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Toilet Training for Children with Autism: The Effects of Video Modeling

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Abstract

This study assessed the effectiveness of an animated toilet training video for teaching daytime urinary control to five young boys with autism across several settings. A between groups multiple baseline across groups design was used following a 2-week baseline-monitoring period. Children in the treatment condition received video modeling plus operant conditioning strategies, whereas children in the control condition received only operant conditioning strategies. The frequency of in-toilet urinations was found to be greater for children who watched the toileting video than for children who did not. Gains were maintained for 3 participants at a 6-week follow-up with generalization to a new setting for 2 participants. The results indicate that, for young children with autism who are resistant to toilet training, the acquisition of urinary control may be facilitated by the use of an animated toileting video in conjunction with operant conditioning strategies.

Key words: autism, toilet training, video modeling

Toilet Training for Children with Autism: The Effects of Video Modeling

For typically developing children, daytime toileting skills are generally achieved by 3-4 years of age (Blum, Taubman, & Nemeth, 2003; Butler, 1997; Schum, Kolb, McAuliffe, Simms, Underhill, & Lewis, 2002). From the limited research available, toileting skills acquisition appears to be delayed, and in some cases never achieved, by individuals with autism (Ando, 1977; Dalrymple & Ruble, 1992; Tsai, Stewart, & August, 1981; Whiteley, 2004; Williams, Oliver, Allard, & Sears, 2003). For example, Tsai and colleagues collected data on 102 individuals with autism and reported that over 59% had not achieved bladder or bowel control by 3.5 years of age. This is a pressing problem, as it can impact negatively on an individual's personal hygiene, self-confidence, physical comfort, stigma (Cicero & Pfadt, 2002), independence, social acceptance (Sells-Love, Rinaldi, & McLaughlin, 2002), and caregiver burden of care.

Appropriate toileting refers to the accomplishment of various unprompted behaviours including recognizing the need for toileting and waiting before eliminating. Other behaviours such as undressing, sitting on the toilet, using toilet paper appropriately, dressing, flushing the toilet, washing hands (Baker & Brightman, 1997), and not eliminating in places other than the toilet/potty (Mahoney, Van Wagenen, & Meyerson, 1971) are also important toileting behaviours. The achievement of toileting skills is an important developmental milestone for people with disabilities as it “allows individuals to fully participate in community activities as well as to develop a sense of personal responsibility and self confidence” (Cicero & Pfadt, 2002, p. 319). Given the current philosophies and policies regarding the importance of inclusion of children with special

needs in regular schools (Dempsey, 2005), the achievement of appropriate toileting is often a goal in educational settings.

Current approaches to toilet training for individuals with disabilities have drawn heavily on operant conditioning principles, originally outlined by Ellis (1963). Ellis developed procedures based on a stimulus-response, reinforcement framework that included a baseline-monitoring period for establishing the time and frequency of a person's eliminations, and toilet visits based on that pattern of toileting. Modifications and refinements to the original techniques used by Ellis followed. Certain techniques, however, have remained fundamental to the majority of toilet training procedures described in the literature. These techniques involve: baseline monitoring to identify patterns of urination; toilet visits based on that pattern or a predetermined schedule; increased fluid intake to increase frequency of urination and practice; use of prompts to request toileting using pictures, language or signs; fading of prompts over time; and reinforcement for appropriate toileting behaviors.

While these approaches have been successful for some individuals with disabilities (Azrin, Bugle, & O'Brien, 1971; Lancioni & Markus, 1999; Richmond, 1983; Sells-Love et al., 2002; Wilder et al., 1997), toilet training for some individuals with autism and intellectual disability has been particularly difficult in terms of both effort and length of time required. For example, Dalrymple and Ruble (1992) reported that individuals with both autism and severe to profound intellectual disability required about 3 years of training to achieve daytime bladder control compared to 1.2 years for individuals with autism but without intellectual disability. Lower cognitive levels predicted higher rates of regression in toileting after training for individuals with autism,

and individuals who lacked verbal skills took about 2.7 years to achieve bladder control compared to 1 year for children with verbal skills.

Given the extent of the toileting difficulties for individuals diagnosed with autism, there has been surprisingly little research with this population. Some early success was reported by Ando (1977) using an approach based on the procedures of Azrin and Foxx (1971) with five boys aged 6-9 years with autism and profound intellectual disability. Appropriate urinations were reinforced and punishment such as verbal reprimands and spanking was applied for inappropriate eliminations. Although training led to a general increase in self-initiated toileting skills, none of the boys were completely toilet trained at post treatment. Furthermore, the use of punishment has, for some time now, been considered inappropriate for ethical reasons.

A small number of studies have reported some success in toilet training for children with an autistic spectrum disorder, however, these studies have generally lacked information about important participant characteristics such as cognitive and receptive language skills, have had small participant numbers, or lacked detail about training procedures and outcome measures. For example, Luiselli (1997) taught daytime urinary control at school to an 8-year-old boy with a diagnosis of Pervasive Developmental Disorder. Scheduled in-toilet urination was achieved and maintained at 6 month follow up, however self-initiated toileting was not reported. Other researchers have reported encouraging results but have had small participant numbers and have not always reported the cognitive or language abilities of the participants (Cicero & Pfadt, 2002; Post & Kirkpatrick, 2004).

It has been argued that teaching procedures may need to be modified for children with autism in order to address their particular needs (Shiple-Benamou, Lutzker, &

Taubman, 2002). Current toilet training procedures may not be optimal for this group of individuals. Children with autism tend to have a relative strength in the visuospatial area (Quill, 1997) and video modeling has been considered an effective treatment approach because it minimizes attentional and language demands and requires the child only to look at a small spatial area (Sherer et al., 2001). This approach has been used effectively to teach a range of skills to individuals with autism (Charlop-Christy & Daneshvar, 2003; Charlop-Christy, Le, & Freeman, 2000; D'Ateno, Mangiapanello, & Taylor, 2003; Schreibman, Whalen, & Stahmer, 2000; Shipley-Benamou et al., 2002). Only one study was found that used video modeling to teach toileting to a child with autism. In this study, a 3-year-old boy with autism learned to walk to the toilet but did not learn to urinate in the toilet (Bainbridge & Myles, 1999). The behaviour of walking to the toilet increased when the boy was prompted after he watched the video and decreased when the video was omitted.

The aim of this study was to assess the effectiveness of visual materials (i.e., a toilet training video) in conjunction with operant conditioning strategies for developing toileting skills in young children with autism across several settings. The study used a between groups multiple baseline across groups design. It was hypothesized that video modeling + operant conditioning strategies would be a more effective method than operant conditioning strategies alone.

Method

Participants

The participants were five boys aged from 4 years 5 months to 6 years 9 months (mean age of 5 years 2 months) and a diagnosis of autism from a paediatrician. All participants wet their underwear or urinated in inappropriate places on two or more

occasions per day, despite past attempts at toilet training. None of the boys had ever gone to the toilet alone and without prompting. For descriptive purposes, all participants were assessed using a number of measures. The children's educational program consisted of attendance at a kindergarten, special education unit, preschool, or a combination of these. Two of the children (John and Allen) were on medication for anxiety.

Measures

The Scales of Independent Behavior (SIB-R; Bruininks, Woodcock, Weatherman, & Hill, 1996) is an individually administered, norm referenced test with good psychometric properties, which assesses adaptive functioning, and the frequency and severity of problem behaviours. Age equivalents are provided for each subtest, and subtests are combined into adaptive behaviour clusters. Available scores included standard scores, percentile ranks and adaptive behaviour skill levels.

The Gilliam Autism Rating Scale (GARS; Gilliam, 1995) is a norm-referenced checklist, which is used for screening autism and is based on the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV; American Psychiatric Association, 1994). The test is completed by caregivers and subtest standard scores are converted into an Autism Quotient, which has a mean of 100 and a standard deviation of 15. Percentiles are also able to be established. The Autism Quotient provides a measure of the probability and severity of autism, which is rated from "very low" to "very high". The test has good psychometric properties.

The Differential Abilities Scale (DAS; Elliott, 1990) is an individually administered, norm-referenced battery of 17 cognitive and 3 achievement tests for children and adolescents aged 2.5 - 17 years. The test has good psychometric properties (Sattler, 2001). Raw scores are converted to an ability score, a percentile rank and a T

score with a mean of 50 and a standard deviation of 10. Abilities are rated from “very low” to “very high”. Several attempts were made to assess the children using the nonverbal subtests without success, with the exception of the Picture Similarities Subtest.

<INSERT TABLE 1 ABOUT HERE>

The results from the standardized assessments showed that all 5 children scored well below their same age peers in most adaptive behaviors, particularly in personal living, social interaction, communication, and toileting (see Table 1). They were also significantly delayed in cognitive development, scoring at or below the 16th percentile on the Picture Similarities subtest of the DAS. Their autism severity rating was average for all the boys except Allen (a pseudonym), who scored in the ‘low’ range. All children were non-verbal.

Design

Participants were recruited from multiple sources that included participants from a previous university research study, 14 special education units, a special school for children with autism, and by posting information about the study on the University of Queensland’s website. Written information was provided and the details about the project explained to parents and teachers, and written consent was obtained.

A between groups multiple baseline across groups design was used to evaluate the effectiveness of the toilet training video in multiple settings after a 2-week baseline-monitoring period. Although multiple baseline research designs often include three or more clients/systems in order to demonstrate treatment effectiveness, two clients/systems are considered appropriate (Kazdin, 1982; Richards, Taylor, Ramasamy, & Richards, 1999; Thyer, Artelt & Shek, 2003). This study proceeded with two groups as described below.

Children within groups were matched according to age, gender, and toileting skills using their scores on the SIB-R, and they were randomly assigned to either a treatment or control condition. Children in the treatment condition received video modeling plus operant conditioning strategies, whereas children in the control condition initially received only operant conditioning strategies. Children in the control condition were introduced to the video once in-toilet urinations commenced for the child in the treatment condition. Allen (treatment condition) and John (control condition) began training while the remaining children continued with baseline monitoring. Once the toileting status of Allen improved, a second pair comprising David (treatment condition) and Tim (control condition) began training. Edward was allocated to a treatment condition and began toilet training at the same time as David and Tim, as there was no available matched control. For ethical reasons, participants in the control condition were given the toileting video to watch once the toileting status of the child in the treatment condition made some improvement, even if the new behavior had not stabilized. Maintenance and generalization to a new setting were assessed at 6 weeks post training.

Setting and Materials

Baseline monitoring, intervention, and post treatment evaluations were undertaken in home and educational settings for each child. All training took place during the day between 7 am and 6 pm, 7 days per week, by the child's parents and teachers. All carers had access to a 30-min timer, a video player and television, recording sheets, and a 6 min animated toilet training video. The toilet training video was developed by the Intellectual Disability Services Council in South Australia in association with Minda Incorporated (2001). It shows the sequence of toileting steps required by both males and females in a simple and logical order, and animated characters provide simple verbal

instructions. The video makes use of colour, sound, music and interesting and friendly characters such as a green frog, and praise is given for appropriate toileting. A set of A4 picture cue cards accompanies the video.

Baseline monitoring. Data were collected on the child's frequency of prompted or unprompted daily in-toilet urinations between 7am and 6pm in home and educational setting(s) over two weeks by caregivers. During this time, children remained in nappies and were given free access to fluids in order to match the training condition. They were not prompted to use the toilet during this period and no toilet training occurred. Carers checked the child's nappy every 30 min and recorded the required information on monitoring sheets. A regular yet individualized schedule of toilet visits was established for each child after assessing his pattern of toileting during baseline.

Selection of rewards (reinforcement). Parents completed a reinforcement schedule and, in order to determine the relative motivating strength of individual reinforcers, procedures established by Frost and Bondy (2002) were followed. For example, parents presented a choice of items to their child and then observed their child's reaction. They took note of which items were chosen first, how their child reacted when items were presented and taken away, and what happened when items were presented again. Carers were also given instructions about the selection and delivery of rewards. For example, rewards were restricted to toilet training times and needed to be given immediately after a toileting success.

The toilet training procedures were explained to caregivers (i.e., parents and teachers) just prior to the commencement of toilet training, and all caregivers received written toilet training procedures and instructions. Caregivers were asked to select the minimum level of prompting required for the completion of the toileting steps. The

second author contacted all caregivers at least once per week to check on progress and to monitor treatment compliance.

Intervention. During intervention, children were given free access to a range of fluids in order to increase the frequency of urination and practice. On average, toilet training occurred six to seven times per day for each child, according to the schedule established during baseline. Children in the treatment condition were required to watch a 6 min animated video of toileting on each occasion prior to toilet use. Children in both conditions were prompted to request toileting using pictures, language or signs. Reinforcement was given initially for any and all of the following: walking to the toilet, undressing, sitting on the toilet, eliminating in the toilet, redressing, flushing the toilet, and hand washing. Promises of rewards for appropriate eliminations in the toilet were also given. Children were required to sit on the toilet for 3 min. If the child did nothing on the toilet after this time, carers were advised to tell the child that they did not have to “wee” or “poo”, and to provide no other attention. If the child was unable to sit for 3 min, carers were advised to encourage the child to sit back on the toilet. For accidents that had already occurred, carers were advised to say “You’re wet” in a flat tone, and to prompt the child to change his pants. Carers were advised to check the child’s pants every 30 min and to record the required information on monitoring sheets. This was done in order to assess the child’s pattern of toileting and whether his toileting schedule needed adjustment. An asterisk was used to indicate whether the eliminations occurred without prompting. If the children indicated that they needed to use the toilet or if they began to urinate away from the toilet, carers were advised to say “no, no, hurry, wee in the toilet” and to take the child quickly to the toilet. Once at the toilet, carers were required to prompt urination.

Results

The frequency of in-toilet urinations per day during baseline, intervention and follow-up for all five children is presented in Figure 1. There were zero in-toilet urinations for all participants during baseline. The three children in the treatment group (Allen, David, and Edward) had 4, 11 and 14 in-toilet urinations respectively during the treatment/control period and for two of the children (David and Edward) some of these urinations were unprompted (see Figure 2). The two children in the control condition (John and Tim) had zero and two in-toilet urinations respectively during the treatment/control period. Given the unique responses of the children to the training approaches, a more detailed description of the results for each child is presented below.

<INSERT FIGURES 1 AND 2 ABOUT HERE>

Allen (treatment condition). Allen had four in-toilet urinations during the treatment/control period, the first occurring 25 days after toilet training commenced. By day 50 he displayed a lack of interest in watching the video and his mother and one teacher withdrew from the study. Data were then only received from one school setting on two consecutive days per week. Although he had from one to two in-toilet urinations per day in that setting until day 124, the results for Allen were not maintained at follow-up. Some changes occurred in Allen's life from day 124 onwards. For example, he had a new carer at school and, during the follow-up period, he became ill and ceased taking anxiety medication.

John (control condition). John had zero in-toilet urinations during the treatment/control period. The video was introduced on day 51 and John's first in-toilet urination occurred 28 days after this. By day 101 he displayed a lack of interest in watching the video and began to protest about toilet training. It was hypothesized that

privacy at the toilet may have been an issue for John as he often hid under the bed to urinate, he used particular gestures to indicate that he wanted to be left alone at the toilet, and he had urinated in the toilet alone and without prompting on days 78 and 82. In order to provide greater privacy, his mother remained out of sight when he sat on the toilet. Picture cue cards from the video were also placed in conspicuous places at home, in order to redirect the child from places where inappropriate urinations occurred. Correct in-toilet urinations began on day 102 and he urinated in the toilet in a new setting on day 110. However, his pattern of correct in-toilet urinations was inconsistent during intervention. By follow-up he had achieved two in-toilet urinations in one day and his mother stated that she was able to redirect him to the toilet once an inappropriate elimination commenced.

David (treatment condition). David had 11 in-toilet urinations during the treatment/control period. Although he protested initially when taken to the toilet, his first in-toilet urination occurred 3 days after toilet training commenced. As it had been for John, privacy at the toilet may have been an issue for David as he often urinated in outdoor settings or in his bedroom when others were not present. Subsequently, from day 83, the changes made to John's training were introduced for David. In-toilet urinations began on day 84. Shortly after this, he self-initiated toileting, and urinary control generalized to an unfamiliar setting (e.g., a community bathroom). As he had lost interest in watching the video at this time, the video was discontinued. However, his toileting skills regressed at the commencement of the school holidays on day 107. The toilet training procedures plus the changes described above were reintroduced on day 118 with subsequent gains that were maintained at follow-up.

Tim (control condition). Tim had two in-toilet urinations during the treatment/control period. Although the video was introduced on day 89, he had not achieved another in-toilet urination by follow-up. His mother withdrew from the study on day 105 and all data points from that time onwards refer to one school setting only.

Edward (treatment condition). Edward had 14 in-toilet urinations during the treatment/control period and his first in-toilet urination occurred one day after the commencement of toilet training. Even though he protested when taken to the toilet, he achieved from 0-2 in-toilet urinations per day at home up to day 76. As with John and David, privacy at the toilet may have inhibited Edward's use of the toilet as he often urinated in outdoor settings when others were not present and the same changes that were made for John and David were implemented for Edward on day 106. The frequency of in-toilet urinations increased from that point onwards and the results were maintained at follow-up. At school, Edward often protested about going to the toilet, and he often urinated before reaching the toilet. In an attempt to address this issue, he watched the video while sitting on the toilet from day 73 onwards. However, no in-toilet urinations occurred in that setting by follow-up.

Discussion

The results from this study suggest that video modeling in conjunction with operant conditioning techniques may enhance the achievement of daytime urinary skills among young children with autism when compared to operant conditioning techniques alone. During the treatment/control condition, the frequency of in-toilet urinations was greater for children who watched a toileting video than for children who did not. Furthermore, participants in the treatment condition achieved a more consistent pattern of

in-toilet urinations than participants in the control condition. At follow-up, gains were maintained for the three children that had received training across several settings (John, David and Edward) and for two of these children, toileting behavior generalized to a new setting. For the other two children (Allen and Tim), training ceased at home after the treatment/control condition although they continued to receive toilet training at school. Reduced opportunities for practice may have impacted on the acquisition of toileting skills by follow-up for these children and may have helped to account for the disappointing results for Tim.

The results are consistent with the view that children with autism may be assisted in their learning when information is presented visually (Biederman et al., 1999; Charlop-Christy et al., 2000; D'Ateno et al., 2003; Houlihan et al., 1995; Shipley-Benamou et al., 2002). The application of video modeling for teaching toileting skills to this population has not been previously tested, and the results from the current study suggest that, for young children with autism, the development of toileting skills may be facilitated by the use of an animated toileting video in conjunction with operant conditioning principles.

The use of video modeling plus the use of picture cue cards may have been effective in the current study because they minimized the need for oral instructions among a group of children who were non-verbal. However, video modeling was not necessary for the achievement of some toileting skills. For example, one participant in the control condition learned to pull up his pants, flush the toilet, and wash his hands independently during the treatment/control period. This is consistent with previous studies that demonstrated the effectiveness of operant conditioning principles for toilet training children with disabilities (Cicero & Pfadt, 2002; Post & Kirkpatrick, 2004).

Although the operant conditioning principles used in this study were similar to those used in other studies for toilet training individuals with autism, the outcomes for children in this study were more modest. For example, in the Cicero and Pfadt (2002) study three children with autism requested the use of the toilet, urinated appropriately in the toilet, and had zero urinary accidents after 18-20 days of toilet training. However, children in the current study had not reached zero urinary accidents by follow-up. Several factors may account for differences. Cicero and Pfadt conducted their study in the school bathroom for the entire day where inappropriate eliminations could be prevented by rushing participants to a nearby toilet. Toilet training in bathrooms was not undertaken in the present study for ethical and practical reasons. For example, it was felt that other important learning tasks would need to be put on hold for an unspecified amount of time while training occurred in the bathroom, and extra staff time would be needed. However, this created access problems, as toilets were generally located at some distance from the child's main daily activities. Also, it is not known if the participants in the Cicero and Pfadt (2002) study and the present study had similar cognitive and verbal profiles. This is an important consideration as cognitive and verbal skills are associated with the achievement of toileting skills among individuals with autism (Dalrymple & Ruble, 1992). Participants in the current study achieved low scores on tests of cognitive functioning and language comprehension, and they were also highly resistant to toilet training.

Responses of individual children to the toilet training procedures used in this study emphasize the complexities of toilet training for children with autism. For some of the children, the intervention period prior to achieving the first in-toilet urination was greater than previously reported (e.g., 25 days for Allen, 28 days for John after

introduction of the video). In contrast, David achieved his first in-toilet urination after 3 days and Edward after only 1 day. Given the small number of participants it is difficult to draw conclusions about the specific factors or child characteristics that may have led to these different outcomes.

One interesting finding from this study was the impact of picture cue cards and privacy on toileting behavior. For 3 participants (John, David and Edward), the frequency of in-toilet urinations increased when the child was afforded greater privacy when sitting on the toilet, and when picture cue cards were used to redirect the child away from areas where inappropriate urinations were occurring. While these intervention techniques were not the focus of this research, they suggest a promising avenue for further investigation.

During the course of the study it was not possible to control for all variables, and there were some confounding factors. Due to the length of the study, change was inevitable, and it is important to note that children with autism often regress when changes to routines are introduced (Dalrymple & Ruble, 1992). Factors such as illness, changes in carers, and changes in medication are likely to have impacted on the acquisition of toileting skills for the children concerned. From a clinical perspective, however, it is important to recognize that these factors may arise for families, and to consider how families can be supported during these periods of change or disruption.

At the conclusion of this study, none of the children were completely toilet trained. However, parents who participated in the study until follow-up reported benefits from their participation in addition to increased toilet use by their children. For example, when compared to previous attempts at toilet training, they felt that their children had progressed well. Redirection to the toilet at the commencement of an inappropriate urination was occurring at follow-up, fewer nappies were being used, and some of the

skills learnt from the toileting program generalized to other activities for some children (e.g., dressing and undressing for swimming).

All caregivers found the toileting procedures very resource intensive and stressful. Access to toilets was difficult in most settings and carers stated that their motivation wavered at times due to the length of time required to achieve the first in-toilet urination. Carers felt that patience, persistence, consistency across settings, access to a support person with whom they could problem solve, as well as privacy and relaxation for the child were important factors in toilet training. They felt it would be helpful if carers were made aware that children's toileting skills may regress following changes of routine and that the training period may be extensive.

This study has identified a number of factors that may be important in the acquisition and maintenance of toileting including video modeling, operant conditioning techniques, settings in which the training occurs, privacy, and frequency of toilet visits. For example, gains were noticed for one participant (David) when the frequency of training at home was reduced to once a day, with the number of toilet visits increasing when an in-toilet urination was achieved at this time. Further research into the variables that may affect the acquisition of toileting skills and ways to provide more effective toilet training to children with autism are needed.

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Table 1

Description of Participants

		Allen	John	David	Tim	Edward
Age	(Year:Month)	4:7	4:5	4:9	4:7	6:9
DAS	Percentile	5	16	Invalid	12	1
(Picture	T Score	34	40	Invalid	38	23
Similarities)						
SIB-R	Language (Year:Month)	3:10	2:0	1:3	2:0	2:0
	Toileting (Year:Month)	1:9	1:11	2:0	1:6	2:3
	Dressing (Year:Month)	4:10	3:5	2:4	2:9	2:6
	Motor (Percentile)	89	93	<1	6	<1
	Social/Communication	11	<1	<1	<1	<1
	(Percentile)					
	Personal Living	13	1	<1	<1	<1
	(Percentile)					
GARS	(Severity)	Low	Average	Average	Average	Average

Figure Captions

Figure 1. Daily frequency of in-toilet urinations across pairs of participants at baseline, intervention, and follow-up.

Figure 2. Frequency of prompted and unprompted in-toilet urination during the treatment/control period.

Figure 2.