

## DEVELOPMENT OF SOCIAL RESPONSES IN TWO SEVERELY RETARDED CHILDREN<sup>1</sup>

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The effect of reinforcement dependent on the social responses of two severely retarded withdrawn children was investigated. During 30 training sessions (30 min each) food and praise were administered dependent upon the children's mutual participation in a ball-rolling and block-passing task. Both children showed a progressive increase in social interaction in a non-training situation during this reinforcement period. After the reinforcement procedures were removed, social behavior decreased markedly. Response generalization to children not involved in training occurred.

One of the most striking behavioral deficiencies that distinguishes the severely retarded child from the higher functioning retarded or normal child is the absence of social responses. Because many skills and discriminations are learned in a context of interpersonal reinforcement, social interaction is a critical prerequisite for much of a child's behavioral development. Conversely, the absence of social interaction probably insures that development will be retarded.

Until recently researchers have not been concerned with investigating the modification of interpersonal behavior. Although several studies have shown that the social behavior of "normal" isolated children can be enhanced through differential reinforcement procedures (O'Connor, 1969; Hart, Reynolds, Baer, Brawley, and Harris, 1968; Brotsky and Thomas, 1967; Wahler, 1967; Azrin and Lindsley, 1967; Allen, Hart, Buell, Harris, and Wolf, 1964), the use of operant procedures for developing social responsiveness in the severely retarded child has been virtually ignored. That operant conditioning techniques can be used to develop or modify motor behaviors of severely retarded children has, however, been suggested by a variety of researchers (Baer, Peterson, and

Sherman, 1967; Watson, 1967; Kerr, Meyerson, and Michael, 1965; Ellis, 1963, 1964; Fuller, 1959). The present study sought to use operant reinforcement procedures for developing social responses in two severely retarded children. More specifically, it examined the extent to which training can modify social behavior in situations in which reinforcement is not systematically scheduled. An additional objective of the study was to develop a procedure that could be easily applied and systematically evaluated by the teacher in a classroom setting.

### METHOD

#### *Subjects*

Two severely retarded, withdrawn children from Logan School for the Mentally Retarded in South Bend, Indiana, were selected. Both subjects were quite hyperactive and only gross estimates of their mental and social ages could be made from formal testing. Liz, 6 yr old, had a diagnosis of Chronic Brain Disorder of unknown etiology. Intellectually (as estimated from the Cattell Infant Scale) and socially (as estimated from the Vineland Social Maturity Scale) she was functioning around the 2-yr level. Rick, who was 10 yr old, had a diagnosis of Down's Syndrome (Mongoloidism) and a Stanford Binet MA of about four. Although both were capable of producing unintelligible sounds, neither could verbalize words or phrases of any kind.

#### *Setting*

The two subjects were in a class that included four other severely retarded children

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(three boys and one girl). All the children lived at home and attended class 5 hr a day, five days a week. The curriculum for the class was not highly structured. Children were encouraged by their teacher to involve themselves in activities such as drawing, coloring, modeling clay, and playing with various types of puzzles and toys. Each day the children went swimming or to a gym where a variety of recreational equipment was available.

#### *Baseline I Period*

Before training procedures began, the subjects' social interactions were observed in the classroom situation when the children were involved in free play. Two 15-min rating sessions were conducted daily over a two-week (10 day) period. The time of day during which ratings were made was varied. During each session, one of two trained observers rated the number, length, and type of social responses in which the two subjects participated. In addition, the names of children, other than the subjects, who were involved in the social response were also recorded. A social response was defined in terms of one child's behavior becoming mutually or reciprocally involved with a second child's behavior. For example, two children might be coloring at the same time on a sheet of paper, or one child might hand a second child a toy. Children involved in solitary play while in close physical proximity to one another were not considered to be socially interacting. Before Baseline observations began, concurrent ratings of the frequency and duration of social responses in another class of socially responsive retarded children indicated perfect inter-scorer reliability. Several reliability checks during Baseline I, Reinforcement, and Baseline II periods also indicated high inter-scorer agreement ( $r > 0.90$  in all instances).

#### *Reinforcement Period*

The training phase of this study was initiated immediately after the base rate for social interaction was completed. This phase extended over 30 consecutive school days. Training was conducted by two undergraduate psychology majors (one male and one female) from the University of Notre Dame. For the first five days (Week 3), training sessions were conducted in a small room isolated from the regular classroom; thereafter, all sessions

(Weeks 4 to 8) took place in the immediate classroom. The sessions lasted for 30 min and were conducted once a day. Initially, social responses were shaped between Liz and Rick by structuring two very simple task situations. In the first, they were seated on the floor facing each other about 3 ft apart and commanded to roll a ball back and forth between them. At first it was necessary to guide their hands. The children were reinforced with M&M's and praise after both completed a response (Liz rolling the ball to Rick and Rick returning the ball). The second task was similar to the first, except that the children sat adjacent to each other, and passed a block. Reinforcement schedules were identical for both tasks throughout treatment. Reinforcement followed every response on Day 1; every five responses (FR 5) on Days 2 to 5; every 15 responses (FR 15) on Days 5 to 10; and every 30 responses (FR 30) on Days 11 to 20.

To facilitate generalization of cooperative responding to other children in the classroom, two additional subjects, Dale and Robby, were brought into the training situation on Day 21. Dale was introduced into the ball-rolling task and Robby into the block-passing task, thus forming two triads. Both tasks remained essentially the same as before, except that now Liz had to roll the ball or pass the block to Rick, then Rick to Dale or Robby, then Dale or Robby back to Liz, and so forth. Again it was necessary at first to guide the hands of the new child in each task. Reinforcement was administered to each child when the cycle of rolling the ball or passing the block among the three children was completed. Reinforcement followed every response on Day 21; every five responses (FR 5) on Days 22 to 25; and every 15 responses (FR 15) on Days 26 to 30.

In accordance with the initial Baseline observation procedures, two 15-min ratings of Liz and Rick's social responses were made daily during the six-week reinforcement period. These ratings were taken in the classroom at various times other than when the training procedures were being administered. No reinforcement was administered during these rating periods.

#### *Baseline II Period*

Two weeks after training was terminated, followup ratings were taken during two 15-min periods in the classroom situation on 10

consecutive days (Weeks 11 and 12) to determine if conditioned social responses had returned to their pre-training Baseline status.

### RESULTS

All social response data presented here were obtained during rating periods when the training (reinforcement) procedures were not being administered. The average time Liz and Rick spent socially interacting per 15-min rating session during the Baseline I, Reinforcement, and Baseline II periods is presented in Fig. 1. It can be seen that in comparison with their initial operant level of responding, both subjects spent considerably more time socially interacting during the Reinforcement period. Rick spent an average of only 0.3 of a min per 15-min session during the Baseline I period, but this increased to 4.3 min during the Reinforcement period. Similarly, Liz, who did not engage in any interactions during the

initial Baseline period, became socially involved for an average of 1.8 min per 15-min rating session during the Reinforcement period. During the Baseline II period, social interaction declined for both subjects, with Rick spending an average of 2.6 min per rating session and Liz about 1.2 min.

Table 1 shows frequency and average duration of Liz and Rick's social responses with each other and the four other children in the classroom during the two Baseline and Reinforcement periods. The Baseline I ratings of Liz and Rick's social responses validated the observer's earlier informal judgment that Liz and Rick were social isolates. Liz did not participate in any social interactions during this 10-day period; Rick participated in only two such interactions. In comparison with their base rate of responding, both subjects showed a progressive increase in the number of social responses emitted during the Reinforcement period. By the eighth week, both children

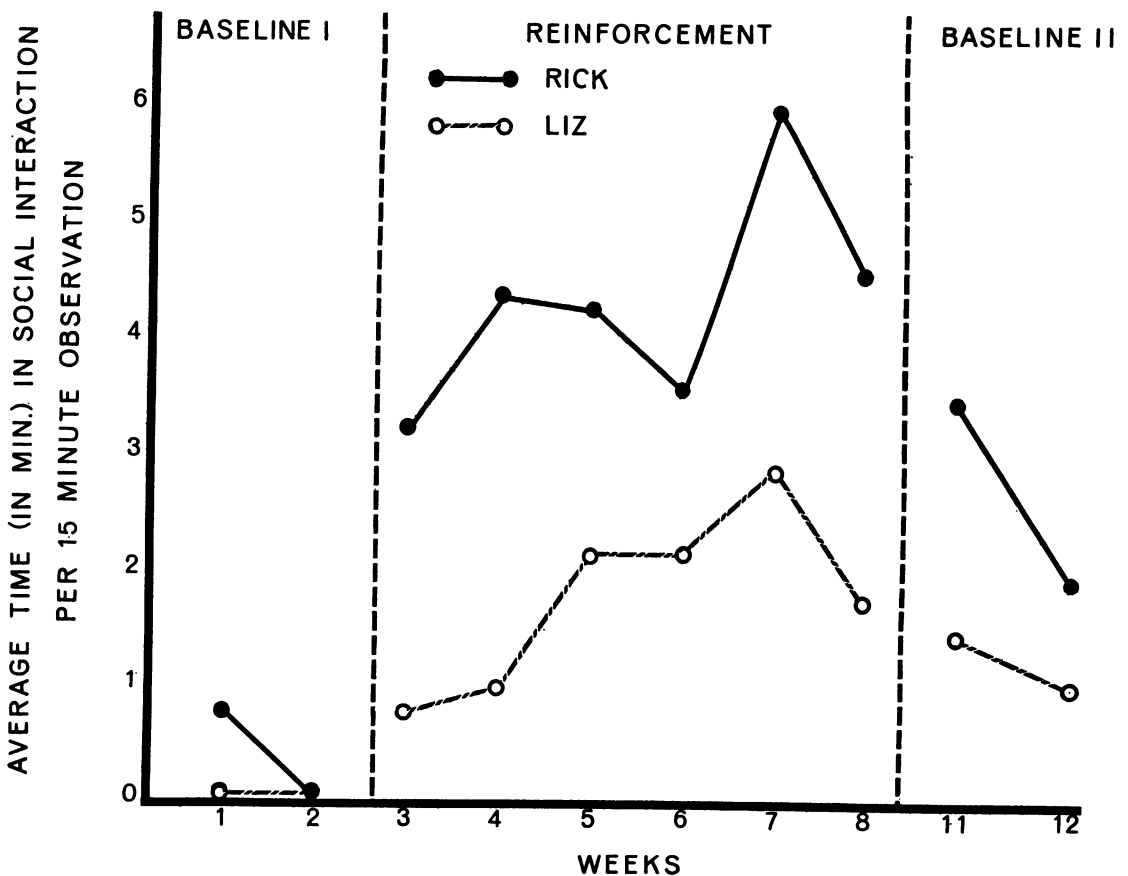


Fig. 1. Average time (in minutes) subjects involved in social interaction per 15-min observation during Baseline I, Reinforcement, and Baseline II periods.

were involved on the average in at least one social response per 15-min rating period. This rate of responding continued to increase, particularly for Rick, during the Baseline II period. Considering the duration of social responses during each of the six weeks of the Reinforcement period, the average length of Rick's social responses was consistently around 3 min. In contrast, the average length of Liz' social responses showed more fluctuation, going from about 3 min during the first week of training to about 75 sec during the sixth week. For both children, the average length of their social responses decreased during the Baseline II period to about 35 sec.

The social response data in Table 1 also depict the degree to which Liz and Rick generalized their social responses with each other, and with Dale and Robby from training to other children in the classroom during the rating period. It can be seen that until Dale and Robby were introduced into the training program, Liz interacted almost exclusively with Rick during the rating period. After their introduction, Liz interacted with Dale and Robby and also with Leona and Roy. In contrast, Rick from the beginning of training interacted with each of the five other children, indicating extensive generalization of responding.

### DISCUSSION

The present results demonstrate the potential effectiveness of a simple reinforcement pro-

cedure for developing social interaction in severely retarded children. It is clear that there were at least temporary gains in the general social responsiveness of the two children. In comparison with their initial base rate of responding, both subjects during training showed pronounced increases in the total time spent in social interactions, and similar increases in the frequency and duration of individual social responses. It is important to note that this increment in social behavior, observed during the rating period, represents a generalization from the training period. There was no systematic program of reinforcement dependent on social responses during the rating period. Further evidence that the social behavior of the subjects generalized is indicated by the fact that many of Liz and Rick's social responses were with children not involved in training.

Examination of the social interaction data also revealed that the social responses emitted by the children during the rating period represented a generalization beyond those responses reinforced during training. That is, while their social responses during training consisted of rolling a ball or passing a block, their social responses during the rating period involved these objects only about 30% of the time. Otherwise, they were engaged in social responses involving other toys (telephones, puzzles) in the room. In general, the behavior of Liz and Rick in the classroom strongly suggests that they learned more than a stereo-

Table 1

Frequency and average duration (in seconds) of Liz and Rick's social responses with peers during Baseline I (Weeks 1 and 2), Reinforcement (Weeks 3-8), and Baseline II (Weeks 11 and 12) periods.

Subjects	Weeks									
	1	2	3	4	5	6	7	8	11	12
Ricky	0	0	2(208)	6(94)	7(179)	10(119)	10(135)	4(141)	10(86)	12(41)
Dale*	0	0	0	0	0	1(91)	3(66)	5(37)	0	0
Liz										
Robby*	0	0	0	1(16)	1(13)	0	3(47)	3(77)	0	1(3)
Leona	0	0	0	0	0	0	1(17)	0	0	1(60)
Roy	0	0	0	0	0	0	2(16)	1(23)	1(7)	3(16)
Rick										
Liz	0	0	2(208)	6(94)	7(179)	10(119)	10(135)	4(141)	10(86)	12(41)
Dale*	0	0	1(180)	3(437)	1(20)	0	3(523)	3(97)	2(56)	4(16)
Robby*	1(225)	0	3(189)	1(380)	3(170)	3(190)	2(90)	4(141)	4(214)	7(63)
Leona	0	0	2(138)	1(120)	2(82)	1(130)	1(34)	2(155)	0	6(16)
Roy	1(180)	0	2(240)	2(122)	3(190)	1(240)	2(218)	2(495)	2(100)	3(22)

Note.—The average length (in seconds) of the social response is enclosed by parentheses.

\*Dale was introduced into the ball-rolling task along with Liz and Rick on the twenty-first training day (Week 7). Robby was introduced into the block-passing task at the same time.

typed response to a specific stimulus situation.

Considering the Baseline II data, it is evident that there was a decrease in the total time that the subjects were involved in social interaction after the reinforcement procedures were terminated. This would suggest that the reinforcement procedures administered during the training period were responsible for maintaining the social responses of Liz and Rick during the rating period. Examining more closely the Baseline II data, it is somewhat surprising that the frequency of the social responses of Liz and Rick did not decrease. However, looking at the average times of the social interactions the children were involved in during this period, it becomes clear that although they were interacting more it was for considerably shorter intervals of time. Despite the fact that there was a decrease in the total social interaction time during this second Baseline period, both subjects, in comparison with their initial Baseline behavior, were considerably more socially responsive. A greater reduction may not have occurred because the social activity itself became reinforcing to the children, thus diminishing the need for other types of reinforcers (*i.e.*, M&M's and praise). This conclusion is supported by our impression that children did indeed seem to enjoy their social interactions.

In addition to changes in Liz and Rick's social behavior patterns, their teacher reported that social interaction among the other children (Dale, Robby, Leona, Roy) in the classroom appeared more frequent. She mentioned that play within the classroom was more constructive and that children were more willing to perform new tasks. It is possible that in addition to the reinforcement procedures producing an increase in social responses of the two subjects, some modeling of social responses might have occurred for children not directly involved in training. The fact that the other children in the class could observe Liz and Rick, and later Dale and Robby, being rewarded for socially interacting, makes this a feasible hypothesis. O'Connor (1969) found that nursery school children who displayed marked social withdrawal increased their level of social interaction significantly after observing a film where children were shown participating in social responses that were accompanied with positive consequences. Speculating about the etiology of isolate behavior in re-

tarded children it seems quite feasible to assume that this behavioral deficiency is not due only to the lack of reinforcers for social interaction but is also a consequence of the absence of appropriate socially effective models in the environment of the retarded child. This would seem to be particularly true for institutionalized children.

Although social responses involving more than two children were not being specifically shaped in this study, the occurrence of three social interactions involving three children suggests that relatively complex social responses might be developed by means of a procedure similar to that used here. Initially, it would involve reinforcing the behavior of two children for socially interacting in a specific task situation. After this social response was established, a third child would be introduced, and later a fourth, *etc.* A study is now in progress where four-person social interactions are being shaped using severely retarded social isolates.

Perhaps the major achievement of the present study lies in the fact that the procedures used can be adapted by teachers who have only a minimal understanding of reinforcement theory in training retarded children. It suggests that by arranging simple but systematic environmental consequences, such as praise and less "natural" reinforcers such as food, the teacher should be able to develop and maintain social responses in severely retarded children. Ultimately, only extensive use of such procedures by teachers will determine the worth of such modification techniques with retardates.

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