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A RAPID METHOD OF TOILET TRAINING THE INSTITUTIONALIZED RETARDED[1]

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Incontinence is a major unsolved problem in the institutional care of the profoundly retarded. A reinforcement and social analysis of incontinence was used to develop a procedure that would rapidly toilet train retardates and motivate them to remain continent during the day in their ward setting. Nine profoundly retarded adults were given intensive training (median of four days per patient), the distinctive features of which were artificially increasing the frequency of urinations, positive reinforcement of correct toileting but a delay for "accidents", use of new automatic apparatus for signalling elimination, shaping of independent toileting, cleanliness training, and staff reinforcement procedures. Incontinence was reduced immediately by about 90% and eventually decreased to near-zero. These results indicate the present procedure is an effective, rapid, enduring, and administratively feasible solution to the problem of incontinence of the institutionalized retarded.

Institutionalized patients, especially the profoundly retarded, often urinate and defecate in their clothing during the day. Several studies (Azrin, Bugle, and O'Brien, in press; Baumeister and Klosowski, 1965; Bensberg, Colwell, and Cassell, 1965; Dayan, 1964; Giles and Wolf, 1966; Hundziak, Maurer, and Watson, 1965; Kimbrell, Luckey, Barbuto, and Love, 1967; Van Wagenen, Meyerson, Kerr, and Mahoney, 1969) have reported some degree of success in reducing this daytime incontinence with institutionalized retardates or mental patients (Wagner and Paul, 1970) by using reinforcement principles. Several of these efforts have been primarily concerned with "habit training", *i.e.*, successful elimination in the toilet bowl when the retardate is placed there at regularly and frequently scheduled intervals (Dayan, 1964; Baumeister and Klosowski, 1965; Hundziak *et al.*, 1965; Kimbrell *et al.*, 1967). Attempts have been made to train normal independent toileting (Bensgerg *et al.*, 1965; Giles and Wolf, 1966; Van Wagenen *et al.*, 1969) but quantitative data regarding the enduring success of these attempts have not been given. In all of these studies, the post-training data were either absent or too incomplete to determine the degree of the continence that endured after the training, as was also concluded by Rentfrow and Rentfrow (1969) in a recent review. At present, no procedure of established effectiveness is available for producing and maintaining normal independent toileting by institutionalized retardates.

The overall rationale used in the present effort was that normal toileting is not simply a matter of learning to respond to bladder and bowel pressures by relaxing the spincter but rather is a complex operant and social learning process that has been hindered by a reduced learning capacity and by institutionalization. In line with this rationale, a general procedure was developed in which positive reinforcement was given for appropriate elimination and inhibitory training for untidiness (see also Van Wagenen *et al.*, 1969; Giles and Wolf, 1966). Urine-sensing apparatuses were

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used to provide feedback to the trainer such that he could then deliver the reinforcers or inhibitors immediately after the eliminatory response (see also Mowrer and Mowrer, 1938; Van Wagenen and Murdock, 1966; Watson, 1968; Van Wagenen *et al.*, 1969; Azrin *et al.*, in press). The operant level of urination (Van Wegenen *et al.*, 1969) or defecation (see Giles and Wolf, 1966) was increased to provide more responses that could be reinforced, rather than dealing with the low frequency of elimination. Generalization of the effect of training was enhanced by conducting the training on the patient's own ward (see Giles and Wolf, 1966). Dressing and undressing skills and unprompted approach to the toilet were taught as part of training (see Giles and Wolf, 1966; Van Wegenen *et al*, 1969). These procedures were modified and developed in this study for the intended effect of rapidity and completeness of continence. In addition, administrative procedures were arranged for assuring the continued social concern of the ward staff so that the effects of the training would endure.

METHOD

Subjects

Nine male incontinent and profoundly retarded residents were selected from a hospital ward; the other residents of that ward were either continent, totally blind, or non-ambulatory. The nine had a mean age of 43 yr and a range of 20 to 62 yr. Their mean number of years of hospitalization was 21 and ranged from 6 to 45 yr. All but one had an IQ less than 30; the median was 14 with a range of 7 to 45. Several had major physical and medical problems, *e.g.*, two had paralysis of one arm and one was partially blind. Speech was minimal for three residents and absent for five; one was echolalaic. All had limited receptive speech but could follow simple directions. Virtually no interaction was observed between residents on the ward of either a positive or negative nature. The residents were regularly toileted as part of the ward routine after each meal. Despite these regularly scheduled periods, incontinence remained the major ward problem. Habit training procedures had been used previously with these residents but had not produced bladder and bowel control or independent toileting.

Experimental Design

A three-day baseline measure of incontinence was obtained for each resident, after which the nine residents were randomly assigned to a treatment or control group, the two groups being matched on the basis of the average number of accidents for the group. The experimental group of four residents was trained as a group. When the last experimental resident completed training, after 12 days, training began for the control group ($N = 5$). Four of the five residents in the control group began training as a group, the fifth being added as soon as one of the four completed training. As each of the nine residents completed training, they were placed on the post-training maintenance program. The matching of groups permitted a standard between-groups statistical evaluation of the effects of toilet training. The later training of the control group permitted a within-subject evaluation for all residents by comparing the pre- and post-training accidents for each of the nine.

Recording

All previous reports of incontinence have based the accident data on the retrospective verbal reports or uncorroborated written reports of parents or attendants who presumably recorded accidents on an unknown basis of selective attention at different times. In the present study, the resident was observed every hour for 8 hr each day and a written record taken at that moment by an assigned observer as to whether the pants were wet or soiled. The recording procedure was kept constant for the three-day period preceding training and the first 12 days after training for each resident. Any accidents observed between the hourly checks were also recorded. When pants were wet or soiled, they were changed immediately so that successive observations of wet pants did reflect repeated wettings. Twelve days after the last resident was trained, the recording procedure was changed to be more compatible with the continence maintenance procedures described below. The residents were individually observed six times per day at roughly 2.5-hr intervals by an assigned observer. Corroboration of the records was conducted through several methods. Reliability was assessed on the third day of the baseline

period and twice during the 12-day post-training period by having the trainer and a ward staff member concurrently observe the residents with each observer unaware of the other's records; perfect agreement was obtained. The ward supervisors regularly observed the residents during the maintenance period, especially at the designated observation hours and indicated in writing their confirmation or disagreement with the data recorded. Virtually all such reports were in agreement. Intermittent observations by the trainer on the ward corroborated the occurrence of the supervisory as well as the regular observations. The record sheets were located in the supervisor's office and changed each day to discourage retrospective or unsupervised recording.

Table 1 is a listing of the various steps of the toilet training procedure.

Table 1

Outline of the Toilet Training Procedure

I. When No Accidents Occur
   1) Resident seated in chair when not seated on toilet bowl
   2) Resident drinks fluids every half-hour
   3) Scheduled toileting of resident every half-hour
   4) Resident given edible and social reinforcer every 5 min while dry
   5) Shaping of undressing and dressing during toileting
   6) Resident given edible and social reinforcer following elimination in toilet bowl and returned to chair.

II. When Accidents Occur
   1) Trainer disconnects pants alarm
   2) Trainer obtains resident's attention
   3) Resident walks to laundry area to obtain fresh clothing
   4) Resident undresses himself
   5) Resident walks to nearby shower, receives shower, and dresses himself
   6) Resident obtains mop or cloth and cleans soiled area on chair or floor
   7) Resident handwashes soiled pants, wrings pants out, and hangs pants up to dry
   8) Trainer removes resident's chair from use
   9) 1-hour timeout procedures:
      a) no edibles or social reinforcers every 5 min;
      b) no fluids every 30 min;
      c) chair not available;
      d) continue 30-min scheduled toilet periods.

Apparatus

Two apparatuses were employed during the toilet training phase. The first, the "pants-alarm" apparatus illustrated in Fig. 1, is described in detail in the report by Azrin *et al.* (in press). Briefly, that apparatus consisted of a moisture-sensitive pair of shorts that sounded a signal when the resident urinated or defecated in the shorts. A wire connected the sensors in the shorts to a small circuit box worn on a belt under the resident's shirt. The circuit box sounded a bleep-tone whenever the residents urinated or defecated in the shorts as the moisture completed a low voltage circuit that was far below the threshold of feeling.

The second apparatus detected appropriate toileting and was a slight modification of the "toilet-chair" apparatus described in Azrin *et al.* (in press). The present apparatus (shown in Fig. 2) was a plastic bowl that was inserted in the ward toilet bowls. The malleability of the plastic allowed the plastic bowl to fit the contour of the ward toilet bowl and allowed the hinged toilet seat to rest normally over the toilet bowl. The plastic bowls were commercially available in a variety of sizes; a size was selected that matched closely the interior dimensions of the ward toilet bowl. The plastic bowl was heat-formed to provide a slight depression at the center in which were fastened

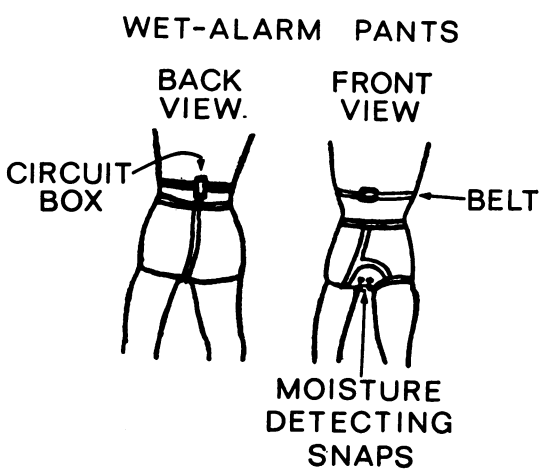

Fig. 1. The wet alarm pants are shown as viewed from the back and front of the wearer. The moisture detecting snaps seen in the front view were two clothing snaps fastened to ordinary men's briefs. Two flexible wires are shown (back view) leading from the snaps to the circuit box. The snaps on the end of the wire were manually removable from the snaps on the clothing. The circuit box was worn on a belt (back view) which was worn "high" on the abdomen. Normal trousers were worn over the special training pants. A tone is sounded by the circuit box when urine or feces moistens the area between the clothing snaps.

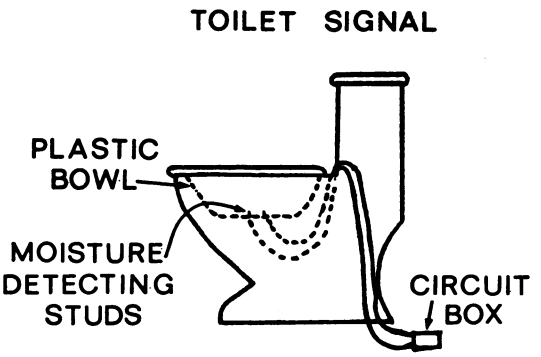

Fig. 2. The toilet signal arrangement is shown from a side view. The malleable plastic bowl fits into the normal toilet bowl and rests on its top edge. The water level (not shown) of the stool must be below the plastic bowl to avoid shorting of the moisture detecting studs on the bottom of the plastic bowl which are designed to be shorted by urine or feces. The dotted lines are the detachable wires that connect the studs to the circuit box which can rest on the floor. The circuit box sounds a tone when moisture shorts the two studs.

two metal sensing screws about 1 in. (2.5 cm) apart. Urine or feces in the bowl caused an electrical signal to pass between the metal sensors. Wires connected these metal sensors to the signal circuit box, which was identical to that described in the report by Azrin *et al.* (in press), and which sounded a signal to the trainer.[2]

Immediacy of detection of elimination. Reinforcement is known to be most effective when given immediately and for every response. The two automatic devices made this immediacy possible by signalling all instances of elimination be they appropriate or inappropriate. The trainer was not forced to watch a resident continuously to the exclusion of other activities. The apparatus allowed fairly immediate consequences while still permitting the trainer: (1) to train several residents at once, (2) to leave the toilet facility briefly as when showering one resident, and still be able to return quickly, (3) to teach the residents responses related to toilet training without having to check the pants of other individuals, and (4) to eliminate looking between the legs of a resident, sitting on the toilet, to determine if he was voiding (see Watson, 1968).

[2]We have been informed by Lehigh Valley Electronics Inc. that they can supply both of the apparatuses described here at an individual cost of about $40. Address: Box 125, Fogelsville, Pa. 18051.

Preventing behaviors incompatible with toileting. Failure of a resident to go to the ward toilet could be caused by the inconvenience of interrupting other behaviors such as sitting in a preferred chair (see Baumeister and Klosowki, 1965). In order to prevent such behavioral incompatibility, the resident was required to remain in the ward toilet area during the entire 8-hr training session. To reduce further the effort required in toileting, the residents were seated within one meter of the toilet bowls. Residents remained in the toilet during the entire daily session of about 8 hr except when they ate their lunch at a table just outside the toilet. The area around the toilet was visually partitioned off to reduce still further any competing reinforcers arising from distractions by other residents. Since sitting in the chair could be considered as still somewhat incompatible with approach to the toilet bowls, this source of incompatibility was also eliminated for 1 hr when a resident had an accident by removing the chair.

Increasing the frequency of urinations. Urination or defecation is a low frequency behavior under normal circumstances even for incontinent individuals. Consequently, few reinforcers for correct toileting can be given during a day. To solve this problem, the procedure increased greatly the operant level of urinating by giving each resident as large a volume of fluids (coffee, tea, or water) to drink each half hour as he would consume. Raising the frequency of urinations would provide more frequent opportunities each day to reinforce correct toileting and to react negatively to incorrect toileting.

Stimulus control of elimination response. On the very first day of training, the procedure attempted to habit train the residents, *i.e.*, to have elimination occur shortly after the resident sat on the toilet bowl. This stimulus control was attempted by physically arranging for almost all urinations to be associated with the act of sitting on the bowl. The residents were required to sit on the toilet every half hour and to remain there for 20 min or until an appropriate elimination was signalled by the toilet alarm, whichever occurred first. Elimination should, therefore, become associthe next toileting. If a prompt was not effective, the more directive prompts were given successively within a few seconds of each other until one was effective. This dressing instruc-

ated with the toilet stimuli, and because of the reinforcement of appropriate elimination there, the resident should start to eliminate immediately upon sitting upon the toilet. Immediate elimination upon being seated on the bowl, accompanied by no "accidents" when not seated, would indicate that simple habit training had been achieved.

Positive reinforcement of correct toileting. To increase the probability of toileting in the bowl, many probable reinforcers were given at the time of correct toileting and as long as the resident remained dry. When an appropriate urination was signalled by the toilet bowl apparatus, the resident was given a large piece of a candy bar, hugged, and praised. To provide reinforcement for remaining dry, the residents were given edibles consisting of sugar-frosted cereal and M & M candies and simultaneously praised for having dry pants every 5 min for as long as they remained dry. The social reinforcement by verbal praise was made as continuous as the trainer's time schedule permitted within these 5-min intervals. Another source of reinforcement for being dry was the drink that was given every half-hour for the purpose of raising the operant level of urinations as described above.

Dressing skills. One of the essential responses in the chain of events involved in independent toileting is the act of pulling the pants down before eliminating and pulling them up again after eliminating. Since several of the residents had been described by the ward staff as unable to dress themselves, this inability would be expected to prevent independent toileting. The general procedure, therefore, included a provision for teaching this skill. When the resident approached the toilet bowl, the trainer used the minimal prompt that was effective in causing the resident to undress, beginning with no prompt at all, then pointing at the pants, then verbal instruction, touching the pants, placing the resident's hands on his pants, and lastly, guiding the resident's hands, if necessary, through the entire act. The same fading of prompts was given for pulling the pants up and for flushing the toilet bowl after elimination. When a prompt was effective, the trainer used the next less directive prompt on tion was given at each half-hour scheduled toileting, as well as at any self-initiated toilet-ings. Social approval and edibles were given, as necessary, for completion of the individual steps in the dressing sequence but were discontinued once the total sequence was established and was followed by correct elimination in the bowl.

Independent toilet approach (self-initiation of toileting). For long-term institutionalized residents, toilet-approach has often been initiated by external prompting stimuli. Attendants often instructed, accompanied, led, or physically seated the resident on the toilet seat. To eliminate the dependence on the prompting stimuli, the trainer deliberately used the minimal social prompt that was effective and progressively reduced these prompts on successive trials until none were given. If necessary, the trainer actively "molded" the resident's limbs through the desired act and verbally instructed him to perform that act. This direct verbal and/or physical guidance was then reduced to a touch, then to a hand motion, then a faint head or finger motion, then nothing. The fading of prompts was begun from the start of training. If the resident did not respond to a mild prompt, a more visible prompt was given within a few seconds, and if necessary a still stronger one, up to the last step of physical and verbal guidance until he was seated. Once the social prompts were minimal or absent, the proprioceptive stimuli, the negative consequences of soiling, and the positive reinforcement for toileting should become the exclusive sources of control. When the resident approached the toilet for the first time without a prompt and toileted himself, all further prompts were discontinued even though the fading process had been only partially completed up to that time. To reduce further inadvertent social prompts once the fading was complete, the trainer discontinued the edibles and social approval that he had been giving every 5 min that the resident was dry. The trainer continued to bestow the edible and social approval when the resident eliminated correctly in the toilet bowl. The anticipation of positive reinforcement and the avoidance of disapproval would become the basis for approaching the toilet bowl.

Modelling. Training could be expected to be more rapid if imitative learning could be used in addition to the shaping. If the residents were sensitive to the actions of others, they could be expected to learn faster by watching the other residents toilet correctly. This modelling influence was arranged by de-

liberately training several residents at one time so they could observe each other. To maximize interpatient observation, the chairs of the residents were placed close together in close proximity to the toilet bowls so there was ample opportunity for residents to view other residents moving toward, or eliminating in, the toilet and receiving reinforcement.

Inhibitions of "accidents". Urinating in the pants was inhibited by verbal reprimands and by timeout from positive reinforcement. When the pants-alarm apparatus signalled an accident, the resident was bodily shaken to gain his attention and told not to wet his pants. The resident was then given the following cleanliness training. He was immediately taken to the nearby shower stall where he undressed and was given a tepid shower. Following the shower, the resident was required to change his clothes himself and to carry the soiled clothes to a sink, to completely immerse them in water, wring them out and hang them up to dry. Upon arriving back at the toilet, the resident was required to mop up the floor or wipe from his chair any traces of his soiling. For the residents that were reluctant to perform these activities, the trainer manually guided the residents arms and hands through the proper motions and faded out this manual guidance as the resident began to cooperate. For 1 hr following the accident, a timeout period was in effect during which the resident received none of the drinks, no edibles, no social reinforcement, and a delay of the regularly scheduled portion of the lunch.

Post-Training Maintenance Procedure

In accordance with the present conception of proper toileting as socially motivated, the benefits of toilet training were not expected to endure after training unless the ward staff was sufficiently concerned to continue to encourage proper toileting and to discourage accidents. For administrative considerations, such a maintenance procedure ideally should be easily conducted, require only one attendant, require little time, be meaningful to the residents and be capable of supervision by the ward supervisors without any special staffing.

Table 2 is an outline of the procedures used during the post-training ward maintenance program. The procedure established six occasions when a resident would be inspected for incontinence: entrance to the dining room (three occasions), between-meal snack periods (two occasions) and bedtime (one occasion). At each inspection period, the attendant encouraged continence by praising the resident if he was dry, discouraging incontinence when he was wet by reprimanding him, requiring the cleanliness training (described above), and either delaying slightly the resident's entrance to the forthcoming meal or omitting the snack during snack periods.

Table 2

Post Training Ward Maintenance Procedure

I. General Procedure
  1) Advance assignment of one attendant for Toilet Responsibility each shift
  2) Snack period between breakfast and lunch and between lunch and dinner
  3) Residents pants inspected at mealtime, snacktime and bedtime (6 times daily)
  4) Attendant initials record sheet when residents checked; record sheet sent directly to supervisor
  5) Discontinued use of both apparatuses for detecting eliminations.

II. When Accidents Occur
  1) Cleanliness training whenever an accident was detected:
    a) Resident walks to laundry area to obtain fresh clothing
    b) Resident undresses himself
    c) Resident walks to nearby shower, receives shower and dresses himself
    d) Resident obtains mop or cloth and cleans soiled area on chair or floor
    e) Resident handwashes soiled pants, wrings pants out, and hangs pants up to dry
  2) Delay of meal for 1 hr if accident prior to meal
  3) Omission of snacks if accident prior to snack
  4) Attendant initials and records each accident

Minimal Maintenance — Starts Eight Weeks after Training
  1) Inspections only at mealtime and bedtime
  2) Cleanliness training given for accidents

Termination of Maintenance Procedure — When resident is continent for at least one month.
  1) No regular inspections for that patient
  2) Cleanliness training given for accidents when detected

To insure administrative feasibility and adequacy of supervision by the normal supervisory personnel, several procedures were instituted. Discussion with the ward supervising nurse, the ward treatment program director, and the nursing division director showed that all were concerned that the residents should remain continent. To translate this concern into action, toileting responsibility was as-

signed to a specific attendant each shift, a different attendant being assigned on different days. The assignments would be made a month in advance, by specific day, with an alternate attendant also scheduled should the assigned attendant be absent or indisposed. A daily predated record sheet was designed on which the attendant responsible for the six inspections would sign his name each time an inspection was made. To insure adequacy of supervision by the concerned treatment supervisors, this sheet was then checked by the ward supervising nurse who then initialled it, thereby signifying her assurance that all inspections had been completed by the attendant specified for that shift. She in turn routed the check sheet to the ward treatment director who also initialled it and in turn routed it to the nursing division director. The nursing division director returned the sheets with written comments which were then discussed by the ward supervisor during the weekly staff meetings where all attendants were normally present.

A second record sheet to record the specifics of the residents accidents was placed in the ward clothing room. The attendant noted on this record the resident's name, time found wet, whether cleanliness training was given, and whether a meal was delayed, or a snack missed. The attendant who was assigned the toileting responsibility was to record any accidents during his shift, even those brought to his attention by another attendant.

One month after training, a minimal maintenance procedure was instituted during which the procedure was simplified by omitting the two extra between-meal snacks and the between-meal inspection periods. Only the mealtime and bedtime inspections were held.

When four weeks had elapsed without a single accident for a given resident, the program was discontinued for that resident. He was no longer inspected at the regular inspection periods; cleanliness training was continued, however, should an accident occur.

RESULTS

All accidents throughout the day had been recorded. Only the accidents recorded within the 8-hr period from 8:00 A.M. to 4:00 P.M. are included in the data presentation, however, because maximum supervision of the recording procedure occurred at that time and because the baseline records included only that period of time.

Reduction of incontinence. Figure 3 shows the number of accidents before and after training for all nine residents. Before training, the residents averaged about two accidents per 8-hr day per patient. After training, the number of accidents decreased to about one accident every fourth day per resident. The decrease was immediate and endured for the entire follow-up period. By the fifth month after training, accidents were virtually absent.

A one-tailed t test was used to compare the accidents during the 12-day post-training period of the treatment group with the comparable no-training period of the control group, based on the difference from the baseline period. The number of accidents was significantly lower for the treatment group ($t = 3.93$, $df = 7$, $P < 0.001$). The mean number of accidents per resident changed from 2.1 to 0.2 for the treatment group and from 1.9 to 2.3 for the control group.

Examination of the records for each resident revealed that before training, the most incontinent resident averaged four accidents per day, whereas the least incontinent resident averaged one every three days. For each of the nine residents the number of accidents was reduced by 80% or more during the first 12 days after training. Two residents accounted for almost all accidents one month after training.

A within-subject comparison of the pre- and post-training accidents of all nine residents by the Wilcoxin Matched-Pairs Signed-Ranks Test (Siegel, 1956) showed a significant ($P < 0.01$) reduction of accidents for each week of the post-training period.

Although the majority of accidents were urinations, defecation was also affected by training. Prior to training, an average of 2.0 pants defecations (soilings) occurred per day for the nine residents combined. During the first seven weeks of the post-training period, they averaged 0.1 soilings, a reduction of over 90%.

Results during training. Training required a median of four days and a mean of six days, and ranged from 1 to 14 days. These figures include all daily training sessions from habit training through the last day of independent toileting training.

An average of 25 cups of fluid were consumed per resident per day of training. Dur-

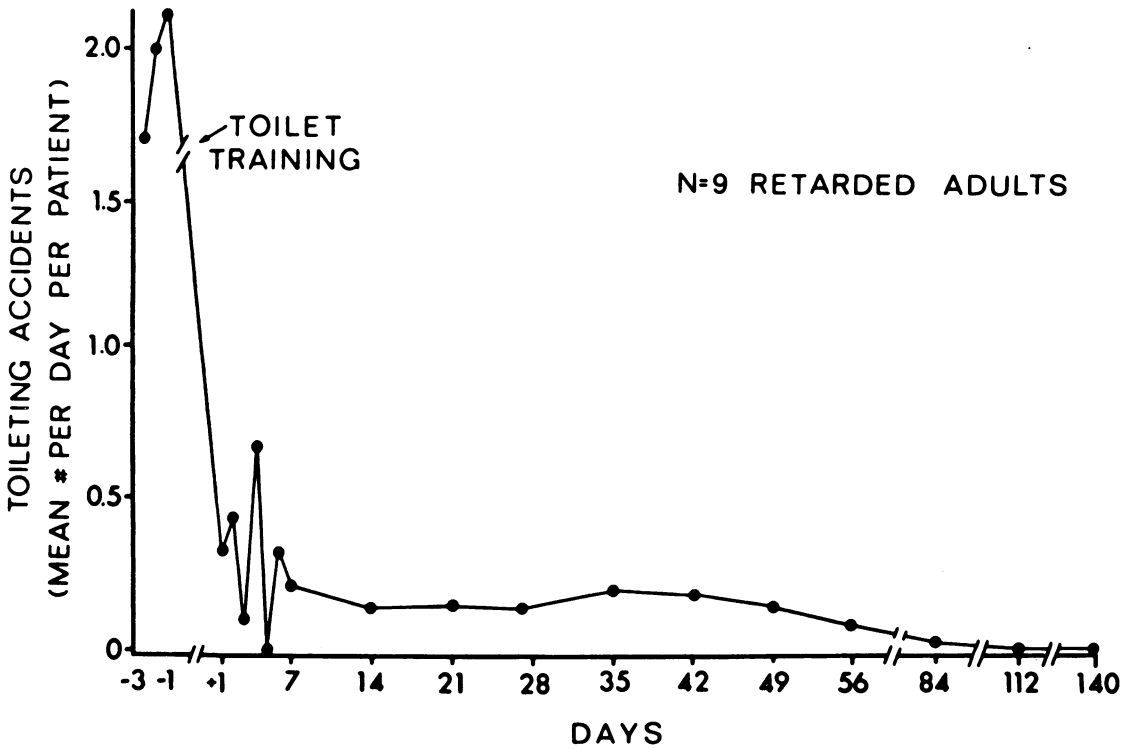

Fig. 3. The effect of the toilet training procedure on the frequency of accidents. The accidents include defecations as well as urinations in the clothing. The subjects were nine adult profoundly retarded residents. The toilet training period is shown as an interruption in the curve. The three data points before the toilet training show the three-day baseline period before training. The abscissa is labelled in terms of the number of days elapsing after training was terminated. Data points are given for each of the three days prior, and seven days subsequent, to the toilet training period. Thereafter, each data point is the average number of accidents per day for a seven-day period.

ing the training the residents averaged 15 urinations per day and one bowel movement every third day per resident.

Five of the nine residents seemed to possess voluntary control over their bladders and bowels (were under the stimulus control of the toilet) at the very start of training. This voluntary bladder control was indicated by: (1) no accidents in the pants during the entire first day, (2) almost immediate elimination upon sitting on the toilet if elimination occurred at all, and (3) external signs that the resident was straining to eliminate in the toilet. Each of the other four remaining residents had at least two accidents in their pants, and consistently remained on the toilet seat for extended periods without eliminating. Training of voluntary control, as evidenced by fairly immediate elimination upon sitting on the toilet seat, was accomplished for all residents within three days.

The existence of voluntary control over elimination did not assure independent toileting. For example, three of the residents who exhibited some voluntary control on the very first day of training required about nine additional days before they consistently and independently toileted themselves without accidents.

Apparatus usage and scheduling. The trainer was able to train four residents simultaneously (but three residents at a time were a more comfortable number with which to work). The number of available toilet bowls was not as critical, since a bowl was rarely indisposed for very long. Since three bowls were available for the four residents, the toileting periods were scheduled in a staggered time sequence. Four pants-alarm apparatuses and three toilet-bowl-alarm apparatuses were used. Both apparatuses were highly reliable, as initial "bugs" in the apparatus had been worked out in an earlier study (Azrin *et al.*, in press). A false positive occurred (alarm

sounded when no wetting had occurred) on the first day of training because of excessive perspiration; this problem was solved by placing a small piece of adhesive tape over the back of the snaps. The tape remained in place throughout the training study, even through repeated laundering of the briefs.

Reliable operation of the toilet-alarm apparatus required only that the bowls were emptied and the moisture-detecting studs wiped dry after each usage during training. As noted previously, neither apparatus was used after training.

Ward staff and patient reaction. Many of the ward staff were pessimistic about the likelihood of success of the proposed program, probably because of their experience with other types of efforts. After observing the residents mopping up their own accidents, and independently initiating toileting for the first time, the majority of the ward staff volunteered statements of satisfaction. The staff began asking the trainer for recommendations for treatment programs unrelated to toilet training for other ward residents. The dramatic reduction (about 90%) in incontinence following the training has been commented on favorably by the majority of the ward staff and all the supervisors.

Patient reaction. The question was raised by several ward staff members as to how the residents would react to the 8 hr per day intensive training sessions. This question could not be answered by the nonverbal residents, but the staff consensus was that almost all behavioral signs showed the program in almost every case to be a very pleasant attention-getting experience. During the training, the residents obtained an unusually higher density of positive reinforcement in the form of both food, drinks, verbal praise, hugs, and attention. Most residents would not leave the toilet at the end of the daily training sessions even when asked to leave. Two of the residents who had completed training and were in the ward maintenance program repeatedly attempted to reenter the training area even though the toilet area was partitioned off from the rest of the ward. At no time did any of the residents physically aggress toward the trainer. Only two residents attempted to leave the toilet, and then only during some of the time-out periods.

One of these residents seemed to be deliberately resisting any attempt to make him continent, even though he had an excellent voluntary bladder control. He was both the major incontinence problem on the ward and also the highest functioning of the residents (estimated IQ-45). The trainer was required to give an unusually large amount of manual guidance, attention, and encouragement to this resident who occupied more training time than any other resident.

Transition from training to maintenance. The proper conduct of the maintenance procedure was facilitated by having the trainer teach the ward staff. During the first two days, the trainer directly assisted the staff. During succeeding days, the trainer observed the inspection periods and answered many questions about the maintenance procedures, such as when and how to inspect the resident, division of staff responsibility, method of changing resident, *etc.* After this training of the staff, no administrative problem existed in having the staff spend the small amount of time needed to inspect the resident and to have the residents change and clean themselves when necessary, especially since so few accidents were now occurring.

Six weeks after training, five residents were discontinued from the Ward Maintenance Program since they had not had an accident for over four weeks. Nine weeks after training, two more residents were discontinued from the maintenance program. The Ward Maintenance Program was dropped in the middle of the fifth month after the two remaining residents were continent for four weeks.

The ward attendant in charge of the clothing room reported that since completion of training the number of pants sent to the hospital laundry each week had been reduced by over 40%.

Night time incontinence. No training regarding night time incontinence had been given. Yet, several reports were made by the night shift that the residents involved in toilet training were getting up at night to eliminate. This result, although not a general occurrence, indicated that some degree of generalization had occurred as a result of training.

DISCUSSION

The results showed that the present procedure virtually eliminated daytime incon-

tinence in all residents. Training was rapid, requiring only a few days (median of four days) for each resident. The reduction endured indefinitely and required little staff time to maintain. Bowel incontinence was reduced to the same extent as bladder incontinence with no need for a differential training procedure. Continence was achieved even for individual retardates with IQs as low as 7, extreme physical disabilities, as much as 45 yr of institutional incontinence, deliberate refusal to be continent, no language, as old as 62 yr of age, locomotor and manipulative disabilities, and no indication of other self-help skills. The special training apparatuses required were of low cost and reliable. The training procedure was not unpleasant to the residents or to the staff; the maintenance procedure for insuring continued continence was easily performed by the ward staff. This latter consideration of hospital feasibility probably ranks in importance with the effectiveness of the procedure as a determinant of the practical value of the program for institutions.

The reduction of incontinence seems to have resulted from the training procedure and not from other factors. The experimental design used both a within-subjects and a between-groups comparison. The within-subjects comparison assured that the effect could not have resulted from chance assignment of spontaneously continent residents to a treatment group. The between-groups design provided a control for time or other events occurring in time, since the control group was remaining incontinent at the same time that the treatment group had become continent. Thus, staff expectations, resident expectations, the inspection periods, the renewed concern regarding continence, the presence of the trainer, daily inspection of resident's clothing, resident's diet, *etc.*, were all held statistically comparable for the treatment and the no-treatment phases.

The distinctive feature of this training procedure was its consideration of proper toileting as a complex and lengthy chain of responses that includes social, physical, and physiological stimuli and requires strong positive and negative operant consequences for its maintenance in that chain, rather than considering it as a simple associative muscular reflex to internal stimuli. This analysis is in accord with the Ellis (1963) conception of toileting as an operant response that is susceptible to training by operant reinforcement that produces stimulus control by exteroceptive stimuli as well as bladder stimuli. Eliminating in a toilet bowl rather than on the floor or in one's clothing is a social convention that requires social consequences. Yet, the lack of concern by otherwise preoccupied attendants often results in an absence or delay of these social consequences. Consequently, the procedure assured that the concerned institutional treatment supervisors did have feedback about the attendant's behavior and could, thereby, communicate their concern to all attendants and encourage their participation. Also, the procedure was based on the rationale that independent toileting usually is not instigated by demanding bladder or bowel pressures, as suggested by the simple reflex-arc orientation, but rather by the negative results (shame, guilt) of having visibly soiled clothing. Consequently, the procedure established stronger-than-normal negative consequences such as cleanliness training, and the delay of meals. Similarly, during training, the signalling apparatus was used to obtain the trainer's immediate reaction to the act of elimination, not to provide feedback to the resident who was already aware that he had eliminated. Postulation of the importance of the environmental and social influences, rather than simply the bladder influences suggested that generalization of the toilet training to the resident's natural environment would be more effective if conducted in that very environment and by the very ward attendants normally present there. Recognition of continence as a lengthy operant chain of toilet behaviors suggested that intensive concern should be given to the resident's skill in dressing as a major contributing factor as well as to his unprompted approach behavior to the toilet and for the absence of competing reinforcers of inactivity. The overall objective was to teach and motivate the resident to toilet himself even when bladder pressures were minimal. Thus, the present rationale conceptualized continence as a complex operant reaction to social factors rather than as an associative reaction of a single muscle to internal stimuli.

The present training procedure offers a method of eliminating incontinence of severe and profound adult retardates. No effective alternative has been reported for the adult

retarded. The time necessary for training was much less (median of four days) than has been reported for training other types of populations. A training procedure for incontinent psychotics required about four weeks for a reduction of incontinence of about 50% (Wagner and Paul, 1970); a procedure for young retardates required a median of six weeks with generalization data to the institutional ward incomplete (Giles and Wolf, 1966); a procedure for outpatient retarded children has required a median of 12 days, but the follow-up data for the home situation was incomplete (Van Wagenen *et al.*, 1969). Several procedures have been reported for producing voluntary bladder or bowel control for young retardates but did not produce independent or unassisted toileting. A procedure for achieving this bladder training phase required about four weeks (Hundziak *et al.*, 1965), about nine weeks (Baumeister and Klosowski, 1965) and about 29 weeks (Kimbrell *et al.*, 1967). As compared with the alternatives, the present training procedure seemed to require far less time, reduces incontinence to a greater extent, leads to complete independent toileting, generalizes more to the resident's natural setting, and shows no regression during follow-up.

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