MODIFICATION OF PRESCHOOL ISOLATE BEHAVIOR: A CASE STUDY¹

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A 5-yr-old preschool boy with a low rate of interaction with his nursery school classmates was induced to pass out candy as a tactic to increase his rate of interaction with them. Interaction with classmates increased markedly during the periods he passed out choices of candy. These changes may have been due to increases in both his rate of initiating activities with his classmates and to increases in his classmates' rate of initiating activities with him. A total time of less than 1 hr was required of the teacher during the experiment.

The problem behaviors of nursery school children studied by psychologists utilizing operant conditioning principles have been varied, and have included such target behaviors as crying and whining, excessive passivity, and isolate play. Of particular interest here are the studies concerning isolate behavior, defined as a low frequency of interaction with other children. Allen, Hart, Buell, Harris, and Wolf (1964) reported success in modifying the isolate behavior of a 4-yr-old nursery school child using teacher attention as the reinforcer. A similar study of a 3-yr-old isolate boy reported by Harris, Wolf, and Baer (1964) indicated that by changing the contingencies for adult attention, rapid changes in social behavior of the child resulted. Reynolds and Risley (1968) demonstrated that material as well as social reinforcers could be used to modify social behavior in the nursery. Buell, Stoddard, Harris, and Baer (1968) increased a nursery school child's rate of social contact with other children by increasing the child's use of outdoor play equipment through teacher reinforcement.

The above studies relied heavily on the reinforcing effects of teacher attention. Reyn-

olds and Risley (1968), included the use of material reinforcers, and Buell *et al.* (1968) used teacher attention to produce a situation where peer reinforcement for social interaction would be likely to occur. One of the problems with the use of teacher attention as a reinforcer is that it requires a large portion of the teacher's time, and might sometimes require her to attend to only one child during the reinforcement period.

The present experiment attempted to increase the rate of interaction between an isolate boy and his nursery school classmates. The study was designed to minimize the time and effort required of the teacher. The isolate boy was induced to pass out choices of candy to his classmates and subsequently given a nickel, candy, and praise from the teacher when he finished the task. By strengthening the interaction behavior in this particular situation it was possible that the behavior would generalize to other situations.

In addition, it was possible that the child's peers would react in a socially reinforcing manner to being given candy and that this would further strengthen his interaction behavior. The strategy was similar to Buell *et al.* (1968), who strengthened one kind of behavior likely to facilitate peer reinforcement for other forms of social behavior.

Finally, it was possible that through being paired with a primary reinforcer such as candy, the child would acquire reinforcing properties for his classmates so that they would be more inclined to interact with him.

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METHOD

Subject

Kenneth was a 5-yr-old child enrolled at the Child Development Laboratory at Humboldt State College, along with 17 other children ranging from 3 to 5 yr in age. According to the laboratory supervisor, he rarely interacted with other children. During a two-week period of informal observation the experimenters confirmed the supervisor's appraisal. Kenneth's father also expressed concern over the child's social behavior and the present study was conducted with the father's approval.

Procedure

The experimental setting was the Child Development Laboratory at Humboldt State College in session from 9:00 A.M. to 11:45 P.M. Monday through Friday. The school laboratory was equipped with an observation room, including one-way mirrors and sound equipment that permitted an observer to see and hear activities in the adjacent room and in the outdoor play area. The school room was approximately 30 ft wide and 50 ft long. The observation windows spanned one entire side of the classroom (50 ft) and regular windows spanning the entire opposite side of the room permitted observation of the outdoor play area. The room contained about 25 chairs and six tables (3 by 4 ft). The tables were often used as a place to put puzzles together, for water coloring, for snacks, and a variety of other activities. There were numerous shelves along the walls of the classroom where an assortment of books and toys were kept available for the children's use at all times. A workbench was also available along one of the classroom walls where the children could nail, saw, or pound on an assortment of different-sized wood.

Two teachers worked at the Child Development Laboratory on a full-time basis along with student workers or practice teachers who worked on a part-time basis. The teacher was told by the laboratory supervisor only that a behavioral study was planned, but was not told any details or rationale behind the procedure. None of the student workers were made aware of the nature of the experiment because they might inadvertently have affected the behavior of the subject.

The experiment took place during a 60-min period designated as "free play", generally

from 9:30 A.M. to 10:30 A.M. Free-play periods were unstructured and allowed the children to move about freely from one activity to another, or from one area to another.

Aspects of the subject's behavior were recorded each morning for 1 hr on data sheets similar to the type used by Allen *et al.* (1964). Three separate lines were used (labelled A, C, and H) to record behavior involving adults (A), other children (C), and himself (H). A complete definition of behavioral symbols used in this experiment is shown in Table 1. When the subject was with others, the symbols for proximity, cooperative play, verbalization, and manipulatory motor activity, along with an accompanying symbol for initiation, were placed on the C line if the activity involved another child, on the A line if the activity involved an adult, or between the A and C lines if both another child and adult were involved. When the subject was by himself, only the symbols for no activity, manipulatory motor activity, and verbalization were placed on the H line. The subject's behavior was recorded at the end of every 10-sec interval. Only one symbol could be used for each interval representing, in the observers' judg-

Table 1

Definitions of the system of symbols used to designate behavior.

<i>Symbols</i>	<i>Type of Activity</i>	<i>Criteria</i>
O	no activity	essentially quiet; not much motor movement; no verbalization.
M	manipulatory motor activity	activity directed toward inanimate objects; motor movement from one area to another.
P	proximity	physical closeness to an adult or child (within approximately 3 ft).
C	cooperative play	shared play; engaging in activity with another child or an adult, regardless of activity.
—	verbalization	verbalization regardless of object.
i	initiation	initiation of proximity, manipulatory motor activity cooperative play or conversation by the subject, with another child or an adult.

ment, the dominant form of behavior during the interval. The 10-sec intervals were signalled by a flash of light controlled by a recycling Hunter timer. A separate timing device recorded total elapsed time.

Five-cent coins and different types of candy were employed as reinforcers. The candy was contained in a brown paper bag.

Design

The experimental design consisted of the following basic stages:

1. Baseline Period
First Week (Days 1 to 5)
2. Reinforcement Period I
Second Week (Days 6 to 10)
3. Reversal Period
Third Week (Days 11 to 15)
4. Reinforcement Period II
Fourth Week (Days 16 to 20)
5. Reinforcement Period III
Fifth Week (Days 21 to 25)

Baseline Period

During this period, an assessment of the subject's behavior was recorded by two independent observers (the experimenter and another graduate student in psychology) using the system of scoring described above. Only one observer recorded the subject's behavior during subsequent stages. Percentage of agreement between the two observers was calculated by dividing the number of agreements by the number of agreements and disagreements combined. An agreement was defined as both observers recording the exact same symbol on the same of the three lines on the data sheet. During the five days of the baseline period (Monday through Friday), agreement between the two observers was 87, 87, 83, 92, and 95%.

Reinforcement Period I

At approximately 9:15 each morning, the subject was called aside by his teacher and given the following instructions in her own words:

Here are two different kinds of candy which I would like to have you pass out to the other boys and girls. I want you to ask each boy and girl which kind of candy they want and then reach in the paper bag and get it for them. It is very important

that you ask them what kind of candy they want, either a piece of _____ or _____. After you have given one piece of candy to everybody, bring the rest of the candy back to me and I will give you a nickel and some candy. If you do a good job, I will let you pass out the candy again tomorrow.

After giving the instructions to the subject, the teacher practised the procedure with him to make sure that he understood how he was to pass out the candy.

Having the subject ask the other children for their candy preferences was designed to ensure a verbal interaction. Requiring the subject to hand the choice of candy to the other children promoted a more direct interaction than simply allowing each child to take the candy from the bag.

Two choices of candy were provided each day and there was enough candy in the paper bag so that everyone could have his choice. Candy choices included Tootsie rolls, licorice sticks, and miniature bars of Hershey, Snickers, and Mounds. After the subject had passed out all the candy, the teacher verbally praised him and gave him five cents and a piece of candy. At this time the experimenter began recording the subject's behavior for the 60-min "free-play period".

Reversal Period

During the third week, the procedure of passing out candy was discontinued. Behavior continued to be recorded during the daily 60-min "free-play" periods. The purpose of the reversal period was to determine if any changes in interaction rates that may have occurred during Reinforcement Period I were dependent upon the experimental treatment. Withdrawal of treatment should have led to extinction of those behaviors that had been strengthened as a result of treatment unless, of course, other reinforcers had been developed in the first stage that could then be maintained in the absence of the treatment.

Reinforcement Period II

During this period, the procedure of passing out candy was reinstated. The purpose of this period was to "reverse" behavior that had been dependent upon the experimental treatment.

Reinforcement Period III

During this period, the subject was given candy to pass out on only two of the five school days (Monday and Wednesday). This period was designed to see how well the increases in rates of interaction that may have occurred as a result of the treatment would be maintained with only intermittent treatment.

RESULTS

Figure 1 shows that during the baseline period, with all response classes combined, the subject spent a mean of 13% of his time with other children. The percentage of time spent with other children during this period varied from 3% to 27% and showed no systematic trend. On the first day of the reinforcement period, his time spent with other children rose to 62%. The mean percentage of time the subject spent with other children during the reinforcement period was 68.8, five times the mean percentage of time he spent with other children during the baseline stage. During the reversal period, the mean amount of time spent with other children dropped to 30.8% and increased again during the second reinforcement period to 60.2%. These results indicate that the treatment employed directly affected the amount of time the subject spent

Fig. 1. Daily percentages of time the subject spent with other children including proximity, cooperative play, manipulatory motor activity, and verbalization during the five experimental periods. The dotted line indicates the subject was absent on the second day of the Reinforcement Period II.

with other children. During the last reinforcement period (intermittent treatment), the mean percentage of time spent with other children dropped slightly to 52.4%.

Figure 2 shows the time spent with other children analyzed into specific categories of behavior change. Proximity and cooperative play showed the most change. Manipulatory motor activity increased toward the end of the experiment while verbalization remained very low throughout.

Figure 3 shows that, except for the reversal period, there was a steady decrease in the aver-

Fig. 2. Analysis of specific behavior patterns while with other children.

Fig. 3. Daily percentage of time the subject spent with adults including proximity, cooperative play, manipulatory motor activity, and verbalization during the five experimental periods. The dotted line indicates the subject was absent on the second day of Reinforcement Period II.

Fig. 4. Daily number of activities the subject initiated with other children during the five experimental periods. The dotted line indicates the subject was absent on the second day of Reinforcement Period II.

age amount of time the subject spent with adults from the beginning to the end of the experiment with all response classes combined. There was a sharp increase in time spent with adults on the final day of each of the first four periods. This seemed to be due to the presence of one particular student assistant who worked only on those days of the experiment. She always spent a large portion of her time playing with Kenneth and when she was absent on the final day of the experiment, he spent only 1% of his time with adults.

A record was also kept of the number of activities the subject initiated with other children. Figure 4 shows the number of activities Kenneth initiated with others during each day of the experiment. The number of activities initiated rose steadily from an average of 9.8 activities during baseline to an average of three activities during the final week of the experiment. But since the upward trend is present throughout the experiment even during baseline and reversal, it cannot be clearly attributed to treatment effects.

DISCUSSION

The present procedure appeared to be successful in modifying Kenneth's rate of interaction with his classmates. The objective data were supported by the casual observations of the experimenters and by the favorable comments from the nursery personnel. Along with his increased rate of interaction, Kenneth seemed to become much more aggressive in his play with others. In fact, his degree of aggressiveness might well have been considered a problem by many people. Hopefully, less

aggressive modes of interaction would develop as a result of continued social experience.

It cannot be determined exactly what aspects of the treatment contributed to the changes in behavior, or to what degree. Kenneth was induced to pass out candy to his classmates and being induced to pass out almost anything may have produced a change in his rate of interaction. Kenneth was given material reinforcement, *i.e.*, a nickel and a piece of candy, as well as praise from the teacher, for passing out the candy. These reinforcers may have been important in strengthening his behavior of approaching other children and this tendency may have generalized to other situations. But, the relative effects of being instructed to pass out candy, and being given material and social reinforcers afterwards, cannot be separated on the basis of the results of this study.

Other variables may have contributed to the results. For example, it is possible that Kenneth's peers provided further reinforcement for his interaction while passing out candy through smiling and statements such as "thank you"; "wow"; "oh boy"; "good"; *etc.* Another possibility is that through being paired with a primary reinforcer such as candy, Kenneth may have become a conditioned reinforcer to his classmates, thus increasing their tendency to interact with him.

The changes in Kenneth's rate of initiating activities with his peers cannot account for the dramatic changes in overall rates of interaction that followed the introduction, withdrawal, and reinstatement of the experimental treatment. Kenneth's rate of initiating activities with his classmates rose steadily, even during

the baseline and reversal, from an average of three activities during the first week to an average of 9.8 activities during the final week.

This study was conducted during the normal operation of the nursery school. The teacher who participated spent less than 1 hr total time with Kenneth over the course of the study. She was free to carry on her normal activities and devote her attention to other children in the class, except during reinforcement periods, when she spent a few minutes giving Kenneth instructions before he passed the candy and the reinforcers after he had completed the task.

As a method for modifying social behavior, utilizing material and possible peer reinforcement contingencies, this study demonstrated a practical alternative to the exclusive use of "teacher attention".

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