JOURNAL OF APPLIED BEHAVIOR ANALYSIS 1971, 4, 241-247 NUMBER 3 (FALL 1971)

THE MODIFICATION OF A CHILD'S ENURESIS: SOME RESPONSE-RESPONSE RELATIONSHIPS

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The present study attempted to evaluate experimentally the relationship between two response classes, enuresis and oppositional behavior. One child who had a long history of bed-wetting was observed in his home setting. Parents' reports and initial observations confirmed that the child was oppositional much of the time. When a timeout operation and differential attention were presented, removed, and presented again, the frequency of oppositional behavior decreased, increased, and decreased accordingly. Fluctuations in enuretic activity also correlated with the presence and absence of the timeout and differential attention operations. The suppression of oppositional behavior and enuretic activity persisted over an 18-month treatment period. It was suggested that the parental operations performed on oppositional behavior may have led to an increase in the parents' social reward value. Cessation of enuretic activity was explained in terms of a shift in parental reinforcer effectiveness.

Yates (1969) indicated that the conditioning method for treating childhood enuresis may not be as effective as was once thought. He recently compiled results from every study that selected an initial arrest criterion of six dry nights per week and provided follow-up data over a minimum period of six months. Taking these studies as a whole, Yates reports that only 53% of the cases were successfully treated by the conditioning method. Although he suggests that this figure might be somewhat higher if experimenters had more closely supervised parents in administration of the method, even the most careful instructions are no guarantee that mistakes will not be made in the home (Bostock and Shackelton, 1957).

When initial symptom arrest has been achieved, it is not clear that the treatment effect will be sustained once the conditioning apparatus is removed. Lovibond (1964) reported that the relapse rate may be as high as 35 to 40% when follow-up extends to 2 yr or more. Turner and Young (1966) reported a similar relapse figure over a 3 to 5 yr follow-up period.

There are other drawbacks to the conditioning method. Bostock and Shackelton (1957) reported a number of problems encountered in the use of the apparatus. Equipment failure is not uncommon. Parents also find the treatment process inconvenient. Furthermore, the overall cost is often very high.

The purpose of the present research was to assess the effectiveness of a new method for treating childhood enuresis, one which, if successful, would be relatively inexpensive and minimally inconvenient. Although nocturnal enuresis is not particularly amenable to direct manipulation by contingent social reinforcement, there may be a means by which parents could indirectly control enuretic activity. Wahler, Sperling, Thomas, Teeter, and Luper (1970) reported the successful treatment of two moderate stutterers by controlling secondary response classes that were functionally related to stuttered speech. Stuttering is a response class with characteristics similar to enuresis. Most conspiciously, stuttering is not particularly responsive to treatment by reinforcement therapies (see Wahler *et al.*, 1970). By modifying secondary response classes (in one case, oppositional behavior; in the other case, hyperactivity) that were responsive to social reinforcement contingencies, the therapists produced dramatic reductions in the frequency of stuttered speech. Their data clearly negated the possibility that stuttered speech

[1]I would like to express my appreciation to Dr. Robert Wahler, Department of Psychology, University of Tennessee, for his helpful comments. Thanks are also due to Michael Thomas and Norbert Reese for serving as observers. Reprints may be obtained from the author, Dept. of Child Development, University of Tennessee, Knoxville, Tenn.

had somehow been inadvertently affected by the reinforcement procedures. The results suggest that some aberrant behaviors typically inaccessible to the usual reinforcement operations might be treated effectively by controlling another response class functionally related to the target behavior.

The present study was undertaken in order (1) to identify a response class functionally related to nocturnal enuresis, (2) to manipulate this response class through the proper distribution of social reinforcement contingencies, and (3) to assess the short and long-term effects of these operations on the incidence of enuretic activity.

METHOD

Patient, Therapy Setting, and Observers

The patient was a 5.5 yr-old boy referred to the University of Tennessee Psychological Clinic because of excessive bedwetting and tantrum behavior. This was his first referral to the clinic by his parents. After the initial interview, all further contacts with the family were made in their home.

Records of patient and parent behaviors were obtained through the use of a behavioral check list (to be described later). All observers used in the study had had formal training in the use of operant principles and procedures of naturalistic observation. Inter-observer reliability checks were computed at regular intervals. In every case, a procedurally naive observer's scores were checked against the experimenter's scores.

General Procedure

During the initial interview, the parents were asked to describe their child's problem behavior and how they typically responded to it. They stated that the boy wet his bed four to five times each week. He had never gained control over nocturnal micturition. They indicated that he was capable of voiding on his own during the daytime, but it later became apparent that the mother very often reminded the boy to go to the bathroom at regular intervals during the day. The parents had also instructed the boy's teacher to remind him to use the bathroom regularly.

The parents stated they were unable to control much of their child's behavior. They said he often refused to follow instructions and was particularly difficult to handle before bedtime. They reported that he had an average of one tantrum per day, although the frequency of tantrum behavior varied considerably from one day to the next. This behavior consisted of screaming, kicking, throwing objects, hitting the parents, and occasionally hitting his 2.5-yr-old sister. Tantrums usually occurred when the parents attempted to enforce an instruction. Spanking, reasoning, threats, and isolation were methods they had used to enforce their demands, all to no avail. They stated that they rarely responded in any aversive way to bedwetting, however. Indeed, they were afraid that any attention to bedwetting would only increase the problem.

After the initial interview, the parents were asked permission to observe the boy in his home environment; arrangements were subsequently made to visit them on a weekly basis to obtain records of the child's behavior. Observations were made during the 1-hr period immediately before bedtime because it was during this period that the parents felt most ineffectual.

Behavior Classification, Baseline Observations, and Reliability

After the initial home visit, it was readily apparent that most of the boy's behavior could be classified into two response categories: oppositional behavior and cooperative behavior. During the next home visit, efforts were made to obtain frequency counts for both child response classes. For a behavior to be scored oppositional, it had to satisfy one of the following criteria: (1) when a parental request or command was presented and the child did not comply within a 20-sec interval, his behavior was considered oppositional. The boy's behavior would continue to be scored oppositional during consecutive 20-sec intervals until he complied or until a new request was presented; (2) oppositional behavior was also scored when the boy clearly violated an implied command; that is, when he initiated behavior clearly unacceptable to the parents. Examples of this type of behavior would be hitting, taking something from his sister, screaming, and yelling.

A behavior was scored cooperative when the boy complied with a parental request within a 20-sec interval. Checks for cooperative behavior were entered in consecutive 20-

sec intervals until the request was completed or until a new instruction was delivered. Since both child response classes were defined as a function of parental instructions, the number of parental instructions per session was also recorded.

Frequency counts for both child response classes were made by having an observer make coded checks for the occurrence of a behavior class within successive 20-sec intervals for a period of 30 min. An occurrence of a class, regardless of its duration during an interval, was scored as a single response unit so that no more than 90 units could be recorded for any one class during an observation period.

Baseline observation periods commenced on the second home visit and continued until the child response classes appeared to be stable. During these sessions, the parents were instructed to behave as though visitors were not present. The only requirement was that they initiate going-to-bed activities shortly after the observers arrived. They were not told to deliver any particular kind of instructions, nor were they told to deliver a certain number of instructions. After each baseline session, they were asked to report the number of tantrums and the number of enuretic episodes that had occurred since the last observation session. They recorded this information on a calendar provided by the experimenter. The parents were also instructed one week before the first baseline session not to make any comments to the boy about bedwetting.

Inter-observer reliability checks were computed during the last session of each baseline and treatment period. After each reliability check session, an agreement or disagreement was tallied for every 20-sec interval and the percentage of agreement was computed for each response class by subtracting total disagreements from total agreements and dividing by total agreements. Agreement percentages for oppositional behavior ranged from 83 to 90% with a mean of 87%. Agreement percentages for cooperative behavior ranged from 84 to 100% with a mean of 90%. Agreement percentages for parental instructions ranged from 80 to 100% with a mean of 92%.

Contingency Management Program

During the baseline sessions, a number of parental behaviors were identified that were felt to be related to oppositional behavior. When the boy was cooperative, the parents often retired to a place in the house where they could converse quietly or read the paper. However, they quickly responded to disruptive behavior. A long interrogation process usually ensued, typically culminating in parental threats or requests for the boy to be good.

After the last session of Baseline 1, the parents were asked to discontinue negotiating with the boy and threatening him when he was disruptive. They were told that this type of attention probably helped to maintain his undesirable behavior. They were informed they would have to start making their attention contingent upon cooperative behavior and begin using a timeout operation to suppress oppositional behavior. The latter operation consisted of placing the boy in a corner in his bedroom whenever he refused to follow a parental command or whenever he initiated disruptive behavior. For example, if the boy took a toy from his sister, yelled at his father, or refused to come to the table for dinner, the parents were told to take the boy to his bedroom, sit him in a corner, and leave the room. He remained in the corner for 10 min. If he had a tantrum during timeout, he was not removed until the tantrum had subsided for several minutes. During the first week of treatment, it was not uncommon for the boy to spend as much as 40 min in timeout. Nevertheless, he never attempted to leave the corner. When it was time for the boy to get into bed and he refused, the parents were told not to place the child in the corner. They were instructed to place him in bed and leave the room. They were asked not to return, even if the boy screamed or cried.

Before beginning the contingency management program, the experimenter and parents discussed several examples of child behavior and how they should respond to them. Particular emphasis was given to the distribution of social reinforcement. The parents were encouraged not only to tell the child that they approved of his behavior, but also show their appreciation with physical affection. It was not uncommon, therefore, for the parents to place their arms around the boy, hug him and say: "Good boy, David", or, "David, we're proud of you when you behave like that". Of course, the parents were told to continue ig-

noring enuretic activity. They also continued to keep daily records of tantrum behavior and enuretic episodes. During observation periods, it was necessary to dispense with the timeout operation so that a continuous 30-min record could be obtained. On all other evenings, timeout was used by the parents. The first observation session occurred three weeks after the last session of Baseline 1 because the family was out of town during weeks No. 4 and 5.

Experimental Demonstrations of Parental Control

The parents had no difficulty implementing the contingency management program. As expected, and as later data will show, the predicted changes in the boy's oppositional and bedwetting behaviors occurred. At this point, it was necessary briefly to reinstate baseline procedures in order to demonstrate clear parental control over the boy's behavior. The parents were therefore instructed to discontinue the differential attention and timeout operations. They continued to ignore bedwetting, however. After two baseline sessions, the parents were instructed to reinstate the treatment procedures. During this period, they were told once again not to make comment to the boy if he did wet his bed. They also continued keeping daily records of tantrum behavior and enuretic activity. These procedures remained in effect for the duration of the study.

RESULTS

Figure 1 describes frequency counts in 20-sec units of David's oppositional and cooperative behavior over baseline and treatment sessions. Also depicted is the number of enuretic episodes that occurred between each session.

As predicted, David's behavior varied with the systematic presentation and withdrawal of parental reinforcement contingencies. Frequency counts for oppositional behavior were much lower during treatment sessions than baseline sessions. On the other hand, frequency counts for cooperative behavior were much higher during treatment sessions than baseline sessions. Of greater interest, how-

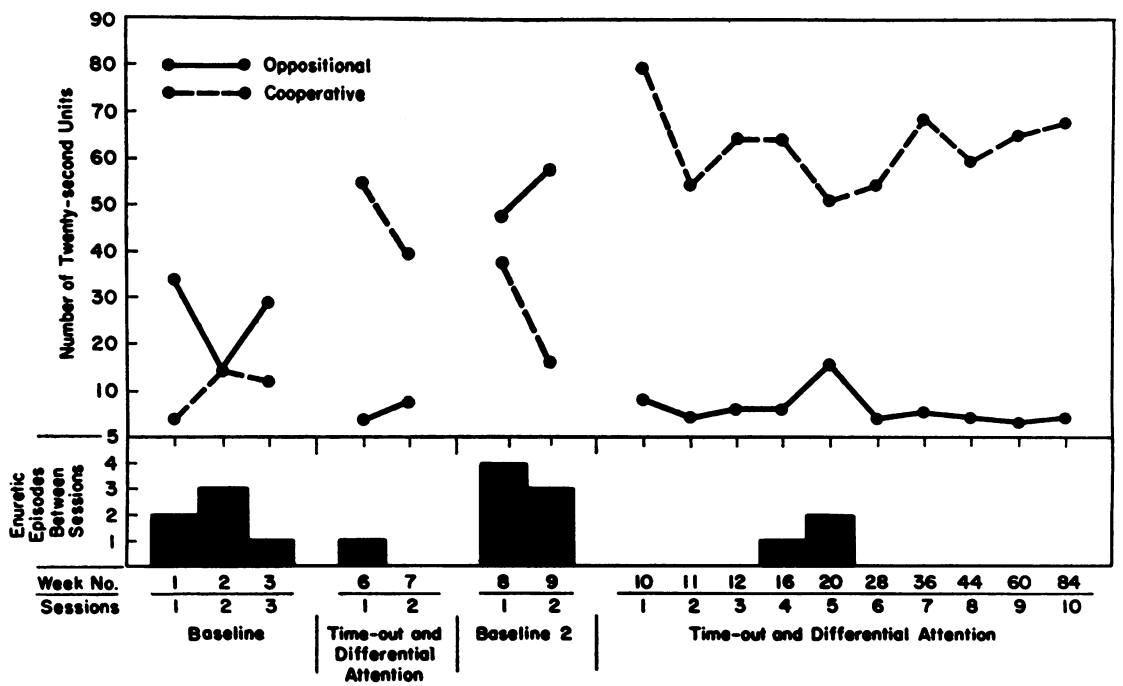

Fig. 1. Number of David's 20-sec oppositional and cooperative units over baseline and treatment periods and the number of enuretic episodes recorded by parents during the period between each session. All observations were made during 30-min sessions held in the home. The week numbers are listed to correspond with each observation session so that the time interval between sessions is easily determined.

ever, is the rather strong relationship between the behaviors under direct experimental control and the frequency of enuretic activity. In Fig. 1, the number of enuretic episodes clearly varies with the presence and absence of the treatment program; decreases in enuretic activity occurred only at those times when the contingency management program was in effect. The number of enuretic episodes rose dramatically, however, when the program was not in effect.

The data in Fig. 1 lead to three conclusions: (1) social reinforcement contingencies provided by both parents were probably responsible for the changes observed in oppositional and cooperative behavior; (2) the frequency of enuretic activity correlated directly with the presence and absence of parental reinforcement contingencies, and (3) treatment effects remained stable over a continuous 18-month observation period. With regard to the first conclusion, one might argue that fluctuations in David's behavior were due to fluctuations in the number of parental instructions across baseline and treatment periods. Table 1, however, shows that parental instructions did not vary systematically from one period to the next.

With regard to the second conclusion, it would appear that the frequency of enuretic activity was more closely associated with the operations performed on oppositional behavior. In Fig. 1, the first session of Baseline 2 depicts a marked rise in the frequency of oppositional behavior. The frequency of cooperative behavior, however, does not drop appreciably, even though four enuretic episodes occurred during the week immediately preceding this session. Although cooperative behavior eventually decreases during the second session of Baseline 2, enuretic activity remained fairly stable, as did the level of oppositional behavior. Again, the data suggest that enuretic activity was functionally related to oppositional behavior.

After David's parents had put the contingency management program in operation, they were able rapidly to control the frequency of oppositional and cooperative behavior. More importantly, they quickly gained control over enuretic activity. One of the primary purposes of the present research, however, was to assess the stability of the treatment effects over time. Both Fig. 1 and Table 1 describe results of the program over an 18 month treatment period. Very stable frequency levels are recorded for oppositional and cooperative behavior and enuretic activity. There was a time, though, when the parents decided to discontinue using the timeout operation. During weeks 19, 20, and 21, they discontinued administering the timeout procedure because:

Table 1

Number of parental instructions presented to David each session and the number of tantrums and enuretic episodes recorded by parents between sessions.

	Baseline			Timeout and Differential Attention				Baseline No. 2		Timeout and Differential Attention																
Weeks	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20-	21-	28-	36-	44-	60-	84
Sessions	1	2	3	-	-	1	2	1	2	1	2	3	-	-	-	4	-	-	-	5	-	6	7	8	9	10
Number of parental instructions per session	19	17	20	-	-	15	18	31	21	21	17	18	-	-	-	18	-	-	-	21	-	20	16	18	22	19
Number of tantrums per week	7	6	8	10	3	0	0	1	4	2	0	0	0	0	0	0	0	0	0	3	2	0	0	0	0	0
Number of enuretic episodes per week	2	3	1	1	0	0	0	4	3	0	0	0	0	0	0	1	0	0	2	0	0	0	0	0	0	0

"We didn't think he needed it anymore. He has been so good." During this period, one can observe a slight rise in the level of oppositional behavior and enuretic episodes as depicted in Table 1. The close correspondence between the rise in enuretic activity and absence of the timeout operation is again quite interesting. After the parents reinstated the timeout operation (week #22), David's behavior quickly returned to treatment level. Thereafter, no significant changes were observed in the boy's behavior.

DISCUSSION

The present findings are of particular significance for clinical practitioners and pose some interesting theoretical puzzles as well. It seems clear that some cases of childhood enuresis might be effectively treated by using the procedures outlined above. There is a strong indication that enuresis may be functionally related to other aspects of a child's behavior that are more amenable to direct parental control. The procedures discussed above are not limited in application to oppositional and cooperative response classes. Essentially the same operations have already been used to modify a wide variety of aberrant behaviors (see Sherman and Baer, 1969). Possibly, some of these behaviors may be functionally related to enuretic activity. At any rate, the clinician has an option available to him that may prove effective and save the parents considerable psychological and financial discomfort.

Although the clinical implications of the present research are clear, it is difficult to place the results into theoretical perspective. How is it possible to control one response class (enuresis) simply by controlling a second, and seemingly unrelated response class (oppositional behavior)? It is virtually impossible to identify environmental stimuli that may have contributed to the changes in enuretic activity *and* oppositional behavior. Wahler *et al.* (1970) found exactly the same lack of stimulus commonality between stuttering and oppositional behavior. Since the parents in the present study were instructed not to reinforce enuretic activity, it is unlikely that the fluctuations observed in enuretic frequency could be attributed to systematic shifts in parental reinforcement contingencies.

Wahler (1969) published some interesting research that may offer a way out of this theoretical dilemma. He showed that the presence or absence of a timeout operation correlated directly with parental reinforcer effectiveness. That is to say, parents scored higher on a test of reinforcer effectiveness during periods when a timeout operation was used as opposed to periods when the operation was not used. If, as Wahler (1969) has shown, parents of oppositional children tend to have low reinforcer value, it is possible that David's parents also functioned as agents of low social reinforcement. Of course, there is no evidence to support this contention, but it does seem reasonable. Assuming for the moment that the parents had little reinforcer value, any effort on their part to reinforce self-initiated diurnal voiding would probably fail. It was noted earlier that David's mother often reminded him to go to the bathroom at regular intervals during the day. Indeed, it is possible that the mother had to remind the boy because attempts to reinforce independent voiding behavior had not proved effective. Be that as it may, if the parents did not function as agents of positive social reinforcement, any efforts on their part to condition voiding behavior to the appropriate discriminative cues would fail. Detrusor muscle tension would probably not become a discriminative stimulus for independent going-to-the-bathroom behavior because parental reinforcement after the act would have little reinforcing power.

If, however, parental reinforcer value suddenly shifted—if the parents suddenly became effective agents of positive social reinforcement—one might predict an increase in independent diurnal voiding if parental reinforcement was made contingent upon the behavior. There are no empirical data to show an increase in parent reinforcer value; nor do any show an increase in independent diurnal voiding during treatment periods. It is known, however, that the parents were instructed to reinforce all cooperative behaviors during treatment periods, including self-initiated diurnal voiding behavior. Also, the timeout operation was used only when the contingency management program was operative and the timeout operation has been shown to correlate with increased parent reinforcer effectiveness (Wahler, 1969). It is known too from the parents' reports that David did not have

to be reminded to urinate during treatment periods, but again, no hard data support their claims. Nevertheless, it is tentatively concluded that detrusor muscle tension probably took on new discriminative properties as a result of a shift in parent reinforcer effectiveness. David apparently learned to associate bladder tension with self-iniated diurnal voiding behavior because an effective social reinforcer was made contingent on the behavior. Through this process, one can account for the transfer from external discriminative control (mother's prompts) to internal discriminative control (detrusor muscle tension) over diurnal voiding behavior. Of course, the best evidence for the acquisition of internal cues with discriminative properties for proper voiding behavior is the cessation of nocturnal enuretic activity. David has not wet his bed once during the past 16 months. Although the results are impressive, additional time is needed to assess prolonged treatment effects.

The present research offers a new and simple means for treating childhood enuresis. The techniques described are easy for most parents to learn and are particularly amenable to a wide variety of problem behaviors, some of which may be functionally related to enuretic activity. Further research efforts should be aimed at isolating those response classes that bear a functional relationship to childhood enuresis. Whether or not the changes in enuretic activity observed in the present research were due to a shift in parent reinforcer effectiveness is an issue easily subjected to empirical test.

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Received 6 April 1970.
(Revised 26 February 1971.)