

*EXTENDED DIAPER WEARING: EFFECTS ON CONTINENCE IN AND OUT OF THE DIAPER*

RACHEL S. F. TARBOX, W. LARRY WILLIAMS, AND PATRICK C. FRIMAN

UNIVERSITY OF NEVADA, RENO

Diaper use is widespread and possibly even increasing across diverse populations in the United States, ranging from infants to very old adults. We found no reports of an experimental analysis of the effect of wearing diapers on the frequency of urinary accidents and the attainment of continence skills (e.g., urinating in the toilet). In this study, we used a withdrawal design to evaluate the effect of wearing diapers on daily urinary accidents and successful voids for an adult who had been diagnosed with mental retardation. Results indicated that wearing diapers increased the rate of accidents and decreased the rate of successful voids. Clinical implications of these results are discussed.

DESCRIPTORS: caregiver training, incontinence, toilet training

Urinary incontinence causes an array of problems ranging from personal embarrassment to imperiled public health. As just one example, incontinence at day-care centers can promote the spread of infectious diseases (Berk & Friman, 1990). Yet, abundant experimental evidence indicates that with skills training urinary continence can be established and maintained effectively in diverse populations, including infants (Smeets, Lancioni, Paul, & Oliva, 1985), emotionally disturbed adolescents (e.g., Friman & Vollmer, 1995), severely handicapped individuals (Azrin & Foxx, 1971), and very old adults (Burgio et al., 1990). A popular cultural and commercial trend toward increased diaper usage, however, appears to promote convenience over continence by forestalling (e.g., in the young) or even forgoing (e.g., in the handicapped or very old) skills training (e.g., Goode, 1999; Lancaster, 1990). The convenience for caregivers created through use of diapers with those in care is an indisput-

able benefit, as are any increases in confidence, mobility, or social participation the use of diapers may provide for those who wear them. But whether extended diaper use produces unwanted behavioral effects has yet to be experimentally investigated. For example, does wearing diapers merely capture urinary accidents or does it also set the occasion for their occurrence? More important, does wearing diapers promote or impede the attainment of out-of-diaper continence skills? We address these questions in this experimental case study.

## METHOD

*Participant.* Ralph, a 29-year-old man with mental retardation, lived in a community residential setting for individuals with developmental disabilities and attended a vocational workshop from 9:30 a.m. to 2:30 p.m. weekdays. Prior to the investigation, Ralph was regularly placed in diapers (Depends® adult diapers) at home by residential staff and was intermittently placed in diapers while at the workshop, depending on staff vigilance and inclination. Ralph arrived at the workshop in a diaper. This study was conducted to determine the effects of diaper use on Ralph's continence and attainment of continence skills.

We thank Deborah Grinager for her assistance with the preparation of this article and Jay Summers and the staff at the Prevocational Assessment, Training and Habilitation Center at the University of Nevada, Reno, for their assistance with data collection.

Address correspondence to Larry Williams, Psychology Department/296, University of Nevada, Reno, Reno, Nevada 89557.

*Procedure.* The study was conducted at Ralph's workshop. During all conditions, Ralph was prompted to use the toilet every half hour. The prompt consisted of telling Ralph "it's time to go to the bathroom," and gently guiding him to the toilet. Once in the bathroom, Ralph independently pulled down his pants and underwear (the staff took off his diaper when he was wearing one) and he sat on the toilet. During the diaper condition, Ralph remained in a diaper throughout the day unless an accident was detected, whereupon the diaper was changed. During the no-diaper condition, Ralph's diaper was removed when he arrived at the workshop and replaced when he left for home.

*Data collection.* Trained staff collected data at Ralph's vocational workshop on the daily occurrence of urinary accidents and successful voids. An accident was recorded if Ralph's garments (i.e., diaper, underpants, or pants) were seen or felt to be wet in any spot at the half-hour check. Successful voids were defined as seeing or hearing urine contacting the toilet during the scheduled toileting opportunities. The time of day that Ralph was taken to the toilet was also recorded for the purposes of evaluating treatment integrity. Treatment integrity data were collected for 100% of sessions. Treatment integrity was assessed by dividing the number of times that Ralph was taken to the toilet within 5 min of the scheduled time per day by the total number of scheduled toilet trips per day, yielding a mean percentage of integrity of 92% across all days (range, 72% to 100%). Interobserver agreement was assessed for at least 30% of the toilet trips during each day. Agreement was measured by dividing the number of agreements on each occurrence of an accident, a successful void, and the time of day by the total number of agreements plus disagreements, yielding a mean percentage of agreement of 100% across all days.

*Experimental design.* A withdrawal design was used to assess the effects of diaper use on urinary accidents and successful voids.

## RESULTS AND DISCUSSION

The results shown in Figure 1 suggest that wearing a diaper set the occasion for Ralph's urinary accidents. In the diaper condition, Ralph had substantially more accidents ( $M = 1.5$  per day) than in the no-diaper condition ( $M = 0.1$  per day). The results also suggest that wearing a diaper had a decremental effect on his using the toilet because, in the diaper condition, he used the toilet substantially less often ( $M = 0.5$  per day) than in the no-diaper condition ( $M = 1.8$  per day). In addition, increased accidents on the 1st day of the second and third no-diaper conditions suggest that when his diaper was removed, it took Ralph at least a day to recover his continence.

Although not addressed specifically by this study, the results suggest that the diaper exerted discriminative control or was an establishing operation, or exerted a combination of these functions. The reinforcers involved cannot be identified with certainty, but the most plausible candidates appear to involve negative reinforcement (e.g., decreases in the sensation of wetness, social detection of accidents, or the effort necessary to urinate). In addition to the function of the diaper, it is possible that social reinforcement played a role in the increase in toilet usage in the no-diaper condition. Future research could extend these results by addressing these issues.

A potential concern involves fluid intake across conditions. Ralph drank two glasses of milk a day throughout the study, but no record of his water intake was kept. According to staff and observers, however, milk comprised the major portion of his fluid intake. A limitation involves the inclusion of

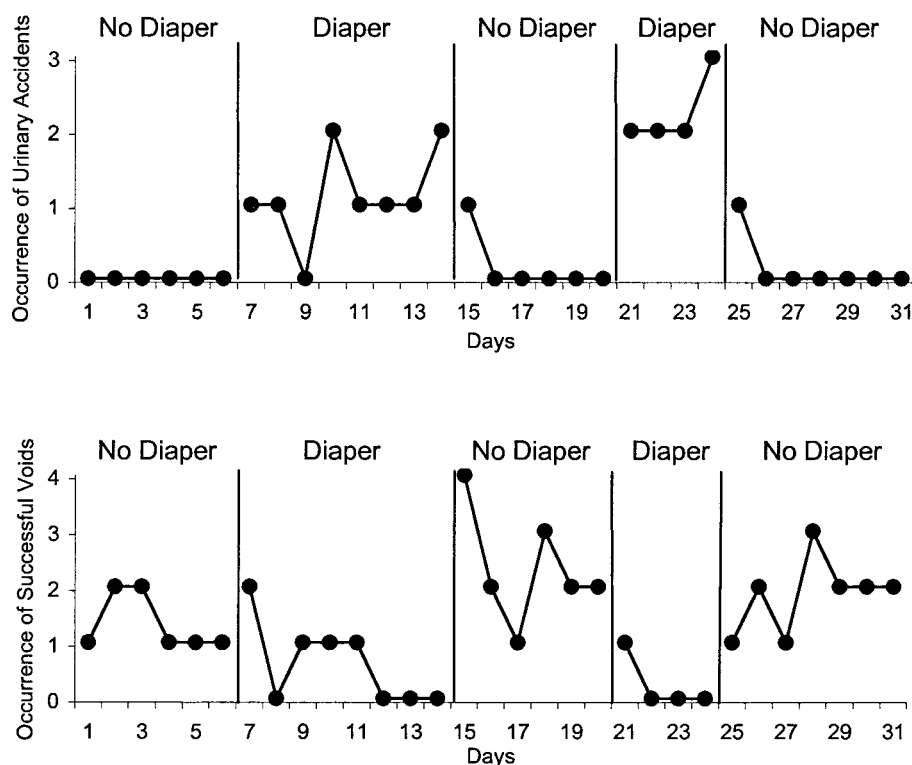


Figure 1. Number of toileting accidents per day are depicted in the top panel. Number of successful voids per day are depicted in the bottom panel.

only 1 participant, which limits the generality of the findings.

Concerns, limitations, and unanswered questions notwithstanding, it seems prudent to discuss some clinical implications of the results. Incontinence is a problem across multiple normal and clinical populations, and an increasingly popular solution involves the use of a diaper-like undergarment. In some cases, use of the garments may be the only feasible solution, but in others, their use, although convenient for caretakers, may retard a wearer's progress in the attainment of continence skills. Wet diapers often provide a rationale for their own continued use (i.e., the fact that they are wet indicates the need for their use, as was the case in this study). The results here, however, suggest that the need for a diaper may be more accurately determined through use of out-of-diaper tests.

Although the participant in this study was an adult with developmental disabilities, the results have implications for other populations such as normally developing young children and very old adults. Market forces are promoting increased diaper use for both populations, and yet attaining and maintaining full continence is achievable for virtually all nonhandicapped children and many older, intermittently incontinent adults as well (Goode, 1999; Lancaster, 1990). The results here suggest the importance of exploring whether diaper use instigates accidents or forestalls appropriate toileting in these populations.

## REFERENCES

- Azrin, N. H., & Foxx, R. M. (1971). A rapid method of toilet training the institutionalized retarded. *Journal of Applied Behavior Analysis*, 4, 89-99.

- Berk, L. B., & Friman, P. C. (1990). Epidemiologic aspects of toilet training. *Clinical Pediatrics, 29*, 278–282.
- Burgio, L. D., Engel, B. T., Hawkins, A., McCormick, K., Scheve, A., & Jones, L. T. (1990). A staff management system for maintaining improvements in continence with elderly nursing home residents. *Journal of Applied Behavior Analysis, 23*, 111–118.
- Friman, P. C., & Vollmer, D. (1995). Successful use of the nocturnal urine alarm for diurnal enuresis. *Journal of Applied Behavior Analysis, 28*, 89–90.
- Goode, E. (1999). Pediatricians renew battle over toilet training. *New York Times on the Web*. Retrieved from <http://www.nytimes.com/library/nationalscience/011299sci-toiletraining.html>
- Lancaster, M. M. (1990). Urinary incontinence: Aids for management. In R. C. Hanby, J. M. Turnbull, L. D. Norman, & M. M. Lancaster (Eds.), *Alzheimer's disease: A handbook for caregivers* (pp. 108–115). St. Louis: Mosby.
- Smeets, P. M., Lancioni, G. E., Ball, T. S., & Oliva, D. S. (1985). Shaping self-initiated toileting in infants. *Journal of Applied Behavior Analysis, 18*, 303–308.

*Received December 3, 2002*

*Final acceptance November 11, 2003*

*Action Editor, Richard Smith*