*MULTIPLE EFFECTS OF A PROCEDURE TO INCREASE
SITTING IN A HYPERACTIVE, RETARDED BOY¹*

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A prompting and differential reinforcement procedure was used to increase sitting in a hyperactive, retarded boy in a remedial preschool. This procedure not only increased sitting, but had the additional effects of decreasing posturing while leaving normal walking unaffected, and increasing the use of toys and proximity to children. All of these changes can be considered socially desirable effects of the sitting program. The results suggest that preschool programs can be designed that will treat several behaviors simultaneously in order to maximize a teacher's effectiveness.

Most behavior modification programs in preschools have focused on a single deficit or deviant behavior in the child's repertoire. Hart, Reynolds, Baer, Brawley, and Harris (1968) dramatically increased cooperative play through the use of contingent teacher attention. Reynolds and Risley (1968) showed that preschool play materials could be used to increase talking to the teacher, and Jacobson, Bushell, and Risley (1969) reduced the number of times children switched activities by requiring that they perform a switching task before proceeding to the next activity.

Recently, though, multiple behavioral effects have been demonstrated to result from a procedure aimed at a single behavior. Buell, Stoddard, Harris, and Baer (1968) used a program of differential attention and priming to increase a child's use of outdoor play equipment and observed collateral increases in touching, talking, playing with other children, and using their

names. They also noted a decrease in "baby behaviors". Risley (1968) obtained an increase in eye contact in a retarded girl as a side-effect of decreasing dangerous climbing. Wahler, Spelling, Thomas, Teeter, and Luper (1970) used a timeout and differential attention procedure to decrease oppositional behavior in a young boy. They noted that these techniques also lowered his rate of stuttering, although never applied to stuttering. Lovaas and Simmons (1969) punished self-injurious behavior in retarded children and also recorded a decrease in crying, whining, and avoiding adults. These studies suggest that the nursery school teacher may be able to increase her efficiency by designing remedial techniques that will not only rectify a single behavior of prime concern, but will also generate desirable collateral changes. The present study demonstrates such a program. Here, a set of procedures was utilized with the primary aim of increasing sitting in seat by a hyperactive retarded boy. However, these procedures also promoted toy play and proximity to other children, and decreased incompatible posturing.

METHOD

Subject and Setting

A 4-yr-old boy, Tim, who had been referred to a remedial preschool, had an IQ of 74, as measured by the Peabody Picture Vocabulary

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Test, but he could read four syllable words phonetically, count to 15, spell and print his name, and copy other words. However, he lacked all social skills. He did not spontaneously talk to anyone, would respond echolalically to questions, and had a high rate of unintelligible vocalizations. He rarely played with toys and spent most of his time either laying on the floor in unusual, squirming postures or jumping around the room.

Seven other emotionally disturbed or retarded children attended the remedial preschool preparatory to attending special education classes in the public schools. Modification programs were aimed at social and preacademic deficiencies. They were implemented during the course of a nursery school curriculum that included structured play activities, freeplay periods, group preacademics, and one-to-one tutoring.

Recording

Tim's behavior was observed using the 10-sec block method (Allen, Hart, Buell, Harris, and Wolf, 1964) during freeplay relative to the following codes: use of toys, proximity to children, and position. Use of toys was defined as either holding a toy or playing with it anywhere in the room for a full 10-sec interval, whether he initiated the play or the teacher gave him a toy. Proximity to children required being within 2 ft of another child for at least 2 sec. Three positions were defined: (1) sitting on a chair for a full 10-sec interval; (2) engaging in posturing, which included laying on the floor, jumping, running, skipping, and hopping for any portion of a 10-sec interval; and (3) walking or standing still for any portion of a 10-sec interval. The codes were not mutually exclusive and several behaviors could be scored simultaneously. However, the scoring of these behaviors was completely independent, that is, the scoring of a category in one code did not influence the scoring of the categories of other codes. The exception to both of these points is the scoring of sitting relative to the other two position categories. Each code was taken for 15 min a day

with two codes being taken at once. Reliability checks were made twice during baseline and once during the first treatment condition by the two observers who regularly took the data, and one other person.

Procedure

The study was conducted during one half-hour of a freeplay period during which the children could choose their toys and playmates. At the beginning of the period, the teacher called them to sit together at a long table in the middle of the room where she praised appropriate activities. At this table, the children usually sat about 1.5 ft apart. The children in the class, with the exception of Tim, usually came and played at the table.

During baseline, the teacher treated Tim as she did the other children by giving him the same commands ("It's time to play at the table"), but she did not give any additional prompts. During the sitting program condition, the teacher placed him in a chair at the table at the beginning of the freeplay period, placed one or more toys on the table in front of him, and praised and gave him tokens while he remained seated. (Tokens were X's on a piece of paper that he wore around his neck and that could be exchanged several hours later for candy and trinkets at the rate of 40 tokens per piece). Initially, the teacher would praise and give tokens about once every 10 sec, but she gradually reduced this level of attention to about once each minute by the end of this condition. If Tim left his seat, the teacher ignored him until he began to approach the table. She then took him by the hand, praised him for returning, and sat him down again. Approximately midway through this condition he was required to touch the table or chair before being prompted to sit down again. Any other behaviors, such as toy play or proximity, were also praised if they were occurring concurrently with sitting. The teacher was instructed to use this procedure at other times when sitting was appropriate such as group time, storytime, and music periods.

In order to determine whether the changes in Tim's behavior resulted from the prompting and reinforcement procedures, the teacher discontinued these for the four days of the reversal condition. During this time, she gave him commands as she had during baseline but did not prompt him or praise him if he sat. The prompting and reinforcement procedure for sitting was reinstated for the second sitting program condition. Again, attention and marks were given about every 10 sec, and this was gradually decreased to about once every minute. Also, he was initially required merely to approach the table to be prompted, but about midway through the condition he was required to touch the table or chair.

RESULTS

Reliability was obtained by comparing each 10-sec interval of a particular category and counting an agreement if both observers had scored the behavior identically. Agreement on the non-occurrence of a behavior was not counted as an agreement. If only one observer had scored the behavior, a disagreement was counted. The number of agreements was divided by the sum of agreements and disagreements. This method yielded the following reliabilities during the baseline condition: use of toys, 93.3%; proximity to children, 100%; posturing, 92.7%; and walking, 91.9%. Both observers agreed that no sitting occurred during this condition. During the first treatment condition, reliabilities were: sitting, 100%; use of toys, 83.3%; proximity to children, 94.0%. Estimates for walking and posturing were not obtained because their rates were very low when reliability was assessed. However, both observers agreed that these rates were very low.

Figure 1 shows the rates of sitting in a chair, posturing, walking, use of toys, and proximity to children. These rates were computed by dividing the number of scored blocks by the total observed blocks. Tim's rate of sitting at the table during freeplay rose from zero during baseline

Fig. 1. Percentages of Tim's sitting, posturing, walking, use of toys, and proximity to children during freeplay as a function of the teacher ignoring him when he did not obey a command to sit down (baseline and reversal) and the teacher prompting him and reinforcing his sitting behavior (sitting program).

to a median of 62.5% during the first sitting program condition. Rates usually ranged from 40% to 80% except for the low point on Day 15. Sitting fell virtually to zero during the reversal and increased to a median of 33% during the second sitting program condition. It should be noted that the effect of the program was small for the first four days, but sitting rose to 60% during the final three days, showing a clear upward trend.

Posturing decreased as sitting increased. This behavior decreased from a median of 81.5% during baseline to a median of 18% during the first sitting program condition. It rose to baseline

level again during the reversal except for the final low point, and fell to a median of 41% during the second sitting program condition. It should again be noted that high rates of posturing occurred on the first four days of the second sitting program condition, while the rates for the last three days are much lower and show a clear downward trend. These points correspond to the higher rates of sitting occurring on the last three days.

The rate of walking remained roughly constant throughout the study at a median of 22%. Use of toys doubled its median baseline value of 16.5% to 33% during the first sitting program condition, fell to zero during the reversal, and rose to a median to 42.5% during the second sitting program condition. Rate of using toys was extremely variable during the sitting program conditions, ranging from 0% to 100%. Proximity to children rose substantially during the first sitting program condition and fell to below baseline level during the reversal. It rose somewhat during the second sitting program condition but not as much as during the first sitting program condition. The sitting program took longer to take effect during the second sitting program condition. This was reflected not only in the rates of sitting, but also in posturing and proximity to children.

Figure 2 summarizes Tim's percentages of sitting, posturing, walking, use of toys, and proximity to children for the baseline and reversal condition and for both sitting program conditions. Overall rates of sitting, use of toys, and proximity to children were greater during the sitting program conditions. Rate of posturing was lower. Overall rate of walking was found to be unaffected.

DISCUSSION

The prompting and reinforcement procedure not only increased the amount of time Tim spent in his seat, but had other desirable effects. Use of toys and proximity to children increased, and posturing decreased. The desirability of the

Fig. 2. Means of Tim's percentages of sitting, posturing, walking, use of toys, and proximity to children for baseline and reversal conditions (solid bar) and for both sitting program conditions (open bar).

changes is twofold. First, they are behavioral prerequisites upon which more complex play skills and more sustained social interactions can be built. Obviously, a child who is usually away from the other children, posturing and rarely playing with toys will not benefit from preschool activities. Second, the collateral effects were obtained with little additional time required of the teacher, an obvious advantage in any classroom.

The collateral changes that occurred in this study were scheduled into the sitting program. That is, when the teacher praised Tim for sitting, any behaviors occurring concurrently were also praised. This explanation can account for part of the increase in toy play, since the teacher gave him a toy while he was at the table. Using it would then be praised. Proximity to children was also arranged by the teacher, since she placed him in a chair near the other children. Therefore, ideally, he should have been near other children any time he was sitting. Obviously, the teacher could have been more efficient in this respect, particularly during the second sitting program condition. The decrease in posturing can be attributed to the fact that this behavior was incompatible with sitting. Walk-

ing, however, did not decrease, although it too was incompatible with sitting. Thus, the sitting program selectively decreased the undesirable posturing, while leaving unaffected the more normal behavior of walking.

Several suggestions can be made for future research. The durability of the collateral changes should be investigated to determine if the child would eventually discriminate that sitting was the sole behavior necessary for reinforcement. He might then stop playing with toys or start moving away from the other children. Alternatively, keeping the child in his seat might expose him to the natural reinforcers of playing with toys and being near other children so that these behaviors would not stop. This design might also be used as a shaping sequence. For example, the teacher could first reinforce prompted sitting, then spontaneous sitting, then sitting only when accompanied by toy play, and finally, sitting, while social interaction was occurring.

Several improvements could be suggested for this study. Data on the teacher's behavior could provide information on the accuracy with which she carried out the procedures and on the number of prompts required to get Tim to sit in his seat. This type of data might also have helped explain why the sitting program took longer to take effect the second time it was used. Perhaps the teacher had reduced the number of prompts or tokens she used. Also, condition changes could have been made at more favorable points in some cases, and the study could have been extended to test the durability of the effects. However, this was not possible because the school year ended.

This study also points out the desirability of measuring several child behaviors, although a modification procedure might focus on only one. In this way the preschool teacher can assess the efficiency of her program based upon changes in other behaviors as well as the behavior of immediate concern. Unlike the side-effects reported by several authors (Risley, 1968; Lovaas and Simmons, 1969; Wahler *et*

al., 1970) which occurred when the consequences for another behavior changed, the multiple effects reported in the present study occurred when the consequences for several behaviors changed. Thus, they do not constitute a response class defined as behavioral change in non-manipulated behaviors when one behavior is manipulated.

Other procedures for dealing with hyperactive behavior have been reported in the literature. A 10-yr-old boy was rewarded by a buzz if non-attending behaviors had not occurred in a 10-sec interval. The buzzes were backed by candy, which he could share with his peers. The procedure was used first in an isolated room and then in the classroom (Patterson, Jones, Whittier, and Wright, 1965). In another study (Doubros and Daniels, 1966), six overactive, retarded children were individually trained by dispensing tokens for progressively longer intervals without hyperactive responses. Recently, Wahler *et al.* (1970) reduced the number of activity shifts by ignoring a boy until he returned to a discontinued activity. All of these techniques decreased hyperactive behavior but required individual sessions. The technique reported the present study is more practical because it can be accomplished by the teacher in the normal preschool setting.

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