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The Use of Overcorrection in the Treatment of Irregular Enuresis in Developmentally Disabled Persons

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In Partial Fulfillment of the Requirements for the Degree Master of Arts

by
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Abstract

Having evaluated previous attempts to toilet train developmentally disabled individuals, Foxx and Azrin (1973) developed a treatment package designed to produce and maintain independent toileting in institutionalized retardates. The training procedure is divided into two phases. The first phase is the bladder training procedure, which is then followed by the self-initiation training. Foxx and Azrin note that, regardless of previous toileting behavior, all trainees should receive the same sequence of training in the toilet training program, i.e., bladder training, followed by self-initiation training. The authors do not differentiate between various types of enuresis, nor do they suggest that a specific type of treatment be utilized for a specific type of enuresis. Without first identifying which children have self-initiated prior to training (irregular enuretics), it is impossible to evaluate if a specific treatment is more beneficial for a particular type of enuresis. Although Foxx and Azrin (1971; 1973) have included overcorrection as part of a total treatment package, the effects of overcorrection, as the major treatment component, in the treatment of a particular subgroup of enuretics, has yet to be established.

The purpose of the present study was to test the efficacy of an overcorrection procedure, combined with verbal praise,
for toilet training developmentally disabled children who display irregular enuresis (Yates, 1970). Four developmentally disabled children with irregular enuresis were administered an overcorrection procedure contingent upon each toileting accident. Verbal praise was also administered for the absence of "accidents." Results indicated that the training procedure was successful in eliminating incontinence in three of the four subjects on whom the training was administered. The reduction of incontinence generalized outside the children's home environment and was maintained during a one month follow-up.
The term "enuresis" refers to an involuntary release of urine in the absence of organic pathology after the age at which a child is expected to be toilet trained. Both diurnal enuresis, or daytime wetting, and nocturnal enuresis, or nighttime wetting, can lead to serious health hazards when left untreated. For example, when daytime incontinence is ignored by institutional staff or parents, the condition can lead to skin irritation or urinary tract infections. It can also result in the child being restricted from normal daytime activities such as excursions outside of the hospital or school, being avoided by staff and peers, or even rejection from formal training programs.

The incidence of enuresis among normal children at five years of age may be as high as 20% (Jones, 1960). Sugaya (1967) estimates that in institutionalized retarded children the incidence of incontinence is considerably higher. Kanner (1972) notes that enuresis is the primary problem for approximately 26% of all children referred for psychiatric treatment. These statistics make it clear that enuresis is one of the more common pathologies of childhood. It is also apparent that an effective and durable treatment is needed to bring an end to the problem.

Yates (1970) makes a distinction between regular and irregular enuresis. Regular enuresis is wetting that occurs
on a daily basis, i.e., the individual has never made a self-initiated toileting response. Irregular enuresis is wetting on a sporadic basis; the individual has appropriately self-initiated on some occasions, while voiding in his or her clothing on others. This distinction is important in that the mode of treatment may vary as a function of the type of enuresis involved.

Previous attempts to train daytime bladder control in the developmentally disabled have centered around three distinct methods. The first uses operant reinforcement principles, combined with a regular schedule for voiding. The second is a method developed by Van Wagenen, Meyerson, Kerr, and Mahoney (1969), in which children were trained to respond to a tone, elicited via wet pants, by voiding. The third method is the Foxx and Azrin (1973) toilet training program.

The reinforcement-scheduling method consists of placing the child on the toilet at regular time periods throughout the day. In using this approach, elimination responses are rewarded while nonresponses, or the absence of voiding, are ignored. Previous studies using reinforcement and scheduling methods (Baumeister & Klosowski, 1965; Bensberg, Coswell, & Cursell, 1965; Dayan, 1964; Giles & Wolf, 1966; Hundziak, Maurer, & Watson, 1965; Kimbrell, Luckey, Barbuto, & Love, 1967) have concentrated on "habit training" the child. The term "habit training" refers to a process in which the child is placed on the toilet at regularly scheduled time intervals. If the child consistently voids when placed on the toilet,
rarely has toileting accidents throughout the day, and does not consistently self-initiate, then the child is considered habit trained.

To be considered "toilet trained," the child must react consistently and appropriately to internal discriminative stimuli (bladder distention) contingent upon the need to use the toilet. In toilet training, the sensation of bladder distention serves as a discriminative stimulus for the child to walk to the toilet, lower the underpants, sit down, void, stand up, raise the pants, and flush the toilet. All of these component behaviors must occur without any prompting from external sources such as parents, teachers, etc.

Several disadvantages are associated with the scheduling method. First, scheduling frequent trips to the bathroom will not necessarily bring about self-initiated use of the toilet. In other words, placing a child on the toilet at regular intervals does not guarantee that the child will learn the various behaviors necessary to use the toilet on an independent basis. A second disadvantage is that scheduling requires considerable time from staff or parents. A third disadvantage is that it is sometimes difficult to determine exactly what time schedule is most appropriate for a given individual, since accidents may occur at irregular or unpredictable time periods. A final disadvantage is that scheduling can foster a dependence on the prompting stimuli, i.e., the person who has been taking the child to the toilet.
Van Wagenen, Meyerson, Kerr, and Mahoney (1969), considered the scheduling method as inappropriate and instead argued that self-initiated toileting behavior be trained as one entire behavior pattern beginning with the internal discriminative stimuli to void. The authors used a method in which subjects were trained to respond to a tone, elicited via wet pants, by voiding. That is, immediately following the onset of urination, a urine sensing apparatus would produce a tone, thus serving as a discriminative stimulus for the child to go into the bathroom and attempt to finish urinating. An attempt was then made to fade the use of the tone such that the child's anticipation to urinate was sufficient to elicit appropriate voiding behavior. The major problem with this procedure is eliminating dependence upon the tone while maintaining the self-initiated behavior.

In reviewing the previously mentioned studies on scheduling and self-initiated toileting methods, many of the studies did not include follow-up data to determine the durability of treatment effects. With respect to the scheduling plus reinforcement method, it is possible that the subjects could adapt to, or satiate on, the reinforcement contingencies over time, and thus display incontinent behavior once again.

Having evaluated previous attempts to toilet train developmentally disabled individuals, Azrin and Foxx (1971) developed what might be called a "blockbuster approach" designed to produce and maintain normal independent toileting in institutionalized retardates. In keeping with the general
format of previous studies, Foxx and Azrin developed a treatment package which included regular scheduling of prompted toilet-approach trials, positive reinforcement for appropriate voiding, the use of a urine sensing apparatus (Azrin, Bugle, & O'Brien, 1971), training in dressing and undressing skills, fading of prompts to help bring about self-initiated toileting, cleanliness training for accidents, and a post-training maintenance procedure. Results indicated that this package was effective in eliminating incontinence in all nine subjects on whom it was tried.

Azrin, Foxx, and O'Brien (1973) provided a detailed explanation and rationale for institutional staff on using the toilet training procedure described by Azrin and Foxx (1971). Following the Azrin et al. (1973) study, Foxx and Azrin (1973) wrote a book entitled Toilet Training the Retarded: A Rapid Program for Day and Nighttime Independent Toileting. The procedure described in that book is essentially the same as the one presented in the article by Azrin et al. (1973). The book is primarily intended for institutional staff, administrators, and parents who are involved in working with incontinent individuals. The procedures described in the book are based on the premise that self-initiated toileting is not merely a function of learning to respond to bladder distention by relaxing the sphincter, but instead is a complex operant and social learning process that has been inhibited by a "reduced learning capacity and by institutionalization."
The general strategy outlined in the Foxx and Azrin book is based on a "reward and systems approach" in which the individual's immediate environment is restructured to eliminate incontinence. The major components of the toilet training program are: (a) high frequency of reinforcement for appropriate responses, (b) variety and immediacy of rewards, (c) artificially increasing the frequency of urinations through increased fluid intake, (d) shaping of independent toileting, (e) the teaching of incompatible responses, (f) regular scheduling of toilet-approaches, (g) overcorrection for accidents, and (h) a post-training maintenance procedure.

The training procedure described in the Foxx and Azrin book is divided into two phases. The first phase is the bladder training procedure (Table 1). In this phase the child is taught to control the bladder muscles such that elimination will only take place when seated on the toilet. It is through this phase that the child is habit trained, but not fully toilet trained. That is, the child has not yet reached the point where self-initiated toileting responses are occurring on a consistent basis.

The second phase is self-initiation training. In this phase the child is taught to self-initiate on an independent basis, i.e., without the help of prompting stimuli. When an accident occurs during the bladder training sequence, the child is put through an overcorrection procedure which consists of brief cleanliness training (Table 2) and positive practice (Table 3). When an accident occurs during the self-
TABLE 1

Bladder Training Procedure

1. Give as much fluid as the child will drink while seated in his chair.
2. Wait about 1 minute.
3. Direct child to sit on toilet seat using minimal prompt.
4. Direct child to pull his pants down using minimal prompt.
   4a) When child voids, give edibles and praise while seated, then direct him to stand.
   4b) If child does not void within 20 minutes after drinking fluids, direct him to stand.
5. Direct child to pull pants up using minimal prompt, then direct child to flush the toilet if he voided.
6. Direct child back to his chair.
7. Check child for dry pants every 5 minutes.
   7a) If pants are dry, give edibles and praise.
   7b) If pants are wet, only show him edible and admonish him.
8. At the end of 30 minutes, begin the sequence of steps again.
9. If accident occurred, give brief cleanliness training and positive practice.

Note. From Toilet Training the Retarded: A Rapid Program for Day and Nighttime Independent Toileting by
Self-Initiation Training Procedure

1. When child voids, give edible and social praise.
2. Lengthen time between dry pants checks.
3. Move child's chair further away from the toilet.
4. Give fluids on an intermittent basis.
5. When accident occurs, give full cleanliness training and positive practice.


TABLE 2

Brief Cleanliness Training

1. Immediately grasp the child by the shoulders so that he is looking at you.
2. Tell the child, "No, you wet your pants."
3. Require child to clean up any traces of urine on the floor or chair.

TABLE 3

Positive Practice Training

1. Require child to walk rapidly to the toilet from (wherever the accident occurred).

2. Require child to lower his pants, sit on the toilet for a few seconds, arise, raise his pants, and return to his chair.

3. Repeat steps 1-2 for several trials (6-8) without interruption until the next half-hour's regularly scheduled toileting. Use verbal instructions and graduated guidance if necessary.

TABLE 4

Full Cleanliness Training

Have the child clean up his accident by requiring him to:

1. Obtain a mop and bucket, fill the bucket with water and disinfectant, and take the mop and bucket to the area where he wet.

2. Mop up the accident, wringing out the mop himself.

3. Empty the bucket in the appropriate place, rinse it out, and return it to the original location.

4. Clean the mop and return it to its usual location.

5. Go to the clothing room and obtain his own dry pants.

6. Carry his dry pants to the bathroom where he should clean his genital region with a cloth and change into his dry pants.

7. Carry his wet pants to a sink where he should completely immerse them in water, wring them out, and hang them up to dry.

initiation training, the overcorrection procedure consists of full cleanliness training (Table 4) and positive practice.

Williams and Sloop (1978) made an attempt to reduce the time and cost required of the Foxx and Azrin (1973) toilet training procedure, while at the same time minimizing the reduced effectiveness of the treatment package. The toilet training program, which was used to train six developmentally disabled children, was essentially the same as the procedure reported by Azrin and Foxx (1971; 1973) except that the use of the urine sensing apparatus was eliminated. In addition, the total time scheduled for training each resident was 3 hours per day, as opposed to approximately 8 hours per day as indicated in the Azrin and Foxx (1971; 1973) toilet training program.

The results of the Williams and Sloop (1978) study indicated that training took a mean of 9 days as compared with a mean of 6 days reported in the Azrin-Foxx procedure. Follow-up results showed a daily accident rate of near zero which also compares favorably with the Azrin and Foxx report.

These results provide strong support for the notion that a shortened version of the Azrin-Foxx toilet training program can be effective when attempting to eliminate incontinent behavior in the institutionalized retarded. The results of this study also suggest that it may be possible to further analyze the various components of the Azrin-Foxx program in order to discover additional components which could be eliminated without reducing the effectiveness derived from
such a program.

In attempting to further reduce the time and cost of the Foxx and Azrin (1973) toilet training program, a logical component to analyze would be the bladder training and self-initiation training phases due to the excessive amount of time required to carry out each particular phase. Regarding the order in which the bladder training and self-initiation training phases are presented, the authors state that the reader should "Follow the same sequence of steps for (the child) who already has some control over his toileting as for (the child) who has shown none of the required skills for self-toileting.... Regardless of prior training, all (trainees) should receive the same sequence of steps in the toilet training program, since the program is designed such that the trainer can determine within one or two trials whether a given skill is present, and, if so, go on to the next step" (p. 50). In other words, Foxx and Azrin suggest that the sequence of training should be the same for the child who has self-initiated in the past as for the child who has never made a self-initiated toileting response. The authors do not differentiate between types of enuresis, nor do they suggest that a specific mode of treatment be utilized for a specific type of enuresis (regular or irregular).

The purpose of the bladder training phase is to teach the child the component behaviors needed to bring about self-initiated toileting. Thus, it would seem unnecessary to have a child who has intermittently self-initiated in the past
(irregular enuretic) go through the time consuming bladder training phase. Since irregular enuretics apparently have the component behaviors necessary for self-initiation, it would seem that these individuals could be toilet trained by implementing only the overcorrection procedure described in the Foxx-Azrin (1973) toilet training program.

In considering all the prior studies concerned with training continent behavior in developmentally disabled persons, none have worked solely with irregular enuretics. All of the previous studies have included a mixture of both regular and irregular enuretics in their subject population. Without first identifying which subjects have self-initiated prior to training, it is impossible to evaluate if a specific treatment is more beneficial for a specific type of enuresis. Although previous studies (Azrin & Foxx, 1971; Foxx & Azrin, 1973; Williams & Sloop, 1978) have included overcorrection as part of a total treatment package, the effect of overcorrection, as the major treatment variable, in the treatment of a specific subgroup of enuretics has yet to be established.

Thus, the purpose of the present study is to test the efficacy of an overcorrection procedure, combined with verbal praise, in toilet training developmentally disabled children. The research question is, can overcorrection, combined with verbal praise, be sufficient to effectively toilet train developmentally disabled children who display irregular enuresis?
Method

Subjects and Setting

Prior to the onset of training, the experimenter verbally administered a set of instructions to a group of teachers who taught at the school from which the subjects were selected. The purpose of the instructions was two-fold. First, the rationale for the study was explained. Secondly, the teachers were asked to submit a list of the names and home phone numbers of any children who might be appropriate for training. (See Appendix A for a copy of these instructions.)

From the list of potential subjects, only those who possessed the following characteristics qualified for training:

1. The child must be able to walk to the toilet without assistance.
2. The child must have enough control of his or her hands to pull the pants up and down without assistance.
3. The child must be sighted in order to locate the correct route to the bathroom.
4. The child must be able to understand simple commands.
5. The child must not be currently enrolled in a specific toilet training program.
6. The child's baseline toileting skills must be consistent with a classification irregular enuretic, i.e., self-initiated toileting and accidents must be occurring on a sporadic basis.
Four male students who were enrolled in a special education facility for developmentally disabled persons were selected for training. The ages of the four students were 3.5, 4, 7, and 8 years, respectively. Subjects #1, #2, and #4 were currently residing at home with their parents at the time of this study. Subject #3 was living in a care home facility for developmentally disabled children.

Evaluation of the subjects' intellectual functioning and adaptive behavior skills showed that all of them fell within the low severe to low moderate range of retardation (mean IQ of 38, range 23 to 41). Subjects were from a mixed socioeconomic status, and at no time during the study did any of the subjects display serious disruptive or abusive behaviors.

The toilet training program was carried out in the home environment for the duration of the study for two of the subjects (subjects #1 and #4). For subjects #2 and #3, training was initially carried out in the home, with some follow-up training implemented in the classroom as well.

Experimental Design

In order to avoid the obvious problems often associated with a reversal design (e.g. reinstating a problem behavior), a multiple-baseline design across subjects was used (Baer, Wolf, & Risely, 1968). With this design, the treatment variable (overcorrection) was applied sequentially to the same behavior (incontinence) across four different subjects. In
using this design, the controlling effects of treatment were inferred from the behavior change in the treated subject, providing the target behavior remained stable in the untreated subjects. This design also allowed for the replication of treatment effects across different subjects.

Recording

Data were collected concurrently in the subject's home and classroom. The dependent measure was the frequency of toileting accidents in the home and at school. An accident was defined as voiding in one's clothing. Both "dribbling" (i.e., wetting the pants with only a few drops of urine) and wetting a major portion of the pants were counted as an accident.

Accidents were recorded in the following manner. The individual who was responsible for recording the accidents (parent or teacher, depending on the setting) was required to check the child's pants at the end of each 1 hr period, beginning with the time the child awoke in the morning and ending with the time the child retired at night. The 1 hr checks were used to detect whether or not the child's pants were wet or dry. After each pants check, the parent or teacher recorded the data on a specially prepared data sheet. (See Appendix B for a copy of the data sheet.) This recording procedure was kept constant throughout the course of the study.

Any accidents observed between the 1 hr checks were also recorded. To guard against the possibility that recordings
of wet pants were a reflection of repeated wettings within the same 1 hr period, the wet pants were changed by the recorder during baseline conditions, whereas during treatment conditions each subject, as a requirement of the overcorrection training, removed the wet pants without assistance.

**Belt-buzzer**

To help prevent the possibility that the recorder might forget to check the child's pants, an external prompt in the form of a 1 hr "belt-buzzer" was used. The recorder was asked to wear this timer so that contingent upon the completion of each 1 hr interval, the buzzing sound would serve as a reminder to perform a pants check.

**Reliability**

Because of the nature of the training environment, reliability data were not gathered in the traditional manner, i.e., having two observers record the target behavior on an independent and concurrent basis. The reason is that the presence of the observers could have served as a prompt for the recorder to check the child's pants, thus producing an inflated reliability measure. Having the observers present might also have had a reactive effect on the child's behavior.

Since the recording method required the data collector to be consistent in terms of collecting accurate data, a method was employed to decrease the probability that the recorder would accidently report incorrect data. Thus, reliability was carried out in the following manner. As was previously mentioned, after each pants check the data collector
was required to record the result of the pants check on the data sheet provided for that purpose. Up until this point, the parent could report unreliable data by recording that a pants check was made and the pants were dry when, in fact, the pants may have been wet. To discourage this unreliable data report, an additional measure, in the form of the actual number of pants that were wet each day, was also used. Thus, immediately following each discovery of wet pants, the parent was required to deposit the wet pants into a commercially designed diaper pail.

It was important to present the parents with an adequate explanation for the additional use of the diaper pail, so that the parent would not feel that the experimenter was implying that they couldn't be trusted with respect to the data collection. Therefore, a written and verbal explanation was provided for each subject. (See Appendix C for a copy of this explanation.)

Reliability for the home data was assessed by having the experimenter make intermittent visits to the home for the purpose of checking the information on the data sheet and to check on the number of wet pants in the diaper pail. The number of times wet pants were recorded on the data sheet for a particular day served as the main dependent measure. The number of wet pants in the diaper pail for that same day was compared against the frequency of accidents recorded on the data sheet, and thus served as a reliability estimate. Reliability was calculated by dividing the smaller score by
the larger score and multiplying by 100.

In addition to the experimenter, a second observer, who was naive concerning the nature and design of the study, also assessed reliability. This second observer was scheduled to assess reliability on randomly selected days in each condition. Reliability was assessed on five occasions during baseline and treatment conditions and on four occasions during follow-up. Thus, there was a total of 14 reliability checks throughout the study. Nine of these 14 reliability checks were made by the additional observer who was unaware of the nature of the study.

Before reliability checks were obtained, parental and teacher consent was obtained. The parents and teachers of the subjects were asked to sign a form explaining that another student, other than the experimenter, would be stopping by periodically for the purpose of collecting the data and to answer any questions that might arise. (See Appendix D for a copy of the consent form.)

Reliability for wet pants at school was assessed in the same manner as for the home data. However, the teacher was not taught how to administer the overcorrection training during the initial stages of the study in order to observe the presence or absence of generalization from the home to the classroom setting.

Procedure

Prior to the onset of treatment, the four subjects were randomly assigned (using a random number table) to their
respective baseline conditions, i.e., baselines 1-4. Baseline measures were taken on the frequency of toileting accidents each day in the home and at school. Baseline measures continued until a stable frequency of accidents was seen. Stability was defined as a period of 6 days in which a child had an average of three or more accidents a day, and no more than 2 dry days during this same 6 day period.

After obtaining stable baseline measures, overcorrection was administered for Subject #1, while baseline observations continued for Subjects #2, #3, and #4. After a reduced frequency of accidents for Subject #1 was evidenced, the overcorrection procedure was administered to Subject #2, and so on.

Baseline Condition

Baseline conditions consisted of the following procedures. Immediately following the completion of each 1 hr interval, a pants check was performed. Regardless of whether the pants were wet or dry, the parent or teacher would behave in a manner that was similar to the way they had responded before the study began. After having made this response, the result of the pants check was then recorded on the data sheet. The various behaviors which were performed during baseline conditions can be seen in Figure 1.

Overcorrection Training plus Verbal Praise

Upon the completion of each 1 hr period, the child's pants were inspected to observe whether the pants were wet or dry. If the pants were dry, verbal praise was administered in the form of "good, [name of child] your pants are dry."
Baseline Condition

Figure 1. Behaviors performed by the recorder during the baseline condition.
Feel your dry pants. I'm so proud of you for having dry pants!" When the child's pants were wet, restitutio\-nal over-
correction was administered which required the child to: 
(a) obtain a towel, (b) clean up all traces of the accident, 
(c) rinse the towel, (d) go to the bedroom and put on clean 
pants, and (e) carry the wet pants to the sink, immerse them 
in water, wring them out, and dispose of them in the diaper 
pail.

Positive practice overcorrection. This immediately fol-
lowed restitutio\-nal overcorrection, and required the child to: 
(a) walk to the toilet and (b) lower the pants, sit down for 
approximately 3-5 seconds, arise, raise the pants, and return 
to the location where the accident occurred. The above two 
steps were repeated 10 times in rapid succession. The entire 
overcorrection procedure, i.e., restitutio\-nal and positive 
practice overcorrection, took approximately 20 min to perform. 
The various behaviors which were performed during treatment 
conditions can be seen in Figure 2.

During the initial training sessions, the overcorrection 
procedure was administered to the child by the experimenter. 
While this training was being administered the child's par-
ents were required to observe the correct manner in which to 
implement the overcorrection training. After the experimenter 
had modeled the correct use of the overcorrection procedure 
for approximately four different training sessions, all subse-
quent training was carried out by the child's parents. As 
the parents were implementing the overcorrection they were
Figure 2. Behavior performed by the recorder during the treatment condition.
instructed by the experimenter via verbal prompts and behavior rehearsal.

A child was considered successfully toilet trained when there had been no accidents for 13 of 14 consecutive days in the home or at school. Immediately following the attainment of this criterion, follow-up data were collected for 1 month.

In the event that a child had a combined total of more than three accidents, which occurred on more than 1 day during any 7 day period of the follow-up, overcorrection training was once again implemented following each accident. The overcorrection training during follow-up was identical to the training received during the treatment condition. Overcorrection for accidents was discontinued when the child did not have an accident for 7 consecutive days in the home and at school.

Results

Fourteen reliability checks were conducted across all experimental conditions for the four subjects. For Subject #1, reliability measures ranged from 80%-100%, with a mean of 94% across all three experimental conditions. For Subject #2, percentages ranged from 73%-100%, with a mean of 91%. For Subject #3, percentages ranged from 80%-100%, with a mean of 96%. Percentages for Subject #4 never fell below 100%.

The results of the toilet training procedure for all four subjects (Jimmy, Bradley, Alex, Steve) are presented in Figure 3. The Figure shows the frequency of accidents in the home and at school during baseline, treatment, and follow-up
conditions. For purposes of presentation, each datum point represents the total number of accidents over a 4 day period. The vertical arrow identifies a time period in which the over-correction training was implemented in the child's classroom setting. The results of the training procedure for each of the four subjects will be discussed separately.

Subject #1. Baseline measures for Subject #1 (Jimmy) indicate that accidents in the home were occurring at the rate of approximately 15 accidents over a 4 day period, or roughly 3.7 accidents per day. Pre-treatment measures of accidents at school approximated the frequency of accidents in the home.

After nearly 2 weeks of baseline measures, the overcorrection training plus verbal praise was implemented. After 8 days of training, accidents in the home decreased from an average of 15 accidents per 4 day period to a frequency of about two accidents over a 4 day period. Following 12 days of training, accidents in the home had been completely eliminated. Results of the generalization measures indicated that the elimination of accidents in the subject's home were paralleled by a reduced frequency, followed by a complete elimination, of accidents in the classroom setting as well (Figure 3).

Follow-up measures showed that the absence of accidents during training was generally maintained during the 1 mo period after training had been terminated. Data regarding the number of accidents at school is missing for Days 65-72 due
Figure 3. Total number of accidents at home and school during baseline, treatment, and follow-up conditions. Data are collapsed over 4 day periods. Arrows identify when treatment was administered at school.
Subject #2. Baseline measures for Subject #2 (Bradley) indicate that accidents in the home were occurring at a frequency of approximately 17 accidents over a 4 day period, i.e., an average of 4.3 accidents per day. Baseline data for accidents at school were about the same (Figure 3).

As can be seen from Figure 3, the overcorrection training proved to be ineffective for this particular subject. After 20 days of training in the home (Day 40), overcorrection was administered in the subject's classroom setting as well. It was hoped that this additional training would help bring about a greater reduction, if not complete cessation, of toileting accidents both in the home and at school.

Following this additional training at school, there was an immediate decrease in the number of accidents at school. Unfortunately this trend in the data was followed by an increased frequency of accidents which approximated baseline measures.

Subject #3. Baseline measures for Subject #3 (Alex) indicate that the number of accidents at home were occurring at a rate of roughly 10 accidents per 4 day interval, an average of 2.3 accidents per day. Accidents at school were of a somewhat lesser frequency (six accidents over an average 4 day period). After only 4 days of training, accidents were virtually absent, with the complete elimination of accidents in the home and school occurring after 12 days of training (Day 44).
Follow-up measures indicated that the elimination of accidents during the treatment phase maintained for the 1 mo period following the last day of training. During the follow-up period, two accidents occurred at school on Day 64. Data for school accidents are missing for Days 68-72 due to Easter vacation. When Alex returned to school on Day 76, no toileting accidents occurred. This trend in the data continued throughout the remainder of the follow-up period.

Subject #4. Before training, Subject #4 (Steve) averaged about 14 accidents per 4 day period, i.e., 3.5 accidents per day (graph 4, Figure 3). After 12 days of training, accidents were virtually eliminated. This substantial decrease endured for the entire 1 mo follow-up period.

Data for the number of toileting accidents at school for Subject #4 was not collected or recorded in the same manner as for Subjects 1-3. The reason was that Steve's teacher felt that Steve's incontinent behavior at school was not serious enough to be considered a major problem. This teacher went on to say that she did not feel she had the time or energy to keep a continuous record of toileting accidents. Steve's teacher also made it clear that she would not appreciate have observers coming into the classroom for the purpose of checking up on her data collection procedure. Therefore, Steve's teacher was asked to simply deposit the wet pants in a plastic bag at the end of each day. She was also required to send this bag of wet pants home with Steve each day.
It should be mentioned that the number of wet pants sent home each day was not an accurate reflection of the exact number of times Steve had wet at school since the teacher reported that she was not consistent in changing the wet pants after each wetting episode. Thus, the number of wet pants brought home each day was only an estimate of the exact frequency of accidents at school.

Since accurate data collection and recording procedures in the school could not be implemented for Subject #4, generalization probes were taken on randomly selected days in each phase of the study. The generalization probes are indicated by the symbol (Δ) in Figure 3. The probes were carried out on eight occasions by counting the number of wet pants that had been sent home from school for a particular day. The result of these intermittent checks can be seen in graph 4 of Figure 3.

Baseline measures indicated that the number of accidents at school was nearly equal to the frequency of accidents in the home setting. Generalization probes on Days 52 and 60 during the treatment phase revealed that the decrease in accidents at school was similar to the number of accidents occurring at home. Follow-up measures also revealed a similar trend regarding the occurrence of home and school accidents for the 1 mo period after training had been terminated (Figure 3).

Training Time. In considering the total time that was required to successfully train Subjects #1, 3, and 4, training
required a mean of 10.6 days, and ranged from 8 to 12 days. These figures include each daily training session from the first day of overcorrection training to the first day of the 1 mo follow-up phase. These figures do not include the data for Subject #2 since this child was not successfully toilet trained at home or in the school.

Regarding the amount of time that was required to instruct the subject's parents in the correct use of the overcorrection procedure, training required a mean of 3 training sessions, or a total of 1.5 hrs for each parent.

Parent reaction. Before training, a few of the parents expressed disbelief that their "retarded" child could be toilet trained after so many previous unsuccessful attempts to bring their child's incontinent behavior under control. After watching their child gain more control over his toileting behavior, many of the parents expressed extreme satisfaction and surprise at how well the child was progressing. The parents of Subjects #1 and 3 expressed a strong desire to administer the same toilet training procedure for their other children when they become old enough to receive such training. One of the parents, who was of a low socioeconomic status, commented that for the first time she felt as though she had really accomplished something of noteworthy importance with her child.

Child reaction. The overall reaction of the four children toward the overcorrection training can best be described as "annoyed." Initially, all the children expressed a great
deal of surprise that all of a sudden consequences were being administered for having an accident. Two of the children, Subjects #2 and #4, physically resisted attempts by the parents to apply the overcorrection training. When this would happen, the parent was trained in the use of manual guidance. After the first few trials of the overcorrection training, manual guidance was gradually eliminated for both subjects.

Nocturnal enuresis. Although the overcorrection training implemented in this study was administered only for daytime incontinence, the parents of Subject #3 reported an almost complete absence of nighttime wetting as well as daytime wetting. Unfortunately, accurate records were not kept regarding the frequency of nighttime wetting for the four subjects, and therefore this informal observation is purely anecdotal. Whether or not generalization had occurred as a result of training is still an empirical question.

Discussion

The results of this study showed that the training procedure was effective in eliminating daytime incontinence in three of the four subjects who participated in this study. Training was relatively rapid, requiring a mean of 10.6 days of treatment for each of the three subjects who were successfully toilet trained.

As the results suggest, the toilet training procedure was not effective for Subject #2 (Bradley). After 20 days of training in the home, overcorrection was administered in the classroom setting as well. This training was implemented
with the hope that the additional training at school might be more effective in bringing about the complete cessation of accidents in both the home and at school. Had accidents been eliminated at school following the overcorrection training in the subject's classroom, this result would have suggested that training at home may have been incorrectly or inconsistently administered. Unfortunately, the additional training implemented at school was not effective in eliminating toileting accidents.

Informal questioning of Bradley's parents by the experimenter revealed that the overcorrection training at home was not being applied in a consistent fashion. Bradley's mother reported there were times when she was busy with household chores and thus was unable to administer the overcorrection when needed.

Informal self-report measures from Bradley's teacher also suggested that the training procedure was not being administered consistently in the school setting as well. Therefore, the results from the questioning of the teacher and parent suggest that the ineffectiveness of the treatment procedure for this subject may have been due to its inconsistent application.

The major goal of this study was to teach the subjects to completely and appropriately toilet themselves on an independent basis, i.e., without any external prompting. Self-report measures from the parents of Subjects #1, #3, and #4 revealed that these subjects were self-initiating to a much
greater extent than before training had been implemented. Accurate data collection for self-initiated behavior was extremely hard to accumulate. The reason for this was because the parents reported they were not always able to observe each incident in which the child would independently toilet himself. However, the parental self-report measures, as well as the data regarding the absence of accidents following treatment (Figure 3), lend support for the conclusion that an increased frequency of self-initiations had occurred as a result of the training which the subject had received.

Unfortunately, a direct comparison between the present study and previous studies on the control of enuresis cannot be made due to the subject population that was utilized in this study. As the reader will recall, all subjects who participated in the training program were considered irregular enuretics (Yates, 1970). Previous studies concerned with toilet training have included a mixture of both regular and irregular enuretic children. Since the present study included only one particular subgroup of enuretics, a direct comparison with previous studies with respect to the cost-effectiveness of the toilet training procedure cannot be performed.

In keeping with the issue of subject population, the question of whether or not the results of this study can be generalized to an entirely different population of children is certainly an important one. The subjects utilized in this study were developmentally disabled children whose ages ranged from 3.5 to 8 years. Whether the procedure described
in this study would be effective in eliminating incontinence in developmentally disabled adults is, of course, a question that remains unanswered.

Other questions to be asked might include: Can incontinent behavior be eliminated, using the procedure described in this paper, in developmentally disabled persons who do not already have the component behaviors necessary for self-initiation (e.g., regular enuretics)? Can the overcorrection procedure be just as effective for eliminating incontinence in persons who are not developmentally disabled, that is, persons who are of normal intellectual and adaptive functioning? A further question which might be asked concerns the efficacy of using the overcorrection procedure to reduce nighttime incontinence. Although the elimination of nighttime wetting occurred for one of the subjects in this study, response generalization across all of the subjects did not occur. These questions are empirical questions that can only be answered by using a variety of subject populations, along with appropriate experimental designs.

The treatment procedure described in this study was relatively easy to administer. This was demonstrated by the fact that the parents of the four subjects served as the trainers. As was mentioned earlier, training the parents in the use of the overcorrection procedure was carried out by written and verbal instructions, modeling, and immediate feedback.
The toilet training procedure described by Azrin and Foxx (1971; 1973) used a urine sensing apparatus as part of a total treatment package. The present study, in an attempt to reduce the cost of purchasing such an item, eliminated the use of the urine sensing apparatus, as was done in the toilet training procedure reported by Williams and Sloop (1978). The elimination of this component apparently did not jeopardize the effectiveness of the method used.

The results of the present training procedure suggest that a shortened version of the Foxx-Azrin toilet training program can be successful when training developmentally disabled persons considered to be irregular enuretics. Although the total time required to train the subjects was nearly twice as long as reported in the Foxx and Azrin (1973) study, the elimination of many of the components of the Foxx-Azrin procedure should prove to be much less aversive for parents, institutional staff, etc., who are involved in programs directed at toilet training incontinent individuals.
References


APPENDIX

A. Copy of instructions to the teachers.
B. Example of the data sheet for frequency of accidents.
C. Explanation to the parents for the use of the diaper pail.
D. Parental consent form.
APPENDIX A

Experimenter's Instructions to the Teachers

At the conclusion of having lunch with a group of teachers from the school where the subjects were to be chosen for toilet training purposes, the experimenter made the following announcement: "I am a graduate student in psychology at the University of the Pacific, and I am presently conducting a training program for developmentally disabled children who are currently displaying a need to be toilet trained. The training program will last for approximately 2 months or less, depending on the condition of each child. The training will take place in the child's home and, if needed, will be continued in the classroom setting as well. If you know of any children who may need this training, I would appreciate it if you could provide me with a list of names and home phone numbers of the children you have selected as potential candidates for training. I will then contact the parents of the children you have selected to see if they are interested in having their children obtain this training."
APPENDIX B

Data Sheet for Daytime Accidents

KEY:  D = dry  
      W = wet

Month of __________________

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Time
APPENDIX C

Explanation to the Parents for the Use of the Diaper Pail

The following explanation was given verbally to each of the parents regarding the use of the diaper pail for data collection purposes: "In working with many other families in the past, I have noticed that the accurate recording of the number of wet pants has often become more difficult than one would tend to think. The result of inaccurate recording is usually the product of finding oneself involved in various household chores, being with friends, etc. Thus, it becomes quite easy to unintentionally forget to record the data or inadvertently miscount the number of wet pants. Therefore, I would appreciate it if you would use the diaper pail for more accurate recording measures."
APPENDIX D

Parental Consent Form

Dear Parents:

Before deciding whether or not you would like to have your child participate in this toilet training program, I would appreciate it if you would take a few minutes to read a brief description of the program as it is discussed below.

The major component of this training program will require you (the parents) to take on a number of responsibilities each time your child has a toileting accident. You will be responsible for requiring your child to: (1) clean up all traces of the accident, (2) take off the wet pants and put on clean ones, and (3) dispose of the wet pants in a diaper pail.

After these three steps have been completed, your child will then be asked to: (1) walk to the toilet and (2) lower the pants, sit down, arise, raise the pants, and return to the location where the accident occurred. The above two steps must be completed 10 times in rapid succession.

When the above mentioned steps have been completed, it will be important for you to record the occurrence of the accident on a specially prepared data sheet provided for this purpose.

I will be occasionally stopping by the home to collect the information you have recorded on the data sheet. There will be days in which I will be unable to collect this information and therefore, I will be asking another individual, who also attends school at UOP, to stop by your home in order to collect this information for me.

I look forward to the possibility of working with you and your child in the near future. In the event that you should have any further questions regarding your child's participation, please feel free to contact me at UOP (946-2132) or at home (465-1380).

Please notice that attached to this letter is a consent form asking for your permission to have your child participate in this study.

Sincerely,

Barry C. Barmann

[Signature]

I give my permission to have my child, ___________________________, participate in the toilet training program described above.

[Signature]