

*SHAPING SELF-INITIATED TOILETING IN INFANTS*

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We evaluated a method for training infants to cue their mothers on the need to eliminate. The program consisted of three phases: Phase I was directed at establishing a close temporal relationship between body signals (straining) and subsequent defecations on the potty; Phase II was designed to establish a relationship between prompted and unprompted potty reaching/grabbing responses and eliminations (defecations *and* urinations) on the potty; and Phase III served to establish unprompted potty reaching/grabbing responses as reliable precursors of eliminations. Four babies, between 3.1 and 6.6 months old, all completed the training before age 1 year, with no negative side effects.

DESCRIPTORS: infants, self-initiated toileting

Many baby books and surveys on child rearing practices in the United States and several European countries strongly suggest that systematic toilet training is generally ineffective and may lead to later emotional maladjustment unless it is started when the child is about 18 months of age or older (Brazelton, 1962; Largo & Stutzle, 1977; Newson & Newson, 1963; Salk, 1972; Sears, Maccoby, & Levin, 1957). On the other hand, there are a few cross-cultural reports and case studies indicating that infants can be trained to signal their needs at about age 1 year or earlier (Ball, 1971; Cederblad, 1970; deVries & deVries, 1977; Holtrop & Scherphuis, 1981). For example, Ball (1971) reported on an innovative approach of an American mother who trained her three children, two normal infants and a Down syndrome baby, to convey their needs (e.g., through fussing), and retain their stool until being placed on the potty. She succeeded in establishing bowel continence by 6 months for the normal babies and 16 months for the Down syndrome baby. Similar findings were reported by deVries and deVries (1977) on the toilet training

procedures of the East African Coastal Bantu (Digo) culture. These families usually establish night and day dryness when the child is 5 or 6 months of age. This is accomplished by a sensitive responsiveness to the infant's signs of straining (grimaces, grunts, cries). Gradually, the infants are also expected to communicate their needs by climbing to the appropriate elimination position (between the mothers' legs).

We evaluated a rather detailed procedure (lacking in the aforementioned reports) for teaching infants to cue their mothers on the need to eliminate, thereby establishing bowel and bladder continence before age 1 year. The major components of the program were modeled after those described by Ball (1971).

## METHOD

*Infants*

Three baby girls (two first-born and one third-born) and one baby boy (first-born) participated. Their ages at the beginning of the study were 3.1, 6.3, 6.6, and 5.4 months, respectively. All were healthy and usually presented body signals (see target behaviors) when about to have a bowel movement. For the boy and the youngest girl, the body signals were very evident and prolonged. For the other two infants, these signals were less evident, thus requiring intensive observation to be

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detected and responded to in time. The babies were fed by bottle or bottle and spoon.

#### *Parents and Research Assistants*

All parents were of lower-middle class. Their participation had been solicited through a pediatrician and one of the research assistants who informed them on the aims and characteristics of the study. The research assistants were three females who had extensive experience with babies. They guided the parents, usually the mothers, during each phase of the study to ensure reliable compliance with the instructions on training and data collection. Moreover, they participated in: (a) carrying out the training (about once a week), (b) performing reliability checks, and (c) gathering the data.

#### *Target Behaviors*

The target behaviors were: urination, defecation, body signals, and reaching/grabbing the potty. Urination and defecation were recorded as successes when occurring on the potty; otherwise, they were recorded as accidents. Body signals were defined as grimaces, flushed face, increased body unrest, or quieting, with or without other behaviors, such as looking at the potty or leaning toward it (without reaching it). Reaching/grabbing the potty was defined as reaching for and touching the potty, taking hold of it, or moving it toward himself or herself.

#### *Potty Training Program*

As a concession to the mothers' normal schedule of activities, it was accepted that on some days the program would be omitted or conducted incidentally. Days on which the mothers implemented the program for a total of 2 or more hours were considered training days.

The implementation of the program was preceded by a pretraining observation period. During these days, the mothers and research assistants recorded occurrences of body signals and accidents (bowel and bladder) and conducted reliability checks on these behaviors. Potty reaching/grabbing responses and defecations and urinations on the potty were not recorded (potties were not avail-

able during this period). Each time a body signal was observed, the adult undid and checked the diaper. Lacking these signals, the adult now and then felt the inside of the diaper or checked for odor. In case of doubt, the adult undressed the baby.

The training program included three phases. Phase I was directed at establishing a close temporal relationship between the emission of body signals and defecation on the potty (Chicco Anatomical Potty-Artsana 339). The potty was always within visual range (1–1.5 m) of the baby. The mothers and research assistants now also recorded the defecations and urinations on the potty. When observing body signals, the adult held or tapped the potty or, if this did not elicit the child's attention, called or touched him or her while holding or tapping the potty. In essence, the adult always made sure that the baby looked at the potty before placing him or her on it. If the baby eliminated (defecated or urinated) within about 3 minutes of being seated on the potty, the adult showed her pleasure and approval by caressing, singing, or presenting objects. Otherwise, she returned the infant immediately to the baby chair or play pen. Accidents were followed by impersonal changing of clothes. This phase was terminated when a baby had a minimum of 18 defecations on the potty and 8 out of 10 consecutive training days without bowel accidents.

Phase II was directed at establishing a relationship between reaching/grabbing the potty and eliminating (defecating *and* urinating) on it. All four target behaviors were now recorded. The potty was at about 30 cm from the child. Regardless of the position of the child (e.g., baby chair or play pen), the potty was always placed in front and a bit to his or her right. Once the child was more mobile, the position of the potty was sometimes changed; the distance, however, was kept the same.

Upon emitting body signals, the babies were guided to grab the potty before being placed on it. They were also placed on the potty when showing unprompted reaching/grabbing responses. In the absence of these behaviors (body signals, reaching/grabbing), the babies were prompted to grab

the potty and placed on it whenever they were expected to urinate (e.g., after a feeding or nap, or after a period of 30 to 65 min with no urinations).

The procedure for teaching the babies to reach/grab the potty was as follows: The adult called for the baby's attention and then waited a few seconds. If this did not result in the baby's reaching/grabbing the potty, minimal physical guidance was used. These prompts were gradually reduced until it was sufficient to simply call the infant's attention to the potty. This phase was terminated after 4–6 days in which the infants reached/grabbed the potty independently for more than 50% of the total toileting actions and the number of accidents (defecations and urinations) did not exceed 10% of these actions.

Phase III was an extension of Phase II. The body signals were no longer recorded (by the end of Phase II, these responses had dropped to zero or near zero levels). The babies were now wearing underpants, so accidents could be detected without intrusive checking. Moreover, the distance between baby and potty was increased. Depending on the child's mobility, his or her distance to the potty ranged from about 0.5–4 m.

The adults responded to the reaching/grabbing behavior. As in Phase II, they were also allowed to prompt the babies' attention to the potty when accidents were anticipated. Unlike Phase II, however, they were instructed to keep the number of daily prompts to a minimum. Phase III was terminated when on 15 out of 18 consecutive (training) days no accidents occurred, and: (a) no more than one reminder a day was given for using the potty, and (b) the overall percentage of reaching/grabbing responses followed by eliminations on the potty was 80 or more.

#### *Interobserver Agreement*

To ensure the continued cooperation of the mothers, the research assistants kept the reliability checks to a minimum, although reliability was checked often during the initial part of the conditions in which behaviors were introduced. For example, the mothers' recordings of body signals and urinary and bowel accidents were double

checked only during the pretraining observation period and not during Phases I and II.

During the pretraining observations, the mothers' recordings of body signals, urinary accidents, and bowel accidents were checked four to six times per child. The interobserver agreement was 80% to 100% ( $M = 95.0$ ) on body signals and 100% on urinary and bowel accidents. During Phase II, reliability checks were made on potty reaching/grabbing responses (a total of 20 to 23 responses per child). The agreement varied from 81% to 95% ( $M = 86.9$ ) per child. During Phase III, reliability checks were made on 10 to 20 potty reaching/grabbing responses per child. The agreement ranged from 90% to 100% ( $M = 97.0$ ).

## RESULTS

All babies were successfully trained before they could walk. They completed the program between the ages of 8.5 months (the baby who entered the program at 3.1 months) and 10.7 months (the baby who entered the program at 6.3 months). The performances of these two babies are shown in Figures 1 and 2, respectively. In each figure, the data points and bars represent mean response frequencies per day over blocks of three (occasionally two) training days. The upper graphs show the daily averages of bowel and bladder accidents. The middle graphs show the daily averages of defecations and urinations on the potty. The lower graphs show the daily averages of body signals and potty reaching/grabbing responses.

For the youngest baby to complete the program (see Figure 1), body signals during Phase I were rather consistently followed by defecations, most of which occurred on the potty. At the beginning of Phase II, the rate of body signals decreased substantially. This occurred when the adults provided frequent occasions for the baby to urinate on the potty. The baby also defecated on most of these occasions. Body signals increased again later (now cuing urinations as well as defecations); eventually, the signals were replaced by reaching/grabbing responses. During Phase III, the number of reaching/grabbing responses increased and stabi-

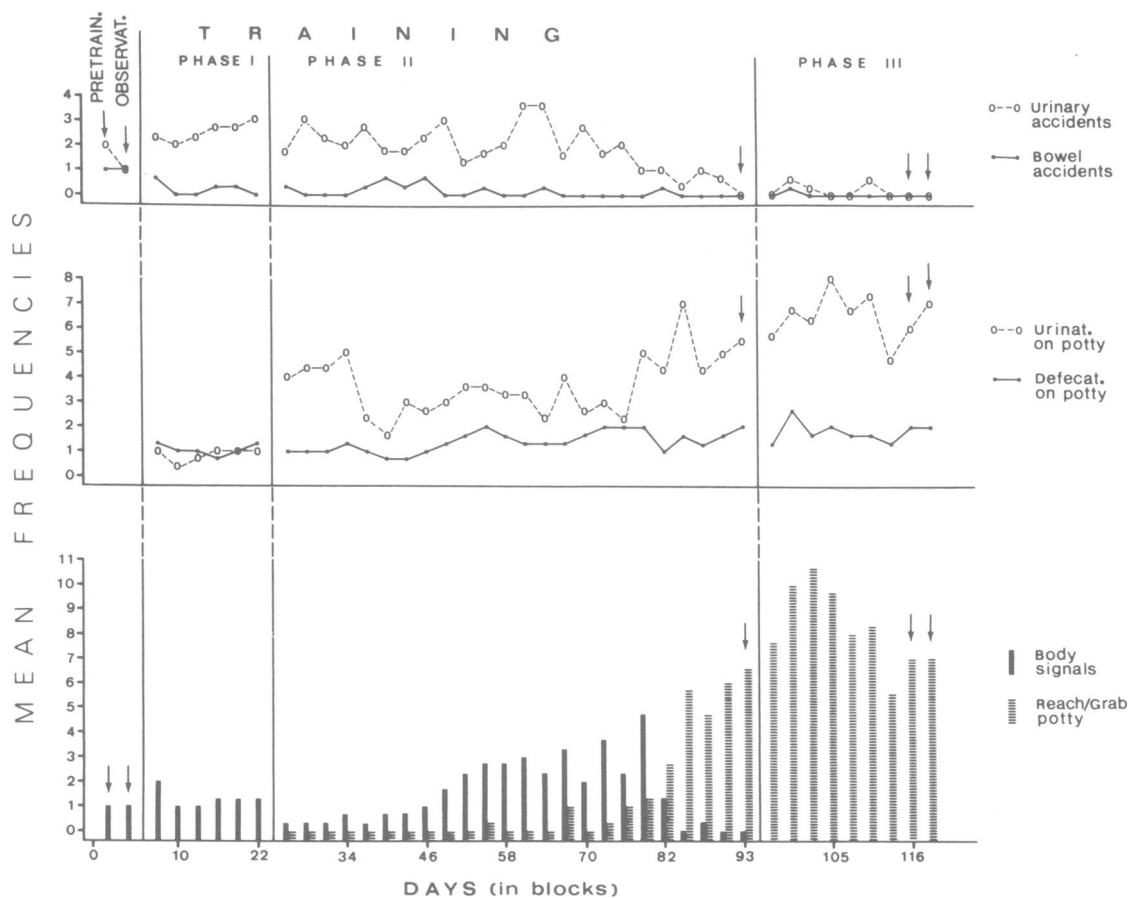


Figure 1. Performance of the youngest child to complete the program. Each data point and bar represents the mean response frequency per day over a block of 3 training days. Blocks of 2 training days are indicated by arrows. Upper graph shows the mean number of defecation and urinary accidents. Middle graph shows the mean number of defecations and urinations on the potty. Lower graph shows the mean number of body signals and of potty reaching/grabbing responses.

lized. However, in the early part of the phase, several of those responses proved unreliable (i.e., they were not followed by eliminations). The average training time per training day was about 3 hours during Phase I and about 4 and 4.5 hours during Phases II and III, respectively.

For the oldest baby to finish the program (see Figure 2), body signals were consistently followed by defecations during the first two blocks of Phase I. She then received medical treatment involving a change of diet. When the program was resumed 10 days later, her body signals were no longer consistently followed by defecations. However, it was observed that on many of these occasions, she made efforts to defecate or passed air. Her reach-

ing/grabbing responses appeared rather soon in Phase II. These behaviors, however, often were not followed by eliminations. As the training continued, the rate of reaching/grabbing responses first decreased and then increased again. At that point, this behavior was a reliable precursor of both bowel and bladder eliminations. During Phase III, this behavior increased and stabilized, while remaining reliable. The average training time per training day for this baby was over 3 hours during Phase I, and about or over 6 hours during Phases II and III, respectively.

The performance of the other two babies resembled that of the older baby reported in Figure 2. They also displayed the reaching/grabbing re-

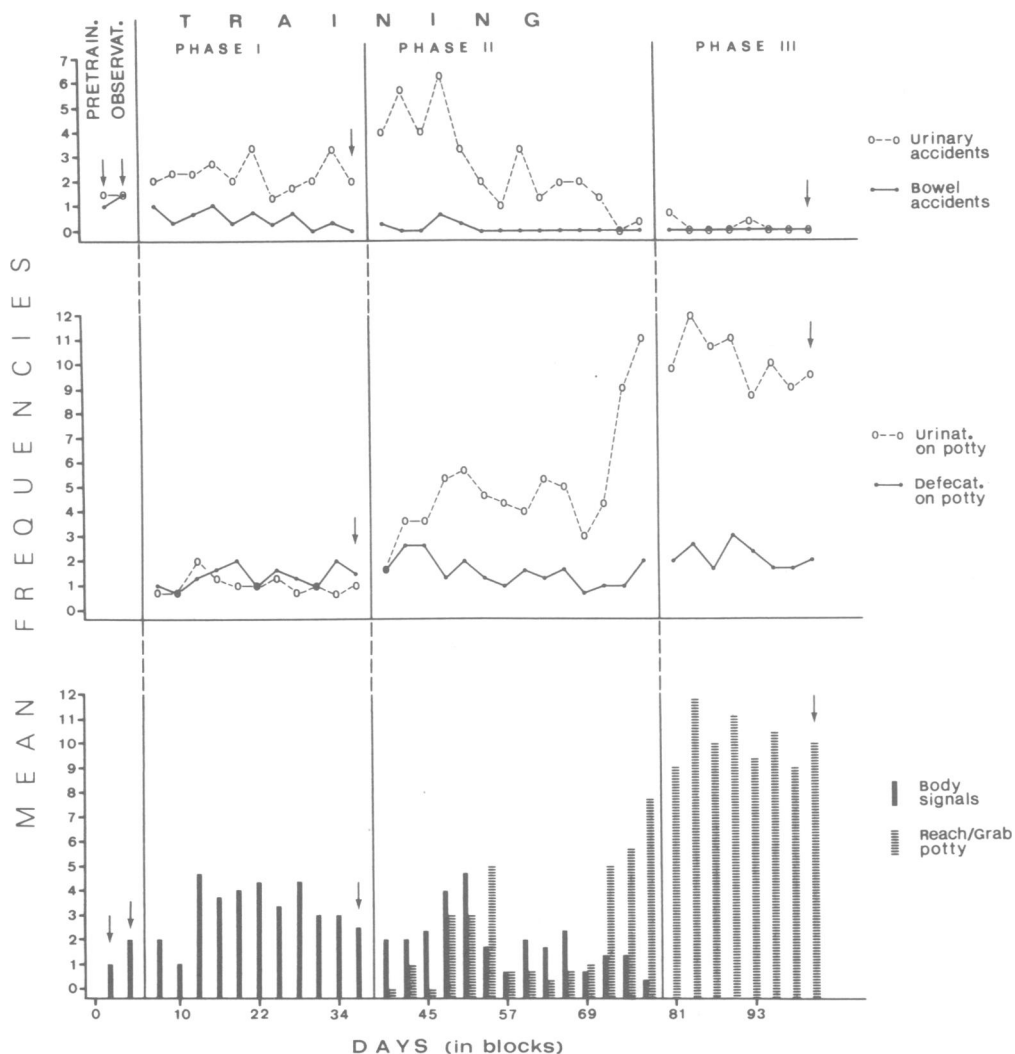


Figure 2. Performance of the oldest child to complete the program. Data are plotted as in Figure 1.

sponses early on in Phase II. During the initial part of this phase, many (approx. 55%) of those responses were false alarms.

Interviews with the parents conducted 30–45 days after the end of the program indicated that three babies had continued to display their toilet skills with only sporadic accidents. The other baby, the oldest to finish the program, had a period of partial disruption of bladder control. That is, with the increase of her mobility (she was moving into different rooms), she often failed to search for the potty on display and wet herself. Subsequently, the parents successfully reestablished the trained skills by displaying potties in each setting (rooms and

play corners) the baby frequented. Another mother reported that the baby guided her in the direction of the potty. When one of the research assistants visited the home, the baby came to her and, while holding on to the adult, pulled herself up and guided her to the potty that was placed in another room.

### DISCUSSION

All four infants learned to use the potty within the first year of life and even before they could walk. Although the design did not provide for an evaluation of the separate components of the treat-

ment package, the systematic manipulation of the potty seems to have played a decisive role in the acquisition of self-initiated toileting. As early as Phase I the program included procedures for the babies to observe the potty following signs of straining. In essence, the conditions were arranged such that the visual and tactile stimuli of the potty could develop into a natural and functional event between two already chained behavioral links, the state of distension associated with straining (first link) followed by stool expulsion associated with physical relief and praise by the mother (second link). If so, this could help to explain why: (a) the children were successful in learning also to use the potty for their urinations, and actively reached for, grabbed, and searched for the potty during subsequent phases of the program; and (b) no negative side effects (e.g., tantrums, eliminating immediately when taken from the potty) were reported. It is noteworthy that the potty manipulation, as it was used here, was markedly different from other procedures in which the mother places the child frequently on the potty in accordance with a fixed daily regimen (Newson & Newson, 1963; Spock, 1972) or rather abruptly following signs of straining (Ilg & Ames, 1955; Jolly, 1977). Although these methods may help to prevent accidents from occurring and eventually be successful, they are prone to shaping the child's passive rather than active participation with the potty following his or her observation of internal cues to eliminate.

Our findings are in contrast to those reported in much of the literature on child rearing practices, but they support the suggestion, made by deVries and deVries (1977), that the maturational explanation for the success of currently advocated delayed training methods should be reconsidered. The success of these methods may result not only from the child, but also from an environmental readiness. Our findings, together with those reported by others (Ball, 1971; Cederblad, 1970; Holtrop & Scherphuis, 1981), suggest that "a potentially useful time for cognitive development may be neglected by our cultural view of infancy" (deVries & deVries, 1977, p. 176). On the other hand, it

should be realized that the skill trained here does not meet the criteria used by most child care experts for defining complete and independent toileting. At the end of the program, the babies were not yet required to hold their eliminations longer than a few minutes and still needed assistance on taking the appropriate position and dressing and undressing. Moreover, even though the established skill may constitute an important component for facilitating the completion of this learning process (at this stage the Digo mothers leave the further training to the older siblings), the procedure reported here may be prohibitive for most mothers, given the high time investment. Thus, the practical relevance of this procedure may largely depend on the social and cultural values attributed to early continence.

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