

REINFORCEMENT PROCEDURES AND SOCIAL BEHAVIOR IN A GROUP CONTEXT WITH SEVERELY RETARDED CHILDREN¹

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Summary.—Operant reinforcement procedures were employed by a teacher and a teacher's aide in the classroom to develop simple but sustained social behaviors in 8 young severely retarded children. The relative effectiveness of social and edible reinforcement was also investigated as well as the tendency for these new behaviors to generalize from a group to a free-play situation. Reinforcement procedures were successfully applied by these teachers in class, providing an effective and economical means for developing social behavior. Edible reinforcement proved to be most effective but the behavior did not generalize.

The general absence of frequent and sustained social interactions is a prominent characteristic of the severely retarded child (Spradlin & Girardeau, 1966). In both structured (group) and unstructured (free-play) activities most of these children tend to remain isolated from neighboring children and adults, while engaging in a variety of self-stimulating and other forms of non-social behavior. Recently, procedures based on operant reinforcement principles have been successfully employed in a variety of problem areas for the severely retarded (Nawas & Braun, 1970a, 1970b, 1970c; Watson, 1967). However, as noted by Whitman, Mercurio, and Caponigri (1970), social behavior (e.g., cooperative play or physical contact) for this population has not received sufficient experimental attention.

The Whitman, *et al.* (1970) study developed cooperative play in two severely retarded children using M&Ms (small, hardcoated chocolates) and praise as reinforcers. Generalization of this behavior to times when no reinforcement was scheduled occurred. Hingtgen, Sanders, and DeMeyer (1965), in a study in which cooperative lever-pressing behavior was shaped and maintained in three pairs of early childhood schizophrenics, noted that physical contact, which had not been directly reinforced, showed a concomitant increase in frequency of occurrence. In a further study, Hingtgen and Trost (1966) were able to shape physical contact in conjunction with vocal responses in very young schizophrenics. Some generalization of this behavior toward adults, not peers, in the ward and at home was noted. More recently, Paloutzian, Hasazi, Streifel, and Edgar (1971) increased the social interactions in free play by severely retarded children using imitation training techniques.

The purpose of the present experiment was to determine whether teachers could develop, in the classroom, rudimentary social behaviors in young severely retarded children using reinforcement procedures. The behaviors of interest

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were non-aggressive physical contact and orienting toward another individual. It was important that these procedures be applied by teachers and evaluated in a group context, since in most institutions or schools practical demands of time, expense, and effort do not generally permit the consistent high staff to student ratios commonly found in most studies of behavior modification (see Gardner, 1969). Also, the relative effectiveness of social and edible reinforcement in developing these behaviors was investigated. Spradlin and Girardeau (1966) have commented on the limited and unpredictable effects of social reinforcement with severely retarded children. Since a substantial amount of social behavior normally develops as a function of social reinforcement, an analysis of the effectiveness of these two classes of reinforcers in class should provide valuable information. Finally, the tendency for the new behaviors to generalize to a free-play situation was evaluated.

METHOD

Subjects and Setting

Eight severely retarded children, 6 to 10 yr. of age, from the National Children's Center in Washington, D. C. served as *Ss*. None of the children were able to verbalize intelligible words. The study was conducted in the classroom, staffed by a teacher and a teacher's aide, for ½ hr. every weekday morning. The observers viewed the classroom from an adjacent room through a one-way mirror.

Procedure

A rating scale was devised to assess *Ss*' social behavior. This scale consisted of a series of mutually exclusive, graduated categories. To be classified in a given category a particular form of social or non-social behavior had to meet precise behavioral specifications. Social behaviors were: (1) child initiated or ongoing face-to-face head orientation with another child, (2) child initiated face-to-face head orientation with teacher, (3) child initiated or ongoing non-aggressive physical contact with another child; must involve hands, (4) child initiated or ongoing non-aggressive physical contact with teacher; must involve hands. Additional and more complex social categories consisted of behaviors that were combinations of those listed above. Since our main goals were to increase both the frequency and duration of social interactions, an instance of social behavior, to be classified as such, had to occur continuously for 5 sec.

Non-social behaviors included: (1) aggression—rapid action directed toward another individual involving excessive force, (2) out-of-seat and out-of-position—back not in contact with the floor and child has physically moved away from the seating arrangement, (3) isolation—no interactions, in proper seating position. A categorization of isolation could occur in two ways. First, if the isolation behavior occurred continuously for a period of 5 sec. and second if no social behavior criterion was met. The final non-social category consisted of teacher-initiated contact that lasted for 5 sec.

Ss were rated in random order for 10-sec. periods. These ratings were carried out five times in class and five times in free play each session (see below).

Prior to the experimental conditions, Ss were rated for seven sessions. On the basis of these scores (which averaged about 2% social behavior) they were matched in pairs and one member was randomly assigned either to Group A ($N = 4$) with Teacher A or to Group B ($N = 4$) with Teacher B. Each experimental session was divided into two consecutive periods approximately 15 min. in length. The first period was a structured group situation (children were encouraged to pass a block) with each group sitting in a circle with its teacher in separate portions of the classroom. All experimental procedures were carried out during this period. The second period consisted of free play in which toys and other objects were made available.

The sequence of experimental conditions was as follows. (1) During no reinforcement, groups received neither edible nor social reinforcement. (Social reinforcement was provided by praise and occasional pats on the head if the child was within reach.) This condition was used to check the equivalence of the groups and to obtain data on base levels of social behavior. (2) During non-contingent reinforcement, to check on the effects of simply providing reinforcement (administered directly to each child), reinforcers were programmed to occur randomly. Group A was reinforced with edibles (mixtures of M&Ms and similar candies) without any social reinforcement. Group B was provided with social reinforcement only. (3) During contingent reinforcement, the teachers reinforced only those behaviors that approximated the desired social behaviors. Group A was reinforced with edibles only and Group B was only provided with social reinforcement. In brief meetings during this phase, Es outlined and described the goals and procedures to the teachers but no formal training in operant conditioning was provided. (4) After Group A achieved a high level of criterion social responses, the non-contingent edible reinforcement condition was again put into effect. Since contingent social reinforcement had little effect, Group B was switched to non-contingent edible reinforcement to obtain baseline data. (Had an effect occurred here, other procedures would have been initiated.) (5) Group A was returned to the contingent edible reinforcing condition. In Group B edible reinforcement only was made contingent on Ss' social behavior, as in Group A.

Reliability checks were frequently carried out with two or more observers rating the same children. Inter-observer agreement was found to be .93 or greater for all conditions.

RESULTS

The frequency data obtained for each category were converted into percentage of ratings in which Ss were engaged in social as opposed to non-social

behavior for each session by summing over these main categories. This was done because virtually all of the behavior classified as social fell into the child initiated or ongoing physical contact categories and the non-social behavior was almost exclusively isolation. Occasionally, face-to-face orientation accompanied this contact for 5 sec. However, since this turned out to be extremely difficult to judge accurately from the observer's vantage point, only the most obvious instances of this behavior were so categorized. The five panels of each figure correspond to the sequence of experimental conditions described in the procedure section. As seen in Fig. 1 (Group A), when edible reinforcement was first made contingent on social behaviors (panel 3), a marked increase in those behaviors resulted. When the non-contingent condition was re-established, the behavior reversed to its previous level but was reinstated when the contingent condition was again introduced. This strongly suggests that the behavioral changes were a function of the experimental procedures. All individual Ss showed appropriate and marked changes as each experimental condition was introduced.

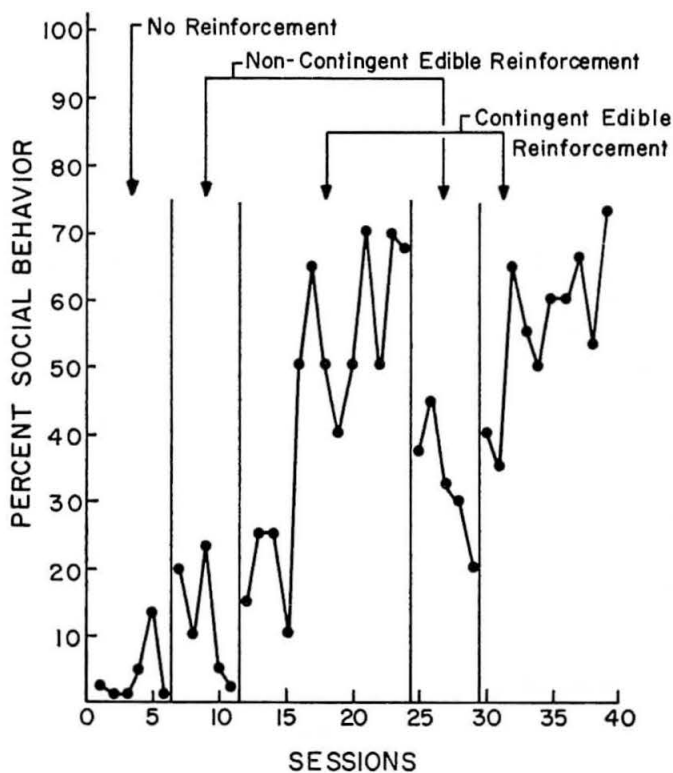


FIG. 1. Mean percent social behavior for Group A as a function of the experimental conditions

Contingent social reinforcement in the matched Group B did not produce any significant changes in social behaviors. To determine whether the failure to obtain these results was due to the nature of the reinforcer or to certain characteristics of Group B's teacher, edible reinforcing procedures were instituted (see Fig. 2). When contingent reinforcement was introduced, three of four Ss increased their social behavior to a relatively high level. The fourth S showed only a small and variable effect, changing from a mean of 7% in the non-contingent, edible condition to a mean of 15% in the contingent, edible condition. Typically, instances of his social behavior were brief, usually resulting in rapid withdrawal and handbiting along with what may be described as a generalized state of agitation. Due to including data for this S, the group curve in Fig. 2 did not reach as high a terminal level of social behavior as Group A showed. In general then, these results provide strong support for the relative effectiveness of edible as opposed to social reinforcement under these conditions.

Social behaviors that were developed in the group situation did not appear at an increased level in the free-play situation. The over-all mean percentage

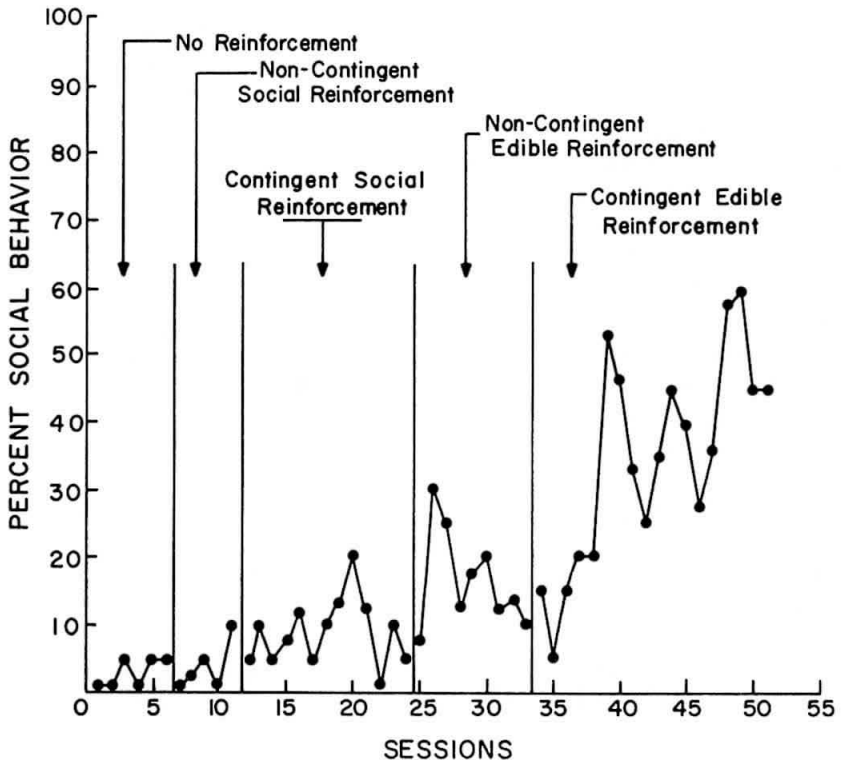


FIG. 2. Mean percent social behavior for Group B as a function of the experimental conditions

of social behaviors for Groups A and B were 5.4 and 4.4, respectively. Only small and unsystematic changes occurred across experimental conditions.

DISCUSSION

These results demonstrate that procedures of reinforcement, applied in a classroom by teachers, can be used to develop simple yet relatively sustained social behaviors in young severely retarded children. Social interactions were virtually non-existent during baseline (non-contingent conditions) but reached a level of 60% to 65% when edibles were made contingent upon those behaviors. The social behavior most affected was non-aggressive physical contact with both the teacher and other children. However, there were numerous instances of complex social interactions, such as one child concurrently touching and orienting toward another child. It was felt that the emergence of these types of social behaviors was an important step in the development of meaningful social relationships.

The teachers were able to adapt quickly to the group and developed an organized scanning sequence so as to reinforce as much appropriate behavior as possible. Even though some proportion of desired behavior either went unreinforced or was reinforced with a slight delay, acquisition proceeded quite rapidly. Again, it should be noted that the teachers who successfully carried out this program were untrained in operant conditioning principles. *Es* simply specified the target behaviors, described the method of successive approximations, and provided feedback in brief meetings throughout the various phases of the experiment. The success of these procedures as applied in the classroom was important since it suggests both an effective and an economical means for promoting social behavior.

Social reinforcement was not effective in developing social behaviors, but these behaviors developed rapidly using edible reinforcers. Although the general ineffectiveness and unpredictability of social reinforcers for severely retarded children have been observed by others (Spradlin & Girardeau, 1966), the present results have experimentally demonstrated the extent of this deficit. Not one child exhibited any consistent changes in social behaviors during the contingent social reinforcement in Group B, whereas three of four children showed rapid and substantial increases in such behavior with contingent, edible reinforcement. Techniques or modifications of techniques for establishing social reinforcers, such as those described by Bensberg, Colwell, and Cassel (1965) and Lovaas, Freitag, Kinder, Rubenstein, Schaeffer, and Simmons (1966), may be useful in this context.

Finally, no generalization from the group to the free-play situation occurred. Although there are many possible reasons for this, such as a marked change in the discriminative stimuli and lack of reinforcement during free play, it is perhaps most likely due to the different behavioral requirements in the two situations. That is, the free-play situation required one child first to approach an

other child actively and usually from a distance in order to engage in some form of social behavior. However, in the group situation, such approach was not necessary and consequently not part of the training program.

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