a student's hand (s), the blocks and the table, which involved approximations to, or completions of, structures or designs. A structure had at least one block which did not touch the table and a design had all blocks in contact with the table.

The following were examples of desirable play:

1. Stacking blocks vertically or horizontally in any combination such that they stood freely.

2. Placing blocks side-by-side.

3. Straightening or adjusting a block(s) to improve alignment with other blocks or improve the balance of the structure.

Less desirable play. To avoid recording or reinforcing stereotyped or self-stimulative behaviors, a category of less desirable play was created. Less desirable play was defined as:

1. Repetitive (three or more consecutive occurrences) movement with the block(s) in hand.

2. Tapping or hitting the blocks repeatedly (three or more consecutive times).

3. Banging blocks together.

4. Putting block in mouth.

5. Rubbing block against body.

6. Throwing blocks

7. Touching the block(s) but not moving it.

8. Picking up and then dropping a block.

No play. No play was defined as no physical contact between the child's hand(s) and the block(s) for the duration of an interval.

Antecedents and consequences. Data were also collected on the occurrence of the trainer's instructions to "play with the blocks" as well as physical and gestural prompts used to initiate block play. Further data were collected on the occurrence of the trainer's delivery of social reinforcement (verbal praise and physical contact such as hugs, pats on the back, etc.) and edible reinforcement.

Each period was divided into 10-sec. intervals and the observers were cued to proceed to the next interval by a tape recording. The previously described behaviors were recorded on a data sheet (see Appendix 1) if they occurred.

Reliability

Reliability was assessed during eleven of the sixty-one sessions (a session consisted of four training periods and four probe periods except during the "infrequent probing" condition) and at least twice during each condition. The first three reliability assessments were made with the assistance of a video-tape recorder. In these cases the entire session, including the tape recorded 10-sec. cues, were video-taped. Percentage agreement reliability figures were later computed on the occurrence or non-occurrence of desirable play. Although not critical for the purpose of helping to demonstrate whether experimental control was achieved, reliability was also taken on less desirable play, no play, antecedents and social and edible reinforcement. Separate percentage agreement reliability figures were computed for each of these behaviors. The remaining eight reliability assessments were made by a second observer who was separated from the first observer by a partition. As in the first three reliability assessments, separate percentage agreement figures were computed for each of the subject and trainer behaviors.

Procedure

During baseline, "pre-training" periods were conducted in the following manner: The trainer positioned himself one meter behind the child and gave the instruction,"(name), play with the blocks", then reinforced desirable play responses on a psuedo-random variable ratio 3 schedule. The duration of a period was three minutes.

Probe periods began in the same manner, that is, the trainer positioned himself one meter behind the child and gave the instruction, "(name), play with the blocks". However, the trainer then backed away from the child and disappeared behind a partition for the remainder of the three minutes.

Training periods also began with the instruction, "(name), play with the blocks", while the trainer was standing one meter behind the child. However, the trainer began to increase his distance from the child. Initially he stepped back an additional .5 m from the child. Immediately following the next desirable play response, the trainer praised the child's play and returned to reinforce with physical contact. Edible reinforcers were used on an intermittant schedule. Specifically, a two-to-one ratio of social (praise and physical contact such as hugs and pats on the back) to edible reinforcement was provided duirng the initial experimental sessions. This ratio was gradually increased until a four-to-one ratio of social to edible was being provided in the final phase of the experiment.

If the child turned around to look at the trainer and/or

stopped playing or displayed less desirable play responses, the trainer looked away until the child resumed desirable play responses, then reinforced with praise, physical contact and edibles if appropriate. As training progressed, the trainer worked up to a 10-sec. delay in the period of time between the resumption of play and the delivery of reinforcement.

When the child had displayed desirable play responses during six consecutive 10-sec. intervals, an observer cued the trainer with a hand signal to increase his distance from the child by an additional .5 m. Each time this criterion of six consecutive 10-sec. intervals was met, the trainer was cued to increase the distance that he stepped back by an additional .5 m. To help disguise the declining reinforcement frequency associated with increased distances, the trainer occasionally deviated from this pattern and returned to shorter distances from the child.

When training had progressed to the point where the child still played while the trainer could step behind the partition (approximately 4 m behind the child), the amount of time that the trainer was out of the child's view was gradually increased. To do this, the trainer followed a psuedo-random variable ratio schedule beginning with VR 2 and increasing to VR 8 for John and to a VR 10 for Robert (thereby indirectly increasing the length of time between reinforcements) by the end of the experiment.

Additional instructions and prompts were occasionally used during training periods to cue the child to resume play

with the blocks if he had wandered from the table or failed to display appropriate play for a number of consecutive intervals. To avoid establishing a pattern of consistently reinforcing the absence of play with instructions to play, a system was employed, beginning in the eighteenth session, in which the observer cued the trainer to give the instruction, "(name), play with the blocks" at the beginning of each minute of a training session independent of the occurrence of non-occurrence of play.

Design

A multiple baseline design across subjects was used. Additionally, a reversal was done with both children. During baseline, probe periods where the trainer was out of the child's view and not providing reinforcement were alternated in a psuedo-random fashion with pre-training periods, during which the trainer was positioned 1 m behind the child and providing frequent reinforcement for desirable play responses. During the first treatment phase, training periods where generalization of play was programmed by having the trainer gradually increase his distance to the child and attenuate the frequency of reinforcement were alternated in a psuedo-random fashion with probe periods, to test the effects of the experiment. Specifically, they were conducted at the fourth, seventh, tenth, thirteenth, etc. sessions. The fourth condition marked the completion of the reversal, i.e, probes were again alternated with training periods. For John there was an additional condition in which probes were again

conducted infrequently.

Results

Inspection of Figure 1 and Table 1 show few instances of generalized self-amusement for either subject during baseline probes. The mean percentage of intervals during which self-amusement was observed during the initial treatment phase, a frequent probing condition, increased from the baseline rate of 4% to 6.6% (the majority of self-amusement occurring during the final seven sessions of this phase) for John and from the baseline mean of 4.3% to 18.8% for Robert. In the next condition, when probes were conducted less frequently, the mean percentage of self-amusement increased to 33.2% for John and to 49.8% for Robert. Return to the frequent probing procedure resulted in a decrease in the mean percentage of intervals during which self-amusement was observed to 15.1% for John and to 23.4% for Robert. When probes were again conducted less frequently on John's behavior, the mean percentage of intervals of observed self-amusement again increased, this time to 35.4%.

Reliability data were collected on subject and trainer behaviors during 11 of the 61 sessions. Table 1 shows the mean reliabilities obtained for both subjects during training and probing periods. The overall mean reliability for training periods was 94%. The range of the reliabilities was 87% to 98%. The overall mean reliability for probing periods was 94.5%. The range was 92% to 97%. The mean reliability on the trainer's delivery of social reinforcement was 87%. The

mean reliability of the trainer's delivery of edible reinforcement was 93%. The mean reliability on the trainer's use of instructions and prompts was 88%.

Discussion

This study was designed to determine whether a generalization training procedure could effectively teach children to play by themselves and to determine whether an aspect of the data collection procedure, the frequency of probing, would have a significant influence on the amount of self-amusement displayed. The results showed a notable increase in self-amusement for both subjects during the initial generalization training. A longer period of time was required to obtain an increase for John than for Robert, and the obtained increase was smaller in magnitude for John. The increase in generalized play was greater for both subjects when probes were conducted intermittantly than when conducted frequently, although Robert again played more by himself under this condition than John.

Examination of Fig. 2 shows that trainer behaviors, following some initial instabilities and a fairly rapid decrease in the frequency of delivered reinforcement during the initial generalization training condition, were fairly stable, though gradually decreasing, throughout the experiment. This provides evidence, over and above that provided by the controls exerted by the design of the experiment, that the observed increases and decreases in self-amusement were due to manipulations in the frequency of probing, not to abrupt changes in the rates of occurrence of the major independent variables.

Thus there seems to be fairly strong evidence that an intermittant probing procedure allows for greater rates of self-amusement than a frequent probing procedure. However, even under this condition, the consistancy and amount of self-amusement is lower than would be optimally desired in a natural setting.

To clarify this point, the data show John's best play performance during probes to be approximately 35% and Robert's to be approximately 50%. This means that both subjects were doing something other than playing appropriately with blocks a majority of the time. While no normative data are available, and while it is probably not realistic to expect children to do nothing other than stack one block after another for long periods of time, a rate of play closer to that achieved during training periods would unquestionably be desirable. Nonetheless, the results suggest that if simular procedures were used in a natural setting, over time enough self-play might occur to be useful for the child and parent or care provider.

There are a number of possible reasons why more dramatic independent play was not achieved. One possibility is that the frequency of reinforcement or other interactions of the trainer with the resident may not have been sufficiently faded during the course of training, thereby easing the discriminability between training and probing periods. Inspection of Figure 1 shows that even at the end of the experiment, the trainer was still providing reinforcement during approximately 20% of the intervals, representing approximately 3 - 4

instances of reinforcement during a three minute period. In addition, the trainer gave instructions or used prompts during approximately 20% of the intervals, representing 3 - 4 more instances of interaction between the trainer and the subject during a three minute period. Thus, on the average, a total of 6 - 8 interactions per period, or, one interaction every 20 - 30 seconds, took place. Not only is this a rate of interaction greater than could practically be provided by parents or other care providers, but it is a possible basis of discriminated performance between training and probing periods since during probes there was no interaction aside from the initial instruction to play with the blocks. This line of speculation is further bolstered by the findings of Redd (1969) who, as already noted in the introduction, discovered that developmentally disabled children rather easily discriminated between different contingencies of reinforcement.

If the above line of reasoning is sound, it would seem desirable to further reduce the amount of interaction between the trainer and the subject during training. In practice, this may be difficult. As the reinforcement frequency declines, one could expect competition from alternate sources in the natural environment. As an example, after about one minute of probing John was frequently observed to begin climbing on various objects in the room and Robert was often observed to engage in self-stimulatory or echolalic behavior.

The individual histories of reinforcement for the subjects may provide another clue as to why it may have been dif-

ficult to teach independent play. For over one year both subjects had been exposed to play-training sessions in which a trainer was always nearby and providing frequent reinforcement. Perhaps if the subjects had had a history of exposure to intermittant schedules and to conditions where they received reinforcement for performing tasks on their own, dependencies on the immediate presence of the trainer and a high frequency of reinforcement might have been less and fading these elements might have been easier.

Using a frequent probing procedure at the beginning of the experiment may have also influenced subsequent results. It is possible that the rate of acquisition of generalized play, or perhaps, the degree to which the subjects learned to discriminate between probe and training periods, would have been different if an intermittant probing procedure had been used throughout the experiment. Future examination of such order effects would appear to be useful.

An irregular training schedule may have also influenced the results. However, whether more regular and frequent training would have resulted in more consistant and higher levels of self-amusement is unknown.

Additional work is unquestionably needed in developing a practical procedure for programming self-amusement. More problem solving is needed on how to effectively disguise declining reinforcement frequencies and how to deal with naturally occurring reinforcers for undesirable alternatives to play. If the issue is the discriminability of reinforcement,

then techniques such as those reported by Koegel (1977) where non-contingent reinforcers were delivered in the extra-therapy environment or similar techniques which would decrease the apparent reliance of the behavior on a high density of reinforcement are suggested.

Closer examination of the influence of data collection procedures on training outcomes is also needed. Stella and Etzel (Note 2) found that frequent probing led to the development of error patterns and poorer performance on subsequent posttesting. They suggest several guidelines for dealing with problems related to probing such as probing only for the minimal information necessary to answer an experimental question or monitor acquisition, probing the fewest number of times that need to be given, and probing only after some level of task acquisition has had an opportunity to occur. These suggestions would appear to be equally appropriate to the present study.

FIGURE 1

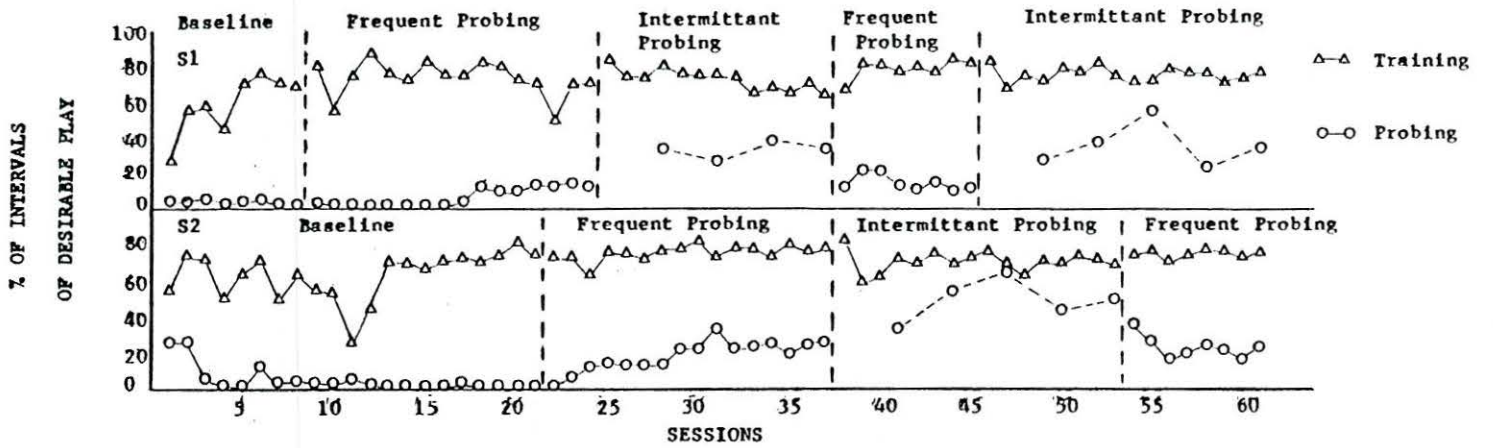

FIGURE 2

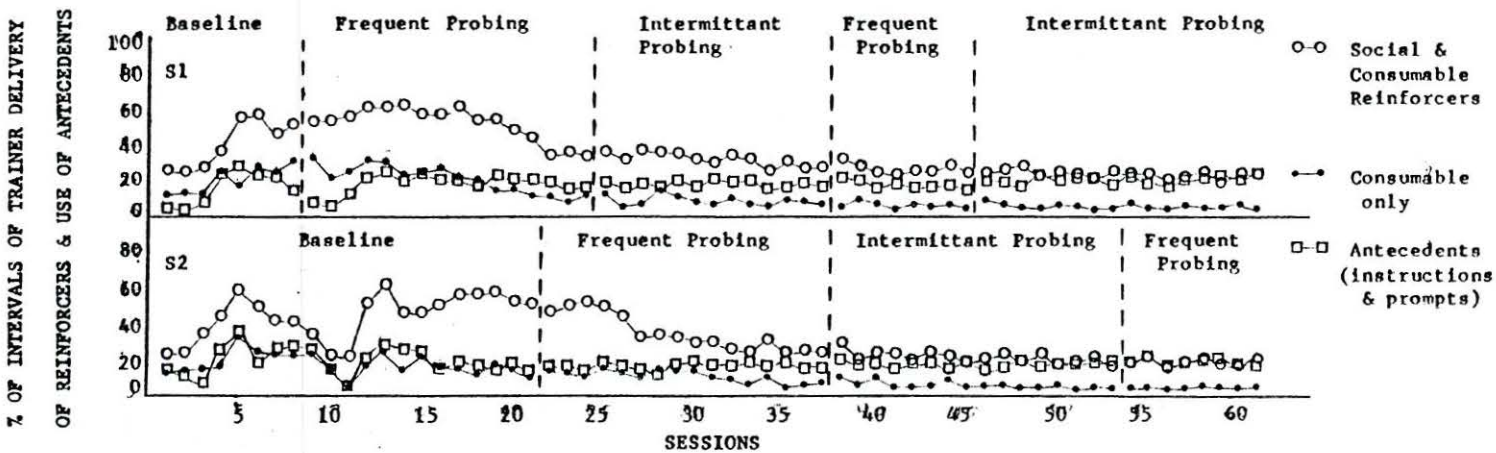

Table 1. Mean percentages of block play during baseline (A), the frequent probing conditions (B), and the intermittant probing conditions (C) for both subjects during training and probe periods.

	Subject 1				
Condition	A	B	C	B	C
During Training Periods	58.8	73.9	72.8	79.6	75.2
During Probe Periods	4	6.6	33.2	15.1	75.2

	Subject 2			
Condition	A	B	C	B
During Training Periods	63.8	76.3	71.4	74.9
During Probe Periods	4.3	18.8	49.8	23.4

APPENDIX 1

Self-Amusement Data Sheet

Name: _____ Date: _____

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Des. Play																		
Les Des. Play																		
No. Play																		
Antecedents																		
Social Srt																		
Edible Srt																		

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
DP																		
LDP																		
NP																		
Ant																		
Soc																		
Ed																		

Reference Notes

Note 1. Solot, R., Dahlkoetter, J., Mabry, J. & Lutzker, J. Development and generalization of appropriate play. An abstract of this paper was presented at the 84th Annual Convention of the American Psychological Association, Washington, D. C., September, 1976.

Note 2. Stella, M. E. & Etzel, B. C. Effects of criterion level probes on acquisition. Paper presented at the 85th Annual Convention of the American Psychological Association, 1977.

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