

EFFECTIVENESS OF A RAPID TOILET TRAINING WORKSHOP FOR PARENTS
OF CHILDREN WITH DEVELOPMENTAL DISABILITIES

by

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ABSTRACT

Individuals with developmental disabilities often experience challenges in learning toileting skills, which highlights a need for effective toilet training strategies that can be readily disseminated to caregivers. The purpose of this study was to evaluate the effects of parent attendance at a rapid toilet training-derived workshop on the toileting behaviours of their children with developmental disabilities. In the workshop, 6 parents were provided with instruction related to teaching urinary continence, which included increased fluid intake, positive reinforcement for correct toileting, scheduled toilet sittings, scheduled chair sittings to teach initiation, redirection for accidents, maintenance and generalization . Following the workshop, parents implemented the toilet training procedure they had learned at home with their children for approximately 5 days with telephone support from a researcher. A multiple baseline design was used to examine the effectiveness of the workshop. Results suggest that the toilet-training workshop resulted in increases in positive toileting behaviours in five of the six children. The results are discussed in relation to previous and future research and implications for practice.

PREFACE

This study received approval from the University of British Columbia's Behavioural Research Ethics Board (BREB) on March 28, 2011 (Certificate H11-00486). Ms. Rinald was responsible for data management and data analysis and is the sole author of this thesis.

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CHAPTER 1: Review of the Literature

Introduction

The acquisition of continent toileting is a vital life skill. In a review of the literature on toilet training for typically developing children, Vermandel (2007) noted that late toilet training is associated with hygiene problems, skin irritation, high expense, parental stress, frustration, social embarrassment, excessive parental dependence, refused preschool admission and environmental problems. For individuals with developmental disabilities, persistent incontinence can also mean limited socialization, restricted residential and vocational placements, and stigmatization (Kroeger & Sorensen-Burnworth, 2009). A lack of toileting competence is a significant barrier to overall quality of life for individuals with developmental disabilities.

While typically developing children generally achieve competent toileting between 24 and 48 months of age (Berk & Friman, 1990), persons with developmental disabilities often experience difficulties in toilet training. In a study of 105 individuals with mental retardation, 62.9% achieved full bladder control by age 7 and 82.9% did so by age 20 (Von Wendt, Similae, Niskanen, & Jaervelin, 1990). The rate of acquisition of toileting skills once training is initiated also varies across populations. In a sample of 1,192 typically developing children, urination training took an average of 5.8 months and 6.4 months in females and males, respectively (Bloom, Seeley, Ritchey, & McGuire, 1993). However, in a study of 100 individuals diagnosed with autism, the average duration of urination training was 1.6 years, and five participants with a mean age of 23.8 years never achieved continence (Dalrymple & Ruble, 1992).

Across nearly 50 years of toilet training practice, two paradigms have dominated: a gradual, child-initiated approach (Brazelton, 1962) and variations of an intensive, behaviourally oriented method known as Rapid Toilet Training or RTT (Azrin & Foxx, 1971). Recent guidelines from both the American Academy of Paediatrics and the Canadian Pediatric Society are still based on Brazelton's child-led approach (Vermandel, 2007). However, despite these endorsements, no studies have been conducted to examine the effectiveness of the Brazelton method for teaching continence to either typically developing or developmentally disabled populations (Christopherson, 2003). In contrast, RTT has proven to be effective for toilet training typically developing individuals as well as those with a range of disabilities (Azrin, Bugle, & O'Brien, 1971; Jason, 1977; Smith, 1979). Most published methods for toilet training persons with developmental disabilities retain at least some of the key components of the RTT approach (Kroeger & Sorensen-Burnworth, 2009).

Rapid Toilet Training

The RTT method developed by Azrin and Foxx (1971) incorporates multiple features to achieve incontinence in individuals with developmental disabilities as well as those who are typically developing. The sample in the authors' 1971 study involved nine adults with profound mental retardation who were residents in an institutional setting.

Key RTT Procedures

Primary caregivers of the residents were trained to implement nine key procedures and were supervised during implementation by the researchers.

Elimination schedule. Prior to initiating the intervention, Azrin and Foxx (1971) established an elimination schedule. Using either a mechanical sensor placed in the undergarments that emits a sound when moisture is detected or a manual procedure in which scheduled wet/dry checks were performed by scanning and, if necessary, feeling a resident's undergarments, data were collected on the timing of voiding. Establishing a data-based pattern of voiding informed the intervener of the optimal times to intervene as the treatment progressed.

Increased fluid intake. Every 30 minutes, Azrin and Foxx provided unlimited fluids in order to increase the rate of urination. Residents consumed an average of 25 cups of fluid per training day, resulting in an average of 15 daily incidents of urination by each individual. Increasing the rate of urination gave participants more opportunities to access reinforcement for correct toileting and to experience punishment for incorrect toileting, thus providing more learning opportunities than would have been possible in the absence of increased fluid intake.

Scheduled sittings. Scheduled sittings involved prompting residents to the toilet on a predetermined schedule. Azrin and Foxx employed scheduled sittings every 30 minutes during the intensive training period. Residents were required to sit on the toilet for 20 minutes or until successful urination occurred. Successful voiding in the toilet resulting in immediate positive reinforcement and permission to leave the toilet (i.e., negative reinforcement). By having residents sit on the toilet until elimination occurred and then providing immediate reinforcement for the targeted act, Azrin and Foxx aimed to place the elimination response under stimulus control of the toilet.

Positive reinforcement for correct toileting. After successful elimination, Azrin and Foxx provided highly preferred items to each individual (e.g., a large piece of chocolate) as well as praise and hugs. Because immediate reinforcement is known to be most effective in strengthening behaviours, Azrin and Foxx placed sensors in each toilet bowl that sounded when elimination occurred, prompting the intervener to provide the reinforcer swiftly. Additionally, when not sitting on the toilet, residents received smaller amounts of reinforcement (e.g., a pea-sized piece of candy and praise) every 5 minutes contingent on maintaining dry pants.

Preventing behaviours incompatible with toileting. In order to mediate the potential of competing reinforcers that might disrupt toileting acquisition, Azrin and Foxx kept residents in the training bathroom for the entire 8 hour daily training period. Residents sat in a chair or otherwise stayed near the toilet for the duration of intensive training.

Teaching independent toileting skills. Azrin and Foxx deemed independent performance of all of the steps involved in each trip to the toilet to be essential for successful toilet training. Accordingly, on all toilet trips, residents were prompted to pull the pants up and down themselves using the least intrusive prompts. Prompts were subsequently faded across toilet trips until participants were performing the steps independently.

Self-initiation of toileting. In order to avoid inadvertently teaching the residents to approach the toilet only when prompted, Azrin and Foxx used a graduated guidance procedure to encourage self-initiation. The least intrusive prompts that were needed to

elicit each step in the toileting procedure were used, and prompts were faded as quickly as possible for each individual.

Punishment procedure for incorrect toileting. A pants alarm that was designed to sound if urination occurred alerted the researchers to implement a punishment procedure, which was referred to as “cleanliness training.” First, the resident’s body was lightly shaken to gain his or her attention and a verbal reprimand was issued (e.g., "Do not soil your pants."). Next, the resident was taken immediately to a shower where he/she undressed, showered, then changed clothes. The resident then carried the soiled clothes to a sink, immersed them in water, hung them to dry, and then mopped the floor to remove any traces of the accident. Manual guidance was provided for residents who were not cooperative with the restitution procedure. Additionally, time-out from reinforcement was initiated for one hour following each accident; during this period, no drinks, small or large edible reinforcers, social reinforcers, or meals were available to the resident.

Maintenance procedures. Following successful acquisition of independent toileting, Azrin and Foxx used dry checks 6 times daily for 8 weeks following the completion of training and then twice daily until the resident was continent for one month. Social reinforcement was provided for successful toileting and dry pants. After one month of continence with twice daily dry checks, regular inspections were stopped. Cleanliness training following accidents remained in place indefinitely.

Outcomes of Rapid Toilet Training

Azrin and Foxx (1971) reported that, within a mean of 4 training days and a median of 6 training days, all nine participants achieved acquisition of independent toileting. Prior to training, the mean number of accidents per resident was 2.1 per day; this was reduced to 0.2 per day post-training. After 5 months, Azrin and Foxx (1971) reported that accidents were "virtually absent" (p. 95). Subsequently, with a sample of 14 school-aged children with mental retardation and no previous toilet training, Jason (1977) compared the Azrin and Foxx procedure to a simple scheduling method in which participants were taken to the toilet 4 times per day. The RTT procedure was found to be superior in virtually eliminating incontinence during 4 month post-training follow up probes.

Issues with Rapid Toilet Training

Despite the documented high success rates for Azrin and Foxx's (1971) RTT procedure, current literature on toilet training for individuals with developmental disabilities indicates that researchers have modified the RTT protocol in a number of ways. Although a significant number of studies related to toilet training individuals with disabilities cite Azrin and Foxx's study as an influence and incorporate some combination of RTT strategies, researchers have identified one or more reasons for changing the RTT protocol. Most commonly, these reasons include the high demands of RTT on training staff, the absence of procedures for more difficult cases, and the use of punishment techniques.

High demands on training staff. Several researchers have noted the impracticality of devoting a large number of staff hours to implementing the RTT procedure. After training staff at a day program to implement both the RTT procedure and a simple scheduled-sittings procedure with a sample of children with mental retardation, Jason (1977) collected anecdotal measures of social validity. Although only the RTT protocol was successful in teaching toilet training, it took an average of 35 hours for staff to implement the initial training and 2 months of follow-up, compared an average of just 5.3 hours for the scheduled-sittings procedure. With regard to RTT, Jason reported that staff were "gratified with the results but frankly see the time and physical energy costs as liabilities which may require considerable offsetting reinforcement and encouragement for the adults carrying out the program" (p. 500). Jason suggested that future researchers refine the RTT procedure to reduce the labour-intensive aspects involved in implementation to enhance utility.

In contrast, Smith (1979) reported similar concerns with regard to staff effort and the costs incurred in implementing RTT, but found results that were contrary to those of Jason (1977). Smith compared a group-training model of RTT, in which a group of persons with disabilities was taught simultaneously by one interventionist, with a method very similar to Azrin's and Foxx's (1971) original procedure. Smith found that the one-on-one training described by Azrin and Foxx resulted in more rapid acquisition of continence among participants than the group model, making RTT more cost and labour-effective than the group model.

Limited procedures for difficult cases. In some situations, researchers have incorporated procedures other than those suggested by Azrin and Foxx (1971) because

severe toileting-related problems beyond incontinence were present. For example, Dalrymple and Angrist (1988) used an extensive procedure for manipulating stimulus control to teach toileting to an adolescent with a history of sensitivity to dirty toilets, constipation, and bowel smearing. Luiselli (1996) described a transfer of stimulus control procedure designed for children who comfortably eliminated in diapers but were very resistant to eliminating on the toilet. In this procedure, the diaper was slowly faded out (by gradually cutting it away) until the child was using only the toilet for elimination. While both of these studies incorporated many features of RTT in their protocols, the researchers deemed their respective additional procedures necessary in light of the specific problems experienced by their participants.

Similarly, Hagopian, Fisher, Piazza and Wierzbicki (1993) found that Azrin and Foxx's (1971) overcorrection procedure resulted in high rates of self-injurious behaviour in a 9-year-old child with severe mental retardation. Based on clinical experience of the effectiveness of an unusual procedure, the researchers poured water into the toilet (between the child's legs) during scheduled sittings. Although previous attempts at toilet training had proven unsuccessful, this "water prompt" was correlated with urination during 64% of intervals (versus 7% in control trials, in which an empty cup was mimed to be poured into the toilet during the sitting) and with low rates of self-injurious behaviour. The child eventually became fully continent. The procedure used by Hagopian and colleagues highlights the fact that researchers occasionally encounter cases in which procedures that go beyond those covered by Azrin and Foxx (1971) are deemed necessary to teach continence.

Use of aversive punishment techniques. In a critical review of the toilet training literature related to developmental disabilities, Kroeger and Sorensen-Burnworth (2009) noted an empirical trend toward “less aversive” punishment procedures than those used by Azrin and Foxx (e.g., Averink, Melein, & Duker, 2005; Bainbridge & Myles, 1999; Cicero & Pfadt, 2002; Duker, Averink, & Melein, 2001; Hagopian et al., 1993; LeBlanc et al., 2005; Luiselli, 1994; Luiselli, 1996; Wilder, Higbee, Williams, & Nachtwey, 1997). Cicero and Pfadt (2002) suggested that this trend reflects the general shift in behaviour analytic research away from the use of “harsh” punishment that has occurred since the time of Azrin and Foxx’s original study.

Effects of Manipulations to the RTT Procedure

It should be noted that despite all of the procedures cited thus far – including those that employ minimal or less aversive punishment procedures -- have resulted in successful toilet training, with only a small minority of research subjects not acquiring continence. However, toilet training procedures that place less emphasis on punishment procedures often require longer durations of training time. While Azrin and Foxx's (1971) subjects were toilet trained in a mean of 4 training days, more recent, reduced-punishment studies have documented slightly longer training times (Cicero & Pfadt, 2002; Leblanc, Carr, Crossett, Bennett, & Detweiler, 2005). However, Kroeger and Sorensen (2010) speculated that a reduction in punishment might not be the sole contributor to the slower acquisition of toileting, noting that the relationship of the trainer to the individual being toilet trained might also be a factor. Azrin and Foxx (1971) trained the primary caregivers of individuals with disabilities to implement their toileting procedure, whereas several subsequent studies (including those that incorporated reduced

punishment and resulted in slower continence acquisition) used clinicians to implement toileting protocols (Cicero & Pfadt, 2002; Leblanc, Carr, Crossett, Bennett, & Detweiler, 2005). In contrast, Kroeger and Sorensen (2010) trained parents of children with autism to implement their non-aversive toileting procedure and were able to replicate the rate of continence acquisition reported by Azrin and Foxx (1971). In analyzing their results, these authors speculated that training primary caregivers to implement toilet training procedures might be more important for the rapid acquisition of continence than is the use of aversive punishment procedures. Thus, a more positive behavioural intervention might prove to be both ethically preferable to the Azrin and Foxx (1971) method and equally as effective.

Parents as Interventionists

Multiple studies have documented that toilet training is an area of concern for parents of children with disabilities in general and autism in particular. Szyndler (1996) conducted a survey of 33 parents of children with autism in the United Kingdom in which 82% reported difficulties with toilet training; many of these parents identified this as an ongoing area of concern. Macias, Roberts, Saylor, and Fussell (2006) conducted a survey in which parents of incontinent children with disabilities reported higher personal stress than parents of children with disabilities who were toilet trained. Additionally, parents are often negatively affected by a number of factors associated with incontinence, including hygiene problems, skin irritation, high expense, frustration, social embarrassment, excessive parental dependence, refused preschool admission, and environmental problems (Vermandel, 2007).

Why Train Parents?

Although the research involving parents as toilet training interventionists is in its infancy, parents have been successfully participating in training programs and acting as interventionists for their children with disabilities in other contexts for many years.

Schopler and Reichler (1971) pioneered the idea of parents as "co-therapists" for their children with autism and designed a 5-year project in which parents observed models of effective techniques and received training, support, and supervision in implementing in-home behaviour change programs. The parents became powerful intervention agents who were able to engender marked improvements in their children's behaviour. Since Schopler and Reichler's groundbreaking study, much research has been conducted with a focus on training parents as interventionists in a variety of settings.

Kroeger and Sorensen (2010) suggested two advantages to training parents to be the primary implementers of toilet training protocols. First, parents are likely to be highly motivated to teach their children to achieve continence because they are primarily responsible for all of the cleaning tasks involved in caring for a child who is not toilet trained (e.g., washing soiled clothing, changing soiled diapers); thus, toilet training their children has a potentially large payoff for parents with regard to both labour and resources. Second, because they are intimately familiar with their children, parents may be able to react more quickly to subtle toileting-related cues and responses. Finally, involving parents in toilet training is logical because they are the most constant people in children's lives, and will be there long after professional interventionists have ended their involvement. Presumably, the more toilet training knowledge they have acquired, the

more likely parents are to be able to maintain the gains made in initial toilet training and remediate any ongoing issues.

Parent Training Procedures

The current body of research documenting parent training in toileting is surprisingly small, but the effects of parent training across other teaching strategies and behaviour support plans for persons with disabilities are well-documented. In a meta-analysis of studies documenting parent-implemented early intervention for young children with autism, McConachie and Diggle (2007) concluded that parent training is likely to contribute positively to intervention outcomes. Kaminski, Valle, Filene, and Boyle (2008) performed a meta-analysis of 77 programs aimed at behaviour change or prevention for children displaying behavioural challenges (not developmental disabilities). They identified several components associated with successful parent training, including increasing positive parent-child interactions, teaching the importance of parenting consistency, and having parents practice new skills with their own children during training sessions.

Although Kaminski and colleagues (2008) noted that providing parents with clinician-supervised practice with their own children during training contributes significantly to positive outcomes, other studies have demonstrated the ability of parents to implement behavioural interventions without in vivo clinician support. For example, Frea and Hepburn (1999) taught two parents of children with autism to perform functional behaviour assessments and plan interventions to address problem behaviours. Involvement from clinicians consisted of presenting the parents with a manual on functional behaviour assessment and intervention planning, and meeting with each parent

five times to discuss components of the manual. After completion of the manual-based training, both parents were able to design and implement effective interventions that resulted in significant reductions in problem behaviour and increases in functional responses. Similarly, Nefdt, Koegel, Singer, and Gerber (2010) evaluated the ability of 27 parents to implement the features of a Pivotal Response Training program with their children with autism. The study utilized an instructional DVD and an accompanying manual as the only means of parent training. The DVD and manual each consisted of 14 chapters describing the motivational procedures used in Pivotal Response Training, including video examples and quizzes after each chapter. After the training procedure, parents were observed to provide 50% more language opportunities and implemented the procedures with an average of 75% fidelity. In addition, their children's use of functional language rose by almost 30% from pre-treatment probes.

Although the focus topics for parent training in these studies was not toilet training, it appears from these examples that parents of children with autism spectrum disorders can learn to implement a wide variety of behavioural procedures in the absence of in vivo modeling from researchers or clinicians. The most common parent training approaches of this type to date have included provision of written materials or videotaped examples and periodic, individual meetings with clinicians to troubleshoot or review progress. However, the potential utility of group parent training via workshops, as suggested by Kroeger and Sorensen (2010) in their recent review of toilet training research, has received less attention, despite the fact that this mode of training could be both cost- and time-efficient for all involved.

Workshop parent training. Several studies have documented the ability of parents to learn to implement interventions for their children with disabilities in a workshop format. Perhaps the best known example of such an intervention is the Triple P Parent Training Program, an extensively researched parent-training protocol that aims to address a variety of parenting-related issues. Triple P's "Stepping Stones" variant was developed for parents of children with disabilities. Whittingham, Sofronoff, Sheffield, and Sanders (2009) conducted a randomized control trial to evaluate its effectiveness in teaching positive parenting practices to the parents of children diagnosed with autism spectrum disorders. The procedures were intended to both increase positive interactions and remediate problem behaviour. While the participating parents were observed working with their children and feedback was given by clinicians, the majority of instruction occurred in a group workshop format. Results indicated significant reductions in both child behaviour problems and dysfunctional parenting styles. Decreases in problematic parenting practices such as verbosity and over-reactivity were maintained at a 6 month post-intervention follow up.

Another example of effective workshop training for parents was evident in a study aimed at comparing the effectiveness of risperidone plus parent training versus risperidone alone for remediating behaviour problems in 125 children with autism spectrum disorders (Aman et al., 2009). All of the children were given risperidone, an antipsychotic drug. In addition, two-thirds were randomly selected to receive parent training, which consisted of direct instruction, modeling, role-playing, activity sheets, and video examples. The instruction took place in a series of workshops aimed at teaching antecedent management techniques, positive reinforcement procedures, extinction,

compliance training, functional communication training, and techniques to promote generalization and maintenance. These topics were covered in 11 standard workshop sessions along with 3 optional sessions and 2 individual booster sessions (one by phone and one face-to-face with the trainer). Results indicated that children in the combined parent training and risperidone group experienced significant reductions in child irritability, stereotypic behaviour, hyperactivity, and noncompliance compared to the risperidone alone group.

Finally, another example of successful workshop training was evident in a study in which researchers taught the parents of 17 children with autism, divided into 2 workshop groups, to implement Pivotal Response Training techniques with their children (Minjarez, Williams, Mercier, Hardan, 2010). As indicated by repeated video probes of parent-child interactions, after a 10-week training program that involved instruction, group discussions, goal setting, video reviews, readings, and worksheets, the parents were able to successfully implement Pivotal Response Training interventions with their children with acceptable fidelity. Additionally, the children's communicative language was observed to increase.

Parents as initial change agents. In all of the toilet training research involving parents to date, researchers or clinicians have implemented the initial part of the intervention with the target child and provided some in vivo modeling for parents. Typically, the rationale for this approach is that initial behaviour change is challenging to implement and clinicians should establish some success in this regard with a child before training the parents to intervene. While the ability of parents to act as the initial agents of change is yet to be investigated in the context of a toilet training intervention, several

studies have shown that parents can be taught to implement feeding interventions successfully with their children with disabilities, without having the researcher establish initial success before involving parents.

For example, Werle, Murphy and Budd (1993) taught three mothers of children with developmental disabilities, food refusal behaviours, and extremely limited diets to implement a feeding intervention in their homes. Parent training consisted of teaching contingent attention skills (including providing clear, direct prompts and contingent verbal and physical praise plus other reinforcers) for cooperating with eating; ignoring disruptive behaviours; and using a mild corrective procedure (e.g., saying "no" and blocking the child from leaving the eating area) for problem behaviour. These skills were taught via instruction, discussion, handouts, role plays, rehearsals, verbal feedback after meals, and periodic videotape reviews. The intervention was divided into two parts; the first was focused on the child's consumption of specific target foods and the second was focused on self-feeding. During the first part of intervention, in which consumption of target foods was the goal, the researchers videotaped the parents as they implemented the procedure and then provided feedback on their use of the procedures. During the second part of the intervention, in which self-feeding was the focus, the researchers did not provide feedback. Results indicated increased levels of positive attention (for 2 of the 3 mothers), and increased offerings of target foods and use of specific prompts for all three mothers. All of the children showed clinically significant increases in both their acceptance of target foods and self-feeding, as well as a decrease in their refusal of target foods.

In a more recent study, Anderson and McMillan (2001) reported the effect of a parent-led intervention designed for a 5-year-old boy with pervasive developmental disorder and severe mental retardation who willingly ate only three foods and who displayed severe refusal-related and self-injurious behaviours when offered new foods. The researchers taught the boy's parents to implement an escape extinction and differential reinforcement procedure to teach the boy to eat a variety of fruits (new, non-preferred foods). Parent training consisted of verbal and written instruction, modeling, showing videotapes of the procedure being implemented with another child, and role-playing. After the initial training procedure, the parents provided the researchers with videotapes of themselves implementing the procedures with their son, and feedback on these videotapes was provided by the researchers at weekly meetings. The parents were able to implement the intervention consistently and the percentage of accepted bites of fruit rose substantially, while expelled bites and self-injurious behaviour decreased. By the end of the intervention, the boy was consuming age-appropriate amounts of fruit.

Given the numerous differences between toilet training and feeding interventions, the ability to determine the potential of applying training procedures such as those used by Anderson and McMillan (2001) and Werle and colleagues (1993) to toilet training is limited. However, the success of these studies in demonstrating the ability of parents to act as the initial agents of change highlights the need for more research in this area.

Parents as Toilet Training Interventionists

Although an extensive body of literature documents success in training parents to implement a variety of interventions for their children with disabilities with a range of researcher support and a variety of training protocols, only five toilet training

intervention studies to date have mentioned parent involvement as a component of the intervention in any capacity.

Cicero and Pfadt (2002) implemented a procedure with three young children diagnosed with autism in a school setting. Teachers were trained as the primary interventionists in the school. While parents received no specific training beyond a letter that was sent home and that described the training procedures implemented at school, they did assist with generalization data collection by providing reports on their child's toilet training successes and difficulties at home. Two of the three parents reported that they attempted to follow the written toilet training procedure with their children at home. However, no data were available to document parent implementation fidelity, so their role in facilitating generalization of the children's toileting behaviours from the school to the home setting was not clear. Nonetheless, after continence was achieved at school, the parents of all three children reported they were no longer having urination accidents at home.

Keen, Brannigan, and Cuskelly (2007) taught parents and teachers to implement a video-modeling and reinforcement-based toilet training intervention package. Parents received some explanation of the program components and a document outlining the procedures that were required to implement the intervention. The intervention had mixed results; none of the participants were fully toilet trained during the study, and the first successful urination did not occur until after 25 days of intervention for 2 of the 3 participants. Two parents dropped out of the study during intervention and anecdotal social validity appeared to be low.

Taylor and Cipani (1994) attempted a modified version of RTT that focused on the transfer of stimulus control of urination from the subject's clothing to the toilet. The subject was a 10-year-old boy with autism and his father served as the main interventionist along with one researcher. The training methods used to teach the boy's father to implement the procedure were not specified, but the procedure was successful in teaching continence to the boy. No specific social validity measures were used, but parents were reported to have provided positive verbal reports related to the study protocol.

Like Taylor and Cipani, LeBlanc and her colleagues (2005) taught parents to implement all components of their toilet training procedure with three children with autism. On the first day of intensive toilet training, researchers implemented the protocol in an outpatient clinic setting while the parents observed and received verbal instruction. The parents gradually started implementing components of the treatment protocol in the clinic, with immediate feedback provided by the researchers. By the end of the day, all of the parents were able to implement the procedure with fidelity. Over the next two training days (weekend days), the parents implemented the procedure with their children at home, with researchers visiting for 2 hours each day. On the fourth day, the children returned to school and their teachers and support staff received training on the procedure from the researchers. The procedure was successful in teaching continence to all participants and the parents who completed a social validity questionnaire gave the protocol favourable ratings.

To date, Kroeger and Sorensen's (2010) study attempted the largest amount of parent involvement in toilet training for two children with autism. Their procedure was

the first to incorporate parent training as a primary focus, using parents as the main interventionists in their homes rather than as co-therapists as in Taylor and Cipani (1994) and LeBlanc et al (2005). At the beginning of the first training day, a researcher explained a modified RTT protocol to each child's parents and then modeled its implementation for 3 hours. For the following 3 hours, the parents were coached to implement the procedure. After this initial 6 hours of training, the researcher was no longer present in the family home. Instead, the parents were instructed to contact the researchers with any questions; one family phoned 4 times over 4 days of intensive RTT training while the other phoned 5 times over 4 days. Results indicated that the procedure was effective in teaching continence to the two children. Both children achieved the initial training criteria within 4 days and maintained continence over follow-up probes spanning 3 years. Additionally, a social validity questionnaire indicated that the parents of both children were highly satisfied with the intervention. While the ability to generalize these results is limited in part by the small number of participants, the success of this parent training study suggests the importance of future investigations aimed at teaching parents to implement toilet training procedures in their homes.

Statement of the Problem and Research Questions

The acquisition of continent toileting can be challenging for families with children with disabilities, and toilet training is rated by parents as an area of significant concern. Toilet training protocols that are derived from Azrin and Foxx's (1971) RTT approach have been shown to be successful in teaching continent toileting to individuals with a wide range of abilities. Although the body of toilet training research for

individuals with disabilities is extensive, only five intervention studies to date have included parent involvement.

A range of studies related to target behaviours other than those required for toileting have shown that parents are able to implement interventions for their children with disabilities successfully, based on a variety of parent training protocols. Although studies reporting parent training in toilet training are limited, a number of promising elements have been identified. In studies reported by both LeBlanc and colleagues (2005) and Kroeger and Sorensen (2010), parents were able to successfully toilet train their children with autism after just 6-8 hours of in vivo training from researchers. Although these results are propitious, a group treatment in which parents are taught to implement a toilet training procedure in a workshop format is a worthwhile pursuit, given the limited availability of both funding and treatment resources for individuals with disabilities in many situations. The ability to share clinician training time during a workshop could enable more parents to access the information that is needed to implement toilet training procedures. Another potential benefit of a workshop training model for parents is the reduction in intervention cost. As Jason (1977) and Smith (1979) suggested, the RTT method involves many hours of clinician time, which has the potential to be extremely expensive for families in a non-research setting.

In many different contexts and with regard to many different behaviours, parents trained in a workshop format have learned to implement interventions that result in child behaviour change. Parents have also learned to act as effective interventionists in situations (e.g., feeding interventions) in which they must act as the initial change agents. Although parents have been shown to participate successfully in toilet training in a few

studies to date, the potential of parents to learn toilet training skills from a workshop and to implement those skills independently has yet to be investigated.

The present study addressed the following research questions:

- a) Is there an association between a workshop-taught, parent-implemented modified RTT intervention and the acquisition of urinary continence in children with developmental disabilities?
- b) Does the parent-implemented modified RTT intervention result in generalization to defecation continence without additional focus on this skill area?
- c) How do parents rate the social validity of the intervention and their perceptions of its effect on their self-efficacy?

CHAPTER 2: Method

Participant Recruitment

Families and child participants were recruited through agencies that provide early intervention services to young children with disabilities in the Lower Mainland of British Columbia, Canada. Service providers were informed of the purpose of the study, the basic study procedures, and the inclusion and exclusion criteria; and were provided with a recruitment letter (Appendix A) to give to potential families.

Six families contacted the researcher and expressed interest in participating. The researcher visited their homes to explain the parameters of the study in detail and to confirm that the parents met the following criteria:

- (a) English language competence that allowed them to understand and participate in a workshop conducted in that language;
- (b) willingness to attend a one-day workshop on toilet training, along with other parents in the study;
- (c) available to implement a home-based toilet training program with their child for at least 8 consecutive hours/day for 5 consecutive days following the workshop. If one parent was not able to stay home for the required time period, he or she was invited to split the duty with a co-parent who was also required to attend the workshop and who met the inclusion criteria; and
- (d) willingness to report daily data on their child's elimination patterns to a researcher by telephone throughout the toilet training period.

During the home visit, the researcher also confirmed via parent report that participating children displayed the following criteria:

- (a) diagnosis of a developmental disability (e.g., Down syndrome, autism spectrum disorder, intellectual disability);
- (b) age between 30-72 months at the time of intervention;
- (c) typically consumed age- and size-appropriate amounts of food and drink, resulting in regular patterns of elimination;
- (d) urinated in the toilet less than 10% of the time in the previous month (i.e., did not display continent urination); and
- (e) urinated in a diaper no more often than hourly.

Children who met the above criteria were excluded if they showed evidence of:

- (a) a neuromotor impairment that affected use of the lower extremities (e.g., cerebral palsy, spina bifida, etc.)
- (b) a seizure disorder, medical condition, or medication that might interfere with the acquisition of continent toileting (e.g., a physical disability affecting bladder control);
- (c) major problem behaviours when presented with demands required for the toileting protocol, such as requests to enter the bathroom or sit on the toilet; and/or

(d) a history of failed toilet training attempts that might interfere with implementation of the toilet training protocol.

Ultimately, all six interested families and their children were found to meet the criteria for inclusion. Parents signed consent forms for participation (Appendix B) and completed a brief demographic survey that asked questions about their children's early toileting experiences and prerequisite skills. The toilet training prerequisite skills were identified by Brazelton and colleagues (1999) and are often suggested by paediatricians. They include (a) staying dry for at least 2 hours at a time, (b) having a regular bowel movement schedule, (c) following simple instructions, (d) demonstrating discomfort with dirty diapers, (e) asking to use the toilet, (f) requesting to wear underwear, and (g) pulling pants up and down independently

Participants

All names used to refer to child and parent participants are pseudonyms. Parents' names are provided first in the sections that follow.

Family 1: Janice and Rebecca

Janice was 38 years old at the time of the study and had emigrated from China as an adult along with her husband. Janice obtained two bachelor's degrees in China and was employed 2 days per week as a tutor. Janice lived with two daughters and her husband, a post-doctoral student. She participated in the study with Rebecca, the younger of her two daughters.

Rebecca was 3 years 3 months of age at the time of the study and had been diagnosed with autism and a global developmental delay at 3 years of age by a public

health services centre. At the time of diagnosis, Rebecca's adaptive skills were assessed using the Vineland Adaptive Behavior Scales-II. Rebecca scored below the 1st percentile in the communication, daily living skills, socialization, and motor skills domains, as well as the adaptive behaviour composite. In general, assessors reported a cognitive age equivalent score around 12 months, although difficulties in testing made precise measurement challenging. At the time of the study, Rebecca had no spoken language and her communication was limited to a few gestures. Rebecca had been receiving an in-home behavioural intervention program for 10 hours per week, speech-language therapy for 1 hour per week, and occupational therapy for 1 hour per week for 9 months prior to the study.

Janice had not attempted to toilet train Rebecca in any way prior to participating in the study. Rebecca demonstrated two of Brazleton and colleagues' (1999) toileting prerequisites: a regular bowel movement schedule and the ability to follow simple instructions.

Family 2: Ava and Lucy

Ava, a single mother who emigrated from El Salvador, was 36 years old at the time of the study. She had completed high school in her home country, had been unemployed for several years, and was planning to begin a college-level English-as-a-second-language class a few months after the study commenced.

Ava's daughter Lucy was 3 years 11 months of age at the time of the study and had received a diagnosis of autism at 3 years 3 months from a public health services centre. At the time of diagnosis, general reports from the assessors placed Lucy's

language skills at 15 months, her adaptive skills at 18-24 months, and her personal/social skills at 15-18 months. Lucy had no spoken language and was learning to communicate using gestures and a picture exchange system through a home-based behavioural intervention program, in which she had been participating for 11 hours/week for 5 months.

Ava had made no previous attempts at toilet training Lucy prior to the start of the study. Lucy demonstrated one of Brazleton and colleagues' (1999) toilet training prerequisites: showing discomfort with dirty diapers.

Family 3: Chana and Amir

Chana, who was born in Algeria, was 38 years old at the time of the study. She immigrated to Canada as an adult along with her husband. Chana has a college nursing diploma from Algeria and speaks French and Arabic as well as English. Chana and her husband lived with their two sons and Chana's sister, who assisted with childcare.

Chana's son Amir (the younger of the two boys) was 3 years 5 months of age at the time of the study and had been diagnosed with an intellectual disability at 2 years 11 months by a public health services centre. Assessments performed at the time of diagnosis placed Amir's receptive language skills in the 16-18 month range and his expressive skills in the 6-12 month level. At the time of the study, Amir communicated mainly with gestures and used about five spoken words functionally. Amir had attended preschool for 16 hours per week with a one-on-one support worker for 8 months. He had also received speech-language therapy services for 2 hours/month for 7 months, centre-

based behavioural intervention for 17.5 hours/week for 4 months, and occupational therapy for 2 hours/month for 2 months.

Chana had made a few attempts at toilet training Amir prior to the study, under the direction of Amir's occupational therapist. She took him to the toilet when she thought he might have to go, and this had resulted in 5 or 6 successful in-toilet urinations over a period of a few months. After each success, Chana gave Amir a piece of chocolate and praise him. Amir continued to eliminate in his diaper or on the floor when Chana did not take him to the toilet. Amir demonstrated two of Brazleton and colleagues' (1999) toilet training prerequisites: staying dry for 2 hours at a time and having a regular bowel movement schedule.

Family 4: Leanne and Andy

Leanne, a Canadian-born Caucasian single mother, was 45 years old at the time of the study. Leanne has a college degree and worked as an investor. She lived with her son and her mother, who also attended the workshop. However, Leanne was the sole implementer of the toilet training intervention in the study.

Leanne's son Andy was 3 years 7 months of age at the time of the intervention. Andy had been diagnosed with autistic disorder at 2 years 6 months by a psychologist in private practice. He had received 12-15 hours/week of behavioural intervention services for 10 months leading up to the study, speech therapy for 1 hour/week for 15 months, and preschool for 9 months. Andy had not had any specific language or skills testing at the time of the study, but Leanne reported that he used no vocal speech and communicated mainly in gestures.

No previous attempts had been made to toilet train Andy. He demonstrated two of Brazleton and colleagues' (1999) toilet training prerequisites: he had a regular bowel movement schedule and could follow simple instructions.

Family 5: Mark and Jack

Mark, a Canadian-born Caucasian, was 40 years old at the time of the study. He had a bachelor's degree in commerce; works as an investigator; and lived with his wife -- a stay-at-home mother -- and two young sons.

Jack, the oldest boy, was 3 years 9 months of age at the time of the study. Jack was diagnosed with Down Syndrome and, at the time of the study, his vocal speech was limited to a few words. However, Jack communicated with proficiency using signs and gestures. Mark and his wife had taught Jack to use over 200 signs using American Sign Language books and videos. Jack had received behavioural intervention services for 18 months leading up to the study, involving biweekly consultation and parent training related mostly to Jack's food refusal behaviours. Jack had also been receiving one hour/week of speech therapy for 12 months prior to the study.

Jack's parents had made a few informal attempts at toilet training, which involved taking Jack to the toilet when they thought he might have to go. They had been doing this for approximately one month prior to the study, resulting in numerous successful in-toilet eliminations. However, Jack continued to eliminate in his diaper if he was not prompted by a parent to go to the bathroom. He would occasionally request to go to the toilet and, when taken there, would sit but did not eliminate. Jack's parents perceived this as an attempt to get out of a non-preferred activity by interrupting it with a request to

go to the bathroom. Jack demonstrated two of Brazleton and colleagues' (1999) toilet training prerequisites: following simple directions and asking to go to the bathroom.

Family 6: Sandra and Jamie

Sandra, a Canadian-born woman of Chinese descent, was 36 years old at the time of the study. She is married to an engineer, has a college degree herself, and is a stay-at-home mother to her son, Jamie, and an older daughter.

Jamie was 5 years 11 months old at the time of the study. He had been diagnosed with autism spectrum disorder at age 3 by a public health services center. Jamie had not received any recent assessments, but Sandra reported he used no vocal speech at the time of the study and noted that much of his behavioural intervention program was focused on problem behaviour intervention. Jamie had attended a center-based intervention programs for 2 years leading up to the study, including 10 hours/week of behavioural intervention and monthly supervision from an occupational therapist and a speech-language pathologist.

Jamie's intervention team and his parents had been attempting toilet training for approximately 12 months leading up to the study, supervised by the occupational therapist. To do so, they sat Jamie on the toilet a few times per day, although he remained in diapers when not on the toilet. This approach led to some success; Sandra reported that Jamie had urinated in the toilet approximately once every other day for several months prior the study. When this occurred, he was presented with praise and small edible food items. Jamie demonstrated 2 of Brazleton and colleagues' (1999) toilet

training prerequisites: having a regular bowel movement schedule and pulling pants up and down independently.

Settings and Materials

Two parent training workshops were provided as the basis for the study. One occurred in a meeting room at a community centre that was convenient for three of the families; and the other occurred a week later in a classroom at the University of British Columbia, which was convenient for the other three families. The workshop was presented by the researcher, a graduate student with experience in parent training and toilet training for persons with disabilities. The training consisted of a Powerpoint® presentation and corresponding handout outlining the steps in an RTT-derived toilet training protocol (described in detail in Procedures). A flexible child-sized mannequin, weighing approximately 10 kilograms and with a height of 1 metre, was used by the researcher for demonstrations of toilet training techniques during the workshop and by participating parents during role plays. In addition, parents were given small erasable whiteboards and markers on which to respond as a group to ‘quiz’ questions presented throughout the workshop following teaching of each toilet training technique. When a question was presented, parents recorded their responses on individual whiteboards and then held them up to share their answers with the group. This type of group responding allowed the presenter to evaluate, at a glance, whether participants were following along with each concept as it was presented. After the workshop, parents implemented the program and recorded data in their homes with the target children.

Measurement

Three primary dependent variables were investigated: toilet elimination initiated by the child, toilet elimination initiated by an adult, and non-toilet elimination. Parents were taught to classify, identify, and record data on the three variables as part of the workshop, using data sheets provided by the researcher (Appendix C). One secondary variable, social validity, was also examined.

Toilet Elimination

Toilet elimination was defined as urination in the toilet. If the child emitted any amount of urine into the toilet, the parent recorded a success on the appropriate data sheet (Appendix C), noting the time that it occurred. If defecation in the toilet occurred, it was also noted on the data sheet.

Child- or parent-initiated elimination. Parents also noted on the data sheet whether a toilet elimination was initiated by the child or a parent. Toilet trips were scored as child-initiated if a child independently requested to use the toilet, alerted a parent of the need to use the toilet (i.e., by gesturing toward it), or approached the toilet without a prompt to do so. Toilet trips were scored as parent-initiated if a parent told the child to use the toilet or physically prompted the child to approach the toilet or if elimination occurred during a parent-implemented scheduled toilet sitting.

Non-Toilet Elimination

Non-toilet elimination was defined as urination that occurred in any location other than the toilet. If a child emitted any amount of urine in a location other than the toilet, the parent recorded the elimination as unsuccessful on the data sheet, noting the time that

it occurred. If a child began to urinate somewhere other than the toilet but finished urinating in the toilet, the parent scored the event as both an in-toilet and a non-toilet elimination. Non-toilet defecation was also recorded on the data sheet if it occurred. During baseline, wet diapers were scored as non-toilet eliminations. However, it is possible that parents may not have noticed a wet diaper until multiple urinations had occurred; thus, the number of non-toilet eliminations recorded in baseline may be lower than the true figure.

Social Validity

The social validity of the intervention was measured by administering a questionnaire to the parents at a follow up visit that occurred 2 weeks after they finished implementing the toilet training procedure with their child (Appendix D). The questionnaire used a 5-point Likert scale to assess the importance of the goals, procedures, and outcomes of the training program from the parents' perspective. Several questions were included to assess the parents' perception of self-efficacy following the workshop and intervention implementation.

Inter-observer Agreement (IOA)

Because parents implemented the intervention independently in their homes, in vivo measure of inter-observer agreement could not be calculated. The sensitive and private nature of the intervention target (i.e., independent toileting) prevented the researcher from videotaping the intervention as it was implemented, for ethical reasons (i.e., the likelihood that children would be videotaped in a semi-naked state). However, as noted by Cicero and Pfadt (2002), both the transparency of the operationally defined

target behaviour (i.e., urination in the toilet) and the high IOA reported in previous toilet training studies reduced the need for point-by-point reliability data. Nonetheless, in order to obtain some measure of reliability, the researcher visited the participating families in their homes 2 weeks after the intervention period concluded in order to confirm that the children were indeed using the toilet for elimination, when parent-reported data indicated that this was the case.

Research Design

A multiple-baseline design across two toilet training groups (each with three families) was used to assess the impact of the independent variable on the dependent variables. The design had three phases: baseline, an RTT parent training workshop, and parent implementation of the RTT procedures. Baseline data were collected by families in the first group for 4 days prior to the workshop. Following the workshop, Group 1 implemented the intervention while families in the second group continued to collect baseline. After 11 days of baseline, Group 2 participated in the workshop and proceeded to implement the intervention afterward.

Procedure

Initial Visit

During the initial home visit, parents who signed the consent form were asked to provide demographic information about themselves, their family, and the target child, including a detailed toilet training history (Appendix E). In addition, parents were provided with a list of items to either purchase (e.g., drinks, underwear) or gather/plan (e.g., enjoyable activities in which the child could engage while on the toilet), in

preparation for the toilet training intervention (Appendix F). The researcher discussed each item with the parents and gave examples as needed. If requested, the researcher assisted the parent to gather the necessary items and/or helped to identify appropriate items to purchase. During this visit, parents were also assisted to make a number of decisions that were relevant to the study, including which parent(s) and/or caregiver(s) would be involved in the training, where in their homes toilet training would occur, and whether their child would wear underwear or nothing from the waist down during training.

Baseline

Procedures for collecting baseline data were explained to parents at the initial visit after they signed the consent form. They were provided with data sheets (Appendix G) and were told when to commence baseline data collection. Group 1 parents collected baseline data for 4 days prior to their workshop and Group 2 parents collected data for 11 days prior to their workshop.

Parent Training Workshop

Parents participated in two group workshops (three families in each) that were conducted one week apart. Each workshop took place over approximately 4 hours, plus snack breaks and a break for lunch (provided by the researcher). During the workshop, for each component of the RTT protocol, parents received (a) a written and verbal description, (b) a videotaped demonstration, implemented by the researcher with a life-size training doll, (c) opportunities to role play the component and receive feedback from the researcher, and (d) a short quiz in which the researcher provided several videotaped

models of the component with a doll and the parents were asked to determine whether the component was conducted correctly or incorrectly. If one or more parents had difficulty learning any part of the intervention, additional time was spent discussing and role-playing that component. Participants were encouraged to ask questions and respond actively throughout the workshop. All parents were provided with a handout copy of the Powerpoint® slides used for the training to take home as a reference, as well as multiple copies of the data forms required for implementation (Appendix C).

The components of the toilet training workshop were based on RTT practices without the use of aversive punishment techniques (Azrin & Foxx, 1971; Kroeger & Sorensen, 2010) and focused on a number of procedures that were designed to teach continent toileting. These included scheduled toilet sittings, increased fluid intake, positive reinforcement for correct toileting, a non-punitive accident procedure, a protocol of scheduled chair sittings to teach the child to initiate trips to the toilet, data collection, and maintenance.

Scheduled toilet sittings. Parents were taught to prompt their child to sit on the toilet for predetermined amounts of time, starting with 30 minute intervals. While on the toilet, children could engage in enjoyable activities that helped them to remain seated (e.g., reading books, playing on a laptop computer, watching television; ideas for activities were discussed at the initial meeting and parents gathered the necessary materials ahead of time). If the child eliminated in the toilet, the parent provided a 5-minute break before starting the next scheduled sitting. Sitting time on the toilet was decreased by 5 minutes and the break for a successful elimination was increased by 5 minutes after every three consecutive successful eliminations on the toilet (i.e., 30

minutes on the toilet and a 5 minute break, then 25 minutes on the toilet and a 10 minute break, then 20 minutes on the toilet and a 15 minute break).

Increased fluid intake. Increased fluid intake involved providing the child with as much of one or more preferred liquids as he or she would consume, with the goal of having the child drink at least 4-6 ounces of liquid per hour. Parents were taught to offer sips of preferred drinks frequently but not to force drinking at any time. Parents did not specifically measure the amount of liquid the child consumed.

Positive reinforcement for correct toileting. When a child eliminated in the toilet, the parent was taught to provide immediate positive reinforcement in the form of lavish praise and activities or items that the parents assumed would function as reinforcers, based on their children's known preferences. Reinforcers were identified by the parent and researcher at the initial meeting and each parent gathered a variety of potential reinforcers prior to starting the intervention.

Accident procedure. If a child eliminated anywhere other than the toilet, the parent was taught to attempt to move the child to the toilet quickly so that some urine was deposited in the toilet. If this happened, the incident was treated as a success and was followed by immediate reinforcement and a break from the toilet. If the child finished urinating somewhere other than in the toilet, the parent was taught to clean the child and change his or her clothes quickly and quietly, without talking about or drawing any attention to the accident.

Chair sittings to teach initiation. After the child had three consecutive in-toilet eliminations in phase 3 of scheduled toilet sittings (i.e., 20 minutes on the toilet, 15

minutes break after successes), parents were taught to implement scheduled chair sittings if the child had not already started move to the toilet independently to eliminate. A chair was placed 2 feet away from the toilet and the child was seated on the chair, using the same schedule of intervals as in scheduled toilet sittings. If the child did not move from the chair to the toilet when he or she began to eliminate, the parent prompted the child to do so using the least intrusive prompt possible. Once the child moved from the chair to the toilet and eliminated completely without prompts on one occasion, the chair was moved 2 feet further away from the toilet. After each child-initiated success, the chair was moved 2 feet further from the toilet until it was 20 feet away, at which time the chair was removed completely.

Maintenance and generalization. After the child finished the schedule of toilet sittings and, if necessary, chair sittings, parents were taught to provide opportunities to use other toilets in their own home or in familiar locations, while still providing reinforcers for successful elimination. Parents also faded the presentation of reinforcers for successful toileting over time by switching to one reinforcer at the end of the day for an “accident free” day or by providing a reinforcer after every 3, then 5, then 10 successes on the toilet. Several options for fading reinforcers were taught, and parents were invited to select the one they felt would be most effective for their child.

Parent-Implemented Intervention

Beginning the day following the workshop, parents implemented the RTT procedure in their homes with their children. Throughout the intervention period, parents were invited to contact the researcher by telephone at any time if they had any questions or concerns about implementing the protocol. Additionally, the researcher contacted

each parent by telephone each evening to receive a data report on the child's in-toilet and out of-toilet eliminations for the day (i.e., the dependent variables). Parents were reminded frequently that the researcher was prepared to provide in vivo support in the family home or by telephone, as often as needed.

Data Collection and Analysis

Parents recorded data on their child's elimination throughout the intervention using the data forms provided to them during the workshop (Appendix C). The researcher telephoned parents for data reports at least once per day during the intervention period. The effectiveness of the workshop was assessed by visual inspection of the data, following the rules of evidence for single subject research methodology. Changes in the frequency of in toilet elimination across phases were used to determine the impact of the intervention.

Social validity data were collected by the researcher during a visit to each family's home 2 weeks after the intensive intervention was complete. Parents were given the option to review the questionnaire and mail it to the researcher or complete it immediately and hand it back to the researcher. All five parents chose to fill out the questionnaire immediately and give it back to the researcher.

CHAPTER 3: Results

The primary goal of this study was to determine whether attendance by parents at an RTT workshop would result in acquisition of urinary continence by children with developmental disabilities. The data were analyzed using individual graphs for each group of participants. The research design did not allow for the demonstration of a functional relationship between the RTT workshop and improvements in child toileting, because only two time points rather than the required three were involved (Horner et al., 2005). However, the data provided evidence that the RTT workshop and subsequent implementation was associated with substantial improvements in toileting-related behaviours for 5 of the 6 participating children (i.e., a basic effect; personal communication, Robert H. Horner, July 7, 2011).

Question #1: Urinary Continence

The first research question in this study was: Is there an association between a workshop-taught, parent-implemented modified RTT intervention and the acquisition of urinary continence in children with developmental disabilities? Figure 1 displays data related to this question for Group 1 and Figure 2 displays data for Group 2. Table 1 displays the range of urination incidents per day in baseline, intervention, and follow-up for all participants. For 5 of the 6 participants, a dramatic change in level from baseline to intervention is apparent in the data, although the patterns of acquisition and behaviour change varied across participants.

Group 1

Rebecca (Janice). At baseline, 100% of Rebecca's urination occurred out of the toilet. Immediately following the onset of intervention, changes in the desired direction were reported: out-of-toilet urination decreased while in-toilet urination increased. Change in the desired direction continued with an increasing trend across the 8 days in which Janice implemented the RTT procedures. At 2-week post-intervention follow-up, Rebecca was using the toilet for 100% of parent-initiated opportunities to do so and had no accidents. However, Rebecca did not learn to initiate urination during the intervention period. At 2-week follow-up, Janice reported taking Rebecca to the bathroom approximately every 2 hours and noted that if Rebecca was not taken to the toilet by an adult, she continued to have accidents. At 1 month follow up, Janice reported that Rebecca had started to initiate in-toilet urination and typically did so 1-2 times/day, although she still had intermittent accidents.

Lucy (Ava). At baseline, 100% of Lucy's urinations occurred out of the toilet. At the onset of intervention, immediate changes in the desired direction were reported: out-of-toilet urination decreased while in-toilet urination increased. However, Ava terminated participation in the study on day 7 of the implementation period because she (Ava) required an unrelated medical intervention.

Amir (Chana). At baseline, 100% of Amir's urinations occurred out of the toilet. At the onset of the intervention, Chana reported immediate changes in the desired direction: out-of-toilet urination decreased while in-toilet urination increased. After 3 days of implementing the intervention, Chana sent Amir to his centre-based behavioural intervention program for two 6-hour days, which resulted in a two-day "break" from

implementing the procedure. However, when Chana re-initiated the procedure after this break, Amir's increasing trend continued. At the 2-week follow-up, Amir was initiating use of the toilet for 80% of opportunities and had no accidents. At the 1-month follow up point, Amir also initiated for 80% of in-toilet urinations and had no accidents.

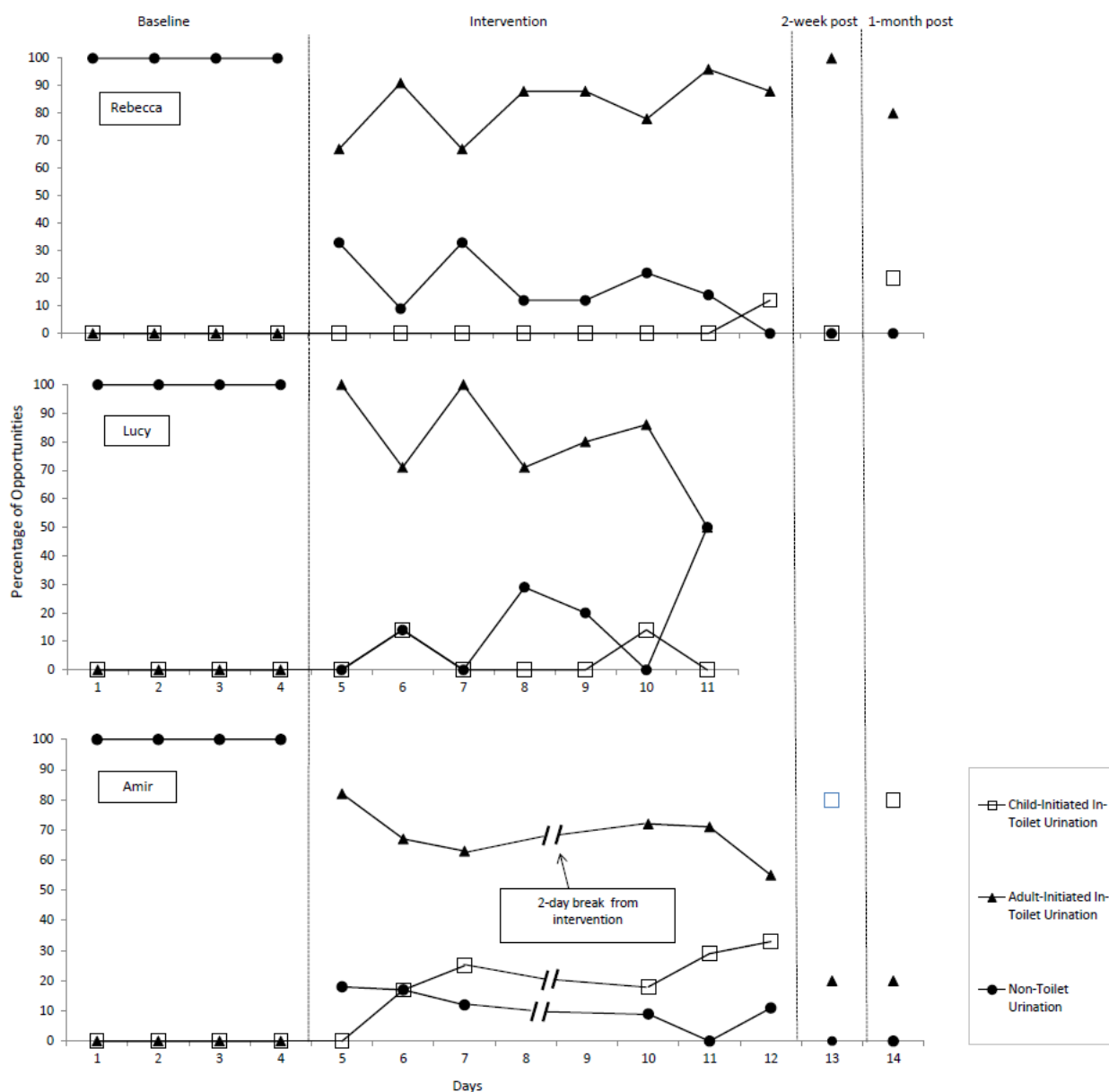


Figure 1. Results of toilet training intervention on urinary continence for group 1.

Group 2

Andy (Leanne). At baseline, 100% of Andy's urinations occurred out of the toilet. At the onset of the intervention, Leanne reported immediate changes in the desired direction: out-of-toilet urination decreased while in-toilet urination increased. By day 3 of intervention, 100% of urinations were initiated by Andy. Andy continued to initiate all incidents of urination throughout the intervention period and at the 2-week and 1-month follow-up checks and had no accidents.

Mark (Jack). Jack demonstrated variable success with in-toilet urination during baseline. While he initiated use of the toilet during baseline for up to 80% of opportunities, he continued to have accidents. When the RTT intervention started, Jack's child-initiated in-toilet urinations increased immediately while his out-of-toilet urinations decreased across the intervention period. At the 2-week follow-up point, Jack initiated 50% of in-toilet urinations and adults initiated the other 50%. There were no accidents. Mark noted that the adult-initiated urinations on the follow-up day occurred when Jack's parents prompted him to use the toilet prior to outings and as part of a bedtime routine. At the 1-month follow-up point, Jack initiated 64% of incidents of in-toilet urination and had no accidents.

Jamie (Sandra). At baseline, Jamie demonstrated some success with adult-initiated in-toilet eliminations, but the majority of urinations occurred out of the toilet. At the onset of intervention, the data reflected immediate changes in the desired direction: out-of-toilet urination decreased while in-toilet urination increased. During the intervention period, Jamie did not begin to initiate toilet trips. Sandra continued to take him to the toilet at increasingly longer intervals over the subsequent weeks and

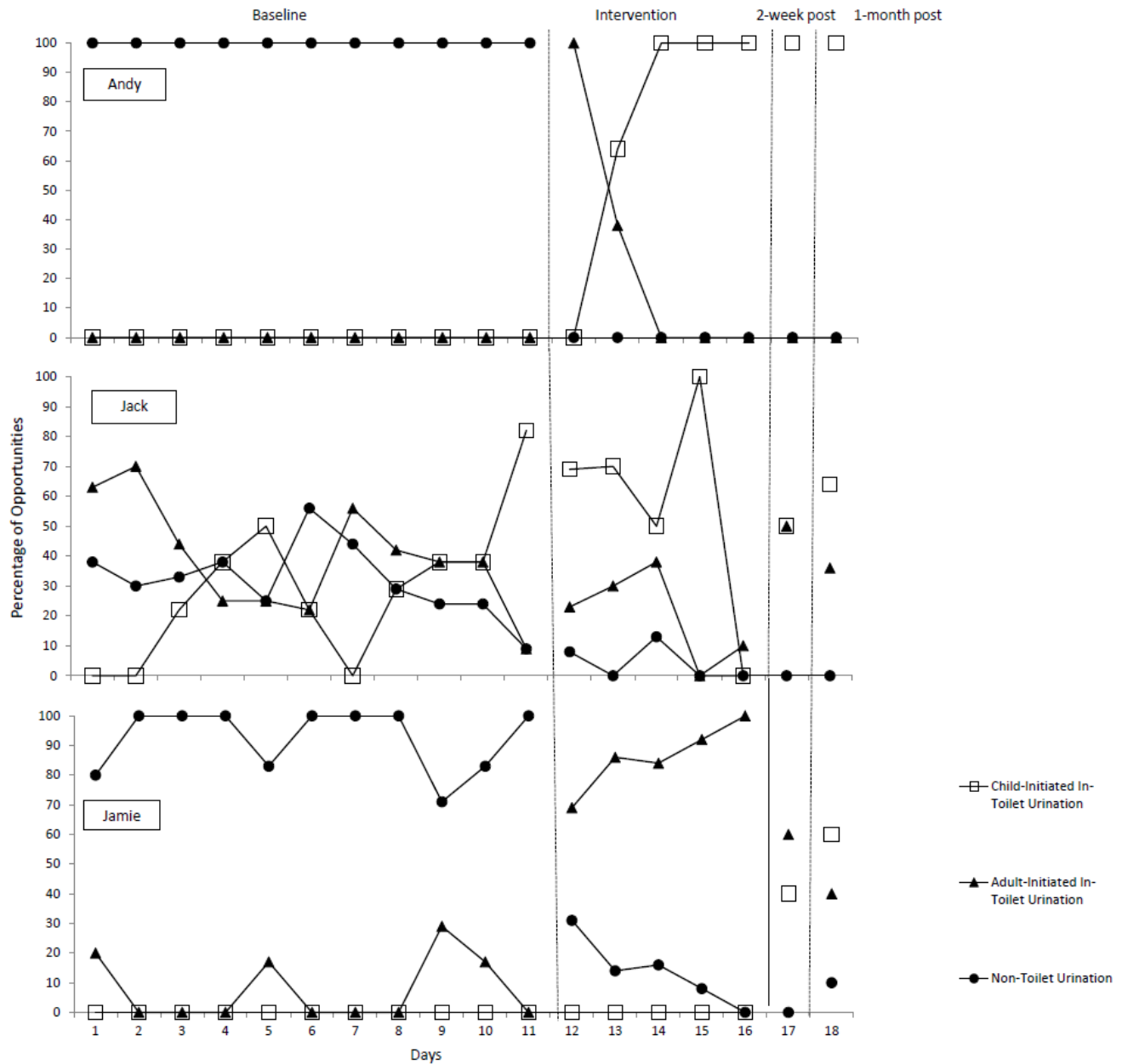


Figure 2. Results of toilet training intervention on urinary continence for group 2.

eventually reported that she felt comfortable fading prompts to take Jamie to the toilet. By the 2-week follow-up point, Jamie was initiating 40% of incidents of in-toilet urination, and at the 1-month follow-up point, Jamie initiated 60% of incidents of in-toilet urination and had no accidents.

Table 1

Range of Urination Incidents Per Day

Parent (Child)	Baseline	Intervention	Follow-Up
Janice (Rebecca)	3-6	6-14	4-5
Ava (Lucy)	4-5	7-10	3-5
Chana (Amir)	3-5	10-18	4-6
Leanne (Andy)	3-7	13-19	4-5
Mark (Jack)	6-10	11-18	7-8
Sandra (Jamie)	4-6	6-12	5-6

Table 1 provides evidence that (a) urinations increased dramatically during the intervention period, when increased fluid intake was in effect; and (b) at follow-up, when increased fluid intake had been discontinued, in-toilet urinations occurred at approximately the same rate as had out-of-toilet urinations during baseline.

Question #2: Fecal Continence

The second research question was: Does the parent-implemented modified RTT intervention result in generalization to defecation continence without additional focus on this skill area? Figure 3 displays data related to this question for Group 1 and Figure 4

displays data for Group 2. For 5 of the 6 participants, a dramatic change in level from baseline to intervention is apparent in the data displays, although patterns of acquisition and behaviour change varied across participants.

Group 1

Rebecca (Janice). At baseline, Rebecca defecated in her diaper for all opportunities and had no history of in-toilet defecation. On Days 1 and 2 of the intervention, Rebecca continued to defecate in her diaper. However, on Day 3, Rebecca defecated in the toilet during an adult-initiated scheduled sitting. By the end of the intensive intervention period and at both follow-up points, Rebecca was consistently defecating in the toilet. However, there were no incidents of child-initiated in-toilet defecation during the intervention or follow-up points. Rebecca had no fecal accidents at the follow-up points.

Lucy (Ava). Lucy demonstrated no in-toilet defecation during baseline, but immediately began defecating in the toilet during adult-initiated scheduled toilet sittings for all opportunities at the beginning of the intervention period. At the time Ava terminated participation in the study, Lucy had not yet demonstrated any child-initiated in-toilet defecation.

Amir (Chana). Amir demonstrated no in-toilet defecation during baseline, but immediately began defecating in the toilet during adult-initiated scheduled toilet sittings at the onset of the intervention period. The trend toward positive defecation behaviours continued after Amir's 2-day break from the intervention. On the final day of intensive

intervention and at the 1-month follow up point, Amir demonstrated child-initiated in-toilet defecation and no accidents.

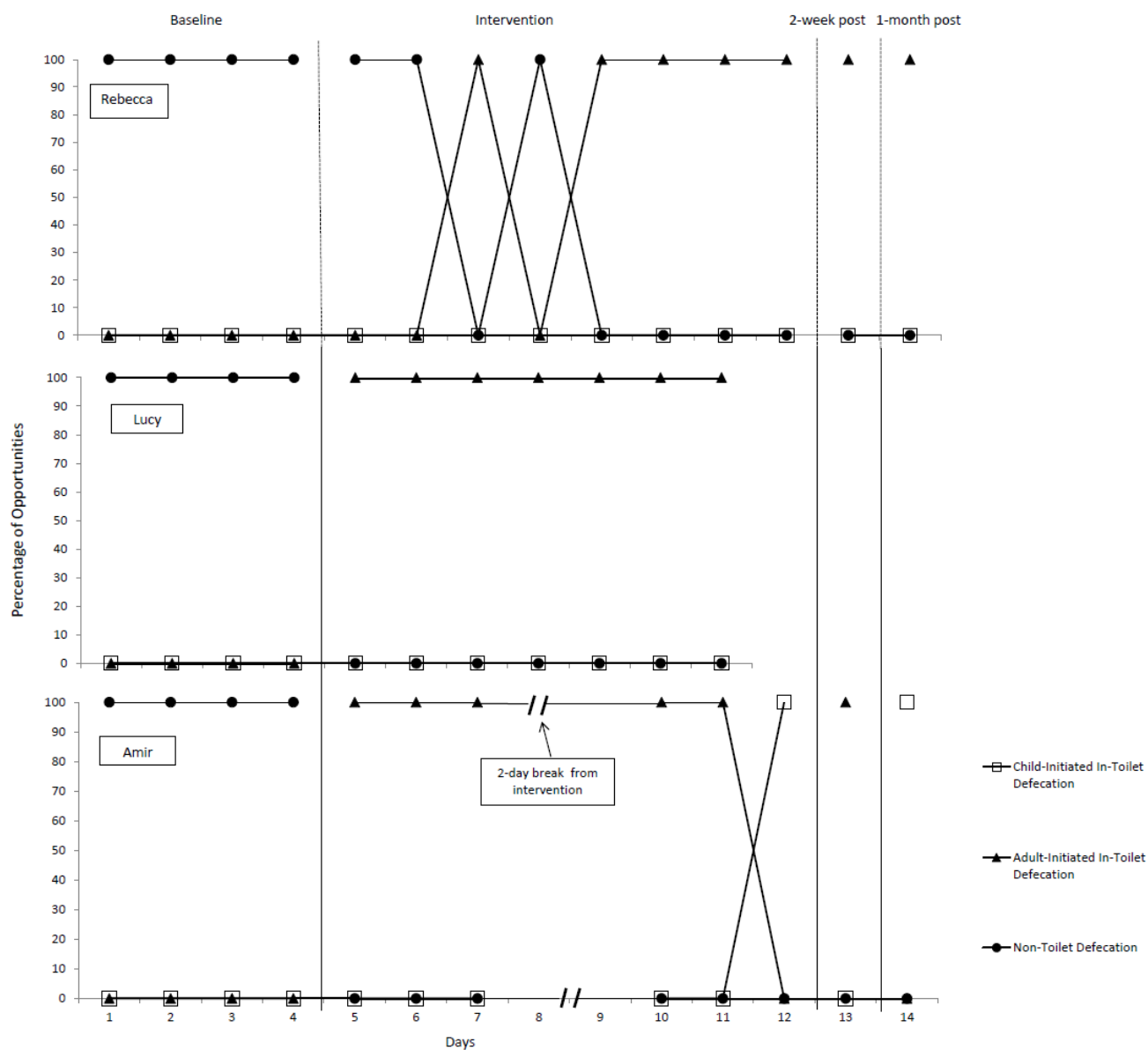


Figure 3. Results of toilet training intervention on fecal continence for group 1.

Group 2

Andy (Leanne). Andy demonstrated no in-toilet defecation during baseline and on Day 1 of the intensive intervention. On Day 2 of the intervention, Andy defecated once in the toilet during an adult-initiated scheduled toilet sitting and once child-initiated. Aside from one non-toilet defecation accident on Day 4 of the intervention, Andy's in-toilet defecation continued to improve. At both the 2-week and 1-month follow-up periods, all incidents of defecation were child-initiated and there were no accidents.

Jack (Mark). As with urination, Jack's recorded baseline for defecation was varied. He had some success with in-toilet defecation during baseline, but it was inconsistent. Data remained variable throughout the intervention period, with a trend toward in-toilet defecation. At the 2-week follow up point, Jack demonstrated 1 incident of child-initiated in-toilet defecation and 1 incident of adult-initiated in-toilet defecation and no accidents.

Jamie (Sandra). At baseline and during Day 1 of the intensive intervention, Jamie demonstrated no in-toilet defecation. On Day 2 of the intervention, Jamie did not defecate at all. By Day 3, however, in-toilet defecation was demonstrated. While Jamie did not initiate trips to the toilet that resulted in defecation during the intensive intervention period, both follow-up points show child-initiated in-toilet defecation and no accidents.

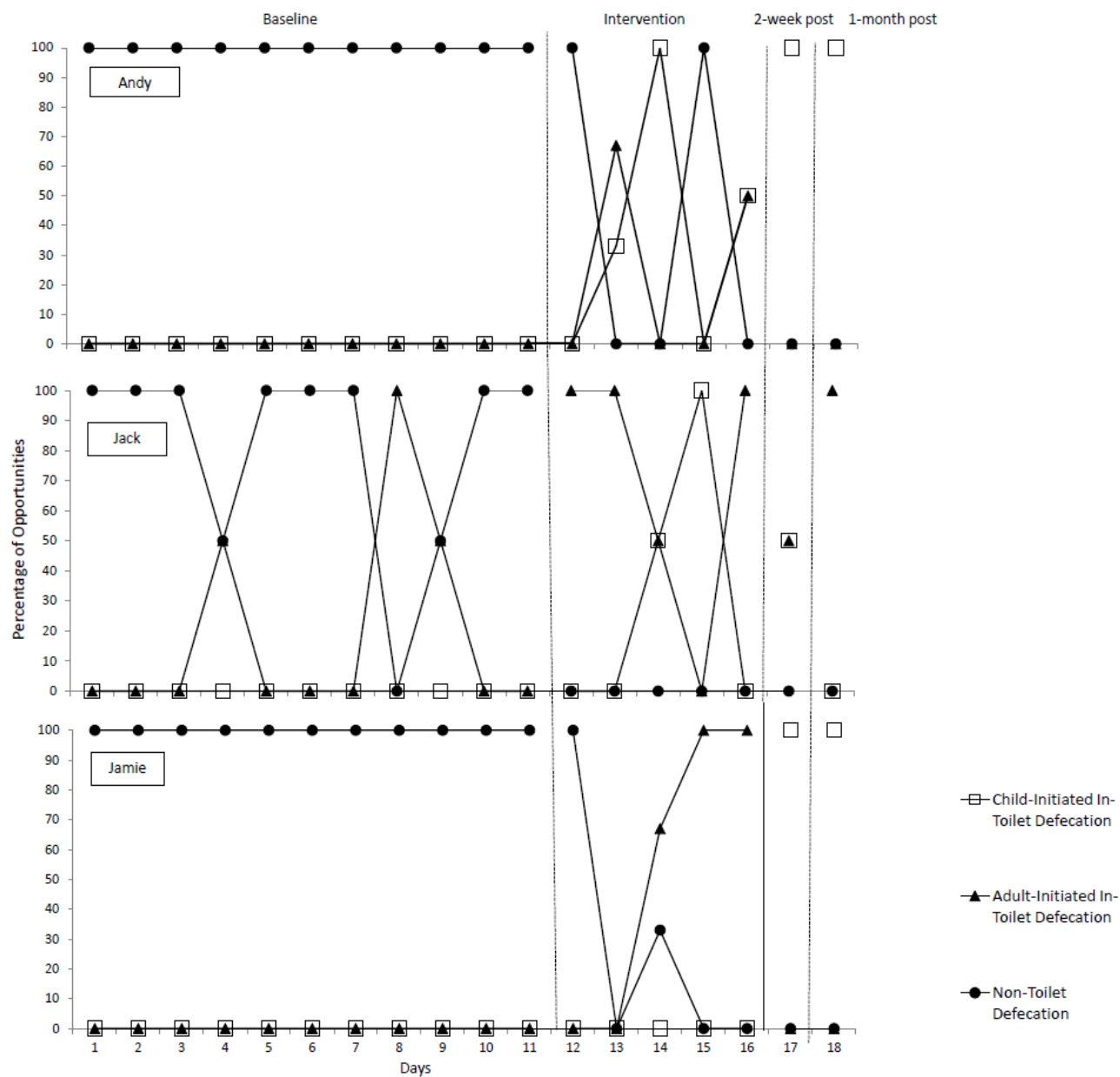


Figure 4. Results of toilet training intervention on fecal continence for group 2.

Jamie (Sandra). At baseline and during Day 1 of the intensive intervention, Jamie demonstrated no in-toilet defecation. On Day 2 of the intervention, Jamie did not defecate at all. By Day 3, however, in-toilet defecation was demonstrated. While Jamie did not initiate trips to the toilet that resulted in defecation during the intensive intervention period, both follow-up points show child-initiated in-toilet defecation and no accidents.

Question #3: Social Validity

The third research question in the study was: How do parents rate the social validity of the intervention and their perceptions of its effect on their self-efficacy? All parents except for Ava, who dropped out of the study for medical reasons, completed the social validity survey; Table 2 displays the results.

Overall, parents rated the social validity of the study very highly. The fourth question, which asked parents whether they were confident that they would be able to use the toilet training strategies to address toileting problems in the future, was rated 5 out of 5 by all parents. This suggests that participation in the study contributed to positive self-efficacy related to toilet training.

Table 2

Number of Parents Who Provided Ratings for Each Social Validity Statement

Statement	Rating					
	0 (not at all)	1	2	3	4	5 (very much so)
My child's ability to use the toilet properly is important to me.	0	0	0	0	0	5
The strategies I learned were helpful for toilet training my child.	0	0	0	0	1	4
My child's ability to use the toilet increased as a result of the strategies I learned.	0	0	0	0	1	4
I am confident that I will be able to use the strategies I learned to address toilet training problems in the future.	0	0	0	0	0	5

Parent Support

Parents were informed that they could ask the researcher to come to their house to provide in vivo support at any time during the intervention period. None of the parents requested in vivo support at any time. In addition, parents were instructed to contact the researcher by phone with any questions or concerns as they implemented the RTT intervention at home with their children. Parents also contacted the researcher each evening to report the data for the day, and sometimes asked questions during this phone call as well. Table 3 summarizes the number of question-related phone calls (including the data call, if a question was asked) during the intensive phase of RTT implementation.

Table 3

Number of Question-Related Phone Calls to the Researcher by Each Parent

Parent (Child)	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Total
Janice (Rebecca)	2	1	2	1	1	1	2	1	11
Ava (Lucy)	1	1	0	0	0	0	n/a	n/a	2
Chana (Amir)	1	1	0	n/a	n/a	1	0	0	3
Leanne (Andy)	1	1	0	0	0	0	0	0	2
Mark (Jack)	1	1	0	0	0	0	0	0	2
Sandra (Jamie)	1	1	1	1	0	1	0	0	5

Janice (Rebecca). On the first day of the intervention, Janice called twice to verify the intervention plan with the researcher; specifically, she was not sure how to progress through scheduled toilet sittings and wanted to ensure she had the interval timings correct. On day 2, Janice was concerned about whether the reinforcers she had selected were potent enough for the intervention and described Rebecca's reaction to them to the researcher. On day 3, Janice was concerned about the number of accidents Rebecca was having and asked the researcher for advice on "catching" the accidents as they occurred so that she could redirect Rebecca to the toilet more successfully. On subsequent days, Janice called to ask general questions about the intervention, such as how the other participants in the study were doing, or how long it might take for Rebecca to be completely toilet trained.

Ava (Lucy). On the first day of the intervention, Ava called to verify the time intervals to be used in scheduled toilet sittings. On the second day, Ava called to ask whether it was acceptable to provide Lucy with a choice of reinforcers after successes on the toilet. Days 7 and 8 appear as 'n/a' on Table 3 because Ava had discontinued her participation in the study by that time.

Chana (Amir). On the first day of intervention, Chana called to ensure she had the definitions of adult-initiated in-toilet urination versus child-initiated in-toilet urination correct. On the second day, she called to say she was struggling with implementation and asked for encouragement from the researcher. Days 4 and 5 appear as 'n/a' on Table 3 because Amir attended his centre-based intervention program and Chana took these days off from implementing the intervention.

Leanne (Andy). On the first and second days of intervention, Leanne called because she was concerned about Andy “dribbling” urine in the toilet. He appeared to be holding his urine and would only relax his muscles enough for a small amount to escape at a time. Leanne asked whether to provide a reinforcer for these incidents of urination. The researcher suggested placing a disposable aluminum baking pan in the toilet to make the urination more audible; Leanne decided to give reinforcers for all audible instances of urination. The “dribbling” problem did not appear after the first 2 days of intervention.

Mark (Jack). On the first and second days of intervention, Mark called the researcher because Jack appeared to be initiating toilet use (by using a sign) to get out of non-preferred activities. Mark asked whether he should honour all Jack’s requests to use the toilet. After describing the problem to the researcher, Mark decided to take Jack to the toilet only if (a) it was likely that Jack needed to empty his bladder, based on his past urinary patterns; and (b) if Jack was not engaged in a non-preferred activity from which escape by requesting to use the toilet might be motivating.

Sandra (Jamie). Across the intervention, the main purpose of Sandra’s calls was to verify the plan and ensure she was implementing correctly. Typically, either shared her successes or asked the researcher for encouragement when she was having difficulty with implementation. On day 3, Sandra called with a specific query: she was concerned that Jamie was not yet initiating trips to the toilet and said she was not comfortable using the chair sittings to teach initiation as she was not sure it would work for Jamie. The researcher gave Sandra the option of gradually extending the off-toilet time intervals and Sandra decided to do so over the subsequent days of intervention.

Summary

For 5 of the 6 families participating in the study, dramatic positive changes in child toileting behaviours occurred after the parents participated in an RTT-derived toilet training workshop. Four of the 5 children were initiating use of the toilet for the majority of urination opportunities, and the other participant demonstrated some initiation by the 1-month follow-up point. Additionally, although the RTT-derived workshop focused only on urination, an increase in in-toilet defecation was seen in 5 of the 6 participants.

Parents were not asked to record specific data on generalization to new toilets, but all parents reported that their children had used toilets in other settings (e.g., relatives' homes, schools and centres, public places) at least once at the time of the 2-week follow up and no parents reported concerns with generalization to new toilets.

CHAPTER 4: Discussion

A significant amount of previous research indicates that RTT-derived toilet training protocols are effective at teaching continence to individuals from a variety of populations (Kroeger & Sorensen-Burnworth, 2009). By teaching parents to implement the toilet training protocol developed by Kroeger and Sorensen (2010), this study serves as an extension of their work. However, while Kroeger and Sorensen trained parents to implement the protocol with in vivo support, the current study differs in two ways: a) parents were taught to implement the procedure in small group workshops, and b) no in vivo implementation support was provided. The results demonstrate a basic effect between an RTT-derived workshop and positive toileting behaviours in participating children, and contributes to the small body of toilet training research involving parents (Kroeger & Sorensen, 2010; Leblanc et al., 2005).

A unique contribution of the present study was the use of a workshop format to teach parents to toilet train their children. Although the level of fidelity with which the parents implemented the procedures they learned at the workshop was not measured, the data they reported provide evidence that they were able to toilet train their children after attending the workshop. The success of the workshop can be attributed to the fact that it incorporated several evidence-based training techniques, such as engaging in role playing and receiving feedback (Whittingham et al., 2009) and providing video examples (Aman et al., 2009). The workshop also included definitions of all toilet training components, models with a life-sized doll, opportunities for the parents to respond and receive feedback, and quizzes that had to be ‘passed’ before moving on, all of which are features of effective behavioural skills training (e.g., Minjarez et al., 2010).

Initiation Training

Initiation training, which was taught using scheduled chair sittings, appeared to be the most challenging component of the RTT protocol for some parents. In each toilet training workshop group, one or more parents asked the researcher to review the scheduled chair sittings component and to provide more role play examples; this was the only component of the workshop of which any parent from either group requested review.

During the workshops, 3 of the 6 parents commented that they did not anticipate their children would learn to initiate. However, all 5 participants who completed the study demonstrated some urination initiation by the time of the one-month follow-up point. For 2 of the 5 children (Amir and Jamie), initiation did not occur more than 50% of the time until follow-up; and for one participant (Rebecca), initiation had only occurred a few times at the 1-month follow-up. Similar issues with initiation training were not documented in Kroeger and Sorensen's (2010) study, in which both participants were initiating within the first 4 days of intervention.

There are several differences between procedures of the present study and Kroeger and Sorensen's (2010) that might account for this discrepancy. First, parents in the present study were taught the toilet training techniques they would need in a workshop prior to implementation, whereas Kroeger and Sorensen taught the parents techniques on an ongoing basis, as they were needed, according to the child's progress. Thus, in the present study, by the time parents implemented the scheduled chair sittings component of the toilet training intervention, several days had passed since they had learned the procedure at the workshop. This may have lead to some confusion over the

specifics of implementation. Additionally, several parents attending the workshop noted that the scheduled sittings component seemed the most challenging, and one parent in each group asked the researcher to go over it again. Challenges in parent mastery of this part of the workshop may be associated with challenges in accurate implementation of scheduled chair sittings, which might explain the difficulty with acquisition of child-initiated toileting.

Emergent Defecation Continence

During the RTT-derived workshop, defecation was not mentioned specifically, and all examples, definitions, role plays, and quiz questions focused solely on urination training. In fact, the majority of toilet training studies have focussed on teaching both continent urination and continent defecation separately, using similar RTT-derived tactics (Kroegeer & Sorensen-Burnworth, 2009). However, the results of this study suggest that it may be unnecessary to provide separate tactics for urination and defecation training, as all five child participants who completed the study demonstrated defecation continence by the end of the intervention period. This may be related to the fact that the anal and urethral muscles are closely linked and can only be contracted simultaneously (Weed, 2006); thus, training for urination may be sufficient in order for continent defecation to occur. Additional research is needed to examine this issue more closely.

Variations to the Toilet Training Protocol

Although the participating children had diverse toilet training backgrounds (e.g., some children, such as Andy and Rebecca, had not been involved in any toilet training; others, such as Jack and Amir, had some success with toilet training prior to the study),

the parents were all taught to implement the same procedure in the workshop. However, implementation challenges that occurred during the implementation period resulted in some changes being made to the protocol on a case-by-case basis to ensure goodness of fit.

Break From Intervention. Traditional RTT (Azrin & Foxx, 1971) emphasizes continuous, intensive toilet training intervention. To date, no toilet training studies have documented the effects of a break during the intervention period. However, one parent in this study, Chana, did not want her son Amir to miss his centre-based early intervention program for the entire study period, and decided to take 2 days off from the intervention in order to send him to the program in diapers. After the 2-day break, Chana again began implementing the protocol where she had left off, and the ascending trend in Amir's positive toileting behaviours continued. Additional research on this issue is required, and may have important implications; for example, parents who engage in RTT-derived procedures but are overwhelmed with the intervention or experience an emergency requiring their attention could be offered the opportunity to take a break from the intervention if subsequent studies confirm that such a break is unlikely to hinder the toilet training process.

Adaptations to Toileting Apparatus. In the early part of the intervention period, Leanne was concerned that Andy was dribbling small amounts of urine into the toilet but was not emptying his bladder. She was unsure of whether to provide a reinforcer for this behaviour and phoned the researcher for help. At the researcher's suggestion, Leanne placed an aluminum foil roasting pan in the toilet in order to make the urination more

audible, and subsequently provided a reinforcer only for clearly audible incidents of urination (Mirenda, 2006). This appeared to resolve the issue for Leanne and Andy.

Changes to Initiation Training Protocol. When it was time to begin scheduled chair sittings with Jamie, Sandra was apprehensive about attempting the chair sitting procedure and told the researcher via telephone that she did not want to go ahead with it. Accordingly, the researcher suggested remaining in the scheduled toilet sitting phase while gradually increasing the off-toilet interval to a schedule beyond that originally planned. Sandra did this until she was taking Jamie to the toilet every 1.5 hours, at which time he began initiating on his own. Sandra reported that Jamie often went to the toilet on his own just before she was about to prompt him to go.

Social Validity and Parent Experiences

Overall, parents were extremely pleased with the outcomes of the intervention, as is evidence from the uniformly high social validity ratings. At the 1-month follow-up point, one parent commented, “I still can’t believe that [my child]’s toilet trained and that I did it!” Another noted, “I feel like I can teach [my child] so many things now.” However, every participating parent noted at least once during the intervention that the RTT protocol was challenging to implement. One parent said, “This is the hardest thing I’ve ever done! It’s so hard to stick with it all day.” Another told the researcher, “When you said that we would have to cancel everything for a few days and just focus on this, you weren’t kidding.” Nonetheless, during the follow-up visit, all five parents told the researcher that their hard work was worth the toileting success. One parent noted, “I learned a lot about [my child] being so focused on him for a few straight days.” Another

said, “I am really proud of [my child] and I’m really proud of myself. I can’t believe we did this.”

Clinical Implications

This study extends the small body of toilet training research that involves parents, further corroborating the notion that training parents to be involved in toilet training their children can be successful. Aside from the increased self-efficacy reported by parents as a result of such involvement (LeBlanc et al., 2005) it is also important to note the financial advantages of involving parents in a toilet training intervention. Parents in this study implemented the intervention for 10-12 hours/day over at least a 4-day period. If they had hired a behaviour analyst to implement the intervention for 40-48 hours at \$70 per hour (the lowest rate charged by behaviour analysts in British Columbia), they would have paid between \$2,800-\$3,360 each. The approximately 10 hours of in vivo and phone support provided by Kroeger and Sorensen (2010) would have cost families at least \$700 each (or \$2,100 for 30 hours across 3 families). In contrast, this study consisted of a 5-hour workshop for 3 families plus no more than 5 hours per family of pre-training meetings and intervention phone support – for a total of 20 hours that would have totalled \$1,400 across 3 families. Thus, involving parents in a workshop-based RTT intervention appears to be an economical pursuit for clinical practice, as paying to attend a workshop and receive follow-up support is likely to be much more affordable than the other two options. Additionally, the workshop-training format used in the study has positive clinical implications. Parents in rural areas could travel to a workshop on toilet training and then return home to implement the intervention, receiving telephone support from a

practitioner who would be unable to travel regularly to the family home. Practices such as these can help to mediate the limited availability of resources to families in rural areas.

Limitations and Directions for Future Research

One limitation of the present study is that the design did not enable demonstration of a functional relationship between the toileting workshop and improvements in child continence. In order for a functional relationship to be demonstrated within a multiple baseline design, it is necessary that a covariation between change in behaviour patterns and introduction of the intervention occur at three different points in time (Horner, Carr, Halle, McGee, Odom, & Wolery, 2005). As only two workshop groups participated in the study, intervention began for participants at two different points in time, rather than three. Thus, the study provided evidence for a basic effect (personal communication, Robert H. Horner, July 7, 2011) but not a functional relationship between the independent and dependent variables.

Only six families participated in this study and only five completed the toilet training protocol, which limits the external validity of the findings. However, external validity is enhanced by the diversity of the parents who were involved (described in detail in Participants). Parents in the study had a range of education and employment histories, and all of the parents in Group 1 spoke English as a second language. The child participants also displayed considerable diversity with regard to chronological age, diagnosis, educational experience, speech ability, adaptive skills, and toilet training histories. Nonetheless, additional research is needed with more diverse participant samples, perhaps including toilet training workshops with larger groups of parent or caregivers. Future research should also focus on extending the toilet training workshop

model to more diverse populations affected by toileting issues (e.g., adults with disabilities; individuals with long histories of problem toileting). Additionally, because this study is the first to teach parents to toilet train their children in a workshop format, replication is needed.

The study might have been strengthened by the use of a preference assessment, as in LeBlanc and colleagues' 2005 study. In the present study, parents were asked to identify reinforcers for their children based on the child's past preferences for items and activities. The decision to have parents select all reinforcers was made in order to limit researcher contact with the participating children, as would occur in a true workshop. However, studies have shown that it is often difficult for parents, caregivers, and interventionists to accurately identify items that may function as reinforcers for target children (Cannella, O'Reilly & Lancioni, 2004). Additionally, motivating operations related to the reinforcing effects of potential items are likely to change over time, depending on a multitude of variables. Accordingly, an item that a parent might expect to function as a reinforcer might work well in reinforcing behaviour after one incident of elimination and not at all after the next (Dyer, 1987). Thus, future research should require parents to perform preference assessments as part of the toilet training protocol so that the potential strength of reinforcers can be assessed on an ongoing basis throughout the intervention, which might result in more rapid acquisition of positive toileting behaviours.

Finally, it would be interesting for future studies to investigate how optimistic parents are that the intervention will work prior to its implementation. Several parents in the present study mentioned during the initial meeting with the researcher and/or the

workshop that their children were extremely difficult to train and that their child probably wouldn't be able to "get it." In fact, one mother remarked during the initial meeting, "If my son gets trained, it will be a miracle," and later, after her child was initiating toilet use, said she still couldn't believe it. Future researchers could study the potential relationship between optimism and implementation fidelity or positive results.

Conclusion

Despite some limitations, the study makes an important contribution to the body of toilet training research that involves parents. The results suggest that parent attendance at a rapid toilet training-derived workshop can result in increases in positive toileting behaviours in their children, with telephone support from a researcher. In addition, training focused on urination resulted in both urinary and fecal continence in all child participants that completed the study.

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APPENDICES

APPENDIX A



The University of British Columbia

OPPORTUNITY TO PARTICIPATE IN A RESEARCH PROJECT ABOUT PARENT-LED TOILET TRAINING FOR CHILDREN WITH DEVELOPMENTAL DISABILITIES!!!

My name is Katie Rinald and I am a graduate student at the University of British Columbia. I have worked with children with autism and other developmental disabilities for over 10 years, and I have noticed that toilet training is a difficult area for many families and children. For my thesis, I will be conducting a study to determine the effectiveness of a workshop designed to teach parents of children with developmental disabilities to toilet train their children in a short period of time. The intervention will involve having parents attend a group workshop in which they will be taught a reward-based toilet training procedure. After the workshop, parents will implement the procedure with their child at home, with telephone support from me. Parents may also request that I visit their homes to provide assistance as needed.

I am hoping to recruit three children for my study. To qualify for this study, a child must:

- Be between 3-6 years of age;
- Have a developmental disability such as an autism spectrum disorder, Down syndrome, or another disorder that was present at birth;
- Routinely eat and drink age- and size-appropriate amounts of ordinary food/drink, resulting in regular patterns of urination and defecation;
- Use a diaper at least 90% of the time for urination and defecation during the daytime (that is, not be toilet trained)
- Urinate in a diaper no more often than one time per hour (e.g., does not “dribble” urine constantly throughout the day)
- Be able and willing to walk into a bathroom and sit on a toilet for more than a few minutes at a time without displaying problem behaviours such as crying, tantrums, etc.
- Not have a neuromotor impairment that affects use of the lower extremities (e.g., cerebral palsy, spina bifida, etc.)
- Not have a seizure disorder or other medical condition
- Not take medication that might interfere with bladder control or toileting;
- Not have a long history of failure with toilet training.

In addition, the child must have at least one parent who is willing to participate and who:

- Is able to read, write, understand, and speak English;
- Is willing and able to attend a one-day workshop on toilet training, along with other parents in the study.
- Is available to implement a toilet training procedure with their child at home for at least 8 consecutive hours on 5 consecutive days following the workshop. If necessary, two parents can share this responsibility, but both must attend the training workshop; and
- Is willing to record and report information about the child's toilet training progress by telephone to the researcher every day during a 5-day implementation period.

The toilet training workshop will take place in a location as convenient as possible for all participants (e.g., a centrally located hotel conference room or a room at UBC). Before the workshop, parents will be provided with a list of items that they will need to purchase for toilet training and will be reimbursed for the cost of those items. The only foreseeable risk to parents and children who participate is the potential stress of implementing and participating in the intensive toilet training protocol, which will require a considerable time commitment for both a parent and a child for approximately 7-10 days. The potential benefit is rapid and successful toilet training of the child, which has many health, financial, and social benefits for children and their families. Additional benefits include information about the effectiveness of the workshop, which may be of benefit to other parents.

If you are interested in participating with your child in this study, please contact me directly at [REDACTED] or [REDACTED]. Alternatively, you may contact my advisor, Dr. Pat Mirenda, at [REDACTED] or [REDACTED].

Thank you for your consideration!

APPENDIX B



The University of British Columbia

Informed Consent Form

Effectiveness of a Rapid Toilet Training Workshop for Parents of Children with Developmental Disabilities

Principal Investigator

Pat Mirenda, Ph.D., Professor (Faculty Advisor)

Department of Educational & Counseling Psychology, and Special Education (ECPS)

Faculty of Education, University of British Columbia



Co-investigator

Katherine Rinald, Graduate Student (Masters)

Department of Educational & Counseling Psychology, and Special Education (ECPS)

Faculty of Education, University of British Columbia



Research for the fulfillment of degree requirements for the Master of Arts degree. Ms. Rinald will use the data from this project for her thesis (public document).

Purpose of the Study

The purpose of the study is to investigate the effects of workshop designed to teach parents to implement a rapid toilet training program with their child. You are invited to take part in this research study because your child is between 3-6 years of age, has a developmental disability, is not yet toilet trained, and is able to sit on a toilet for more than a few minutes at a time without displaying problem behaviours such as crying, tantrums, etc.

Study Procedures and Time Commitment

The study will involve several phases: (1) meeting with the researcher to prepare for the toilet training (TT) workshop, (2) collecting baseline data on your child's toileting, (3) attending the TT workshop, and (4) implementing the TT procedure with your child.

While the procedure is being implemented, you will be in contact with the researcher daily by telephone to share progress.

During phase 1, the researcher will meet with you in your home to collect some basic information about you and your child and to review a list of items that will be needed to implement the TT procedure. The researcher will help you to gather or purchase these items, as needed. During phase 2, you will record the frequency of your child's toileting accidents and successes for one week, using a record sheet provided by the researcher. During phase 3, you will attend a one-day TT workshop together with other parents in the study. The workshop will be conducted by the researcher and will take place as soon as possible after phase 2, at a time and location that is convenient to everyone involved. The workshop will emphasize a positive, reward-based approach to TT that is designed to be enjoyable for both the child and the parent who conducted the training. In phase 4, you will use the TT procedure that is taught in the workshop with your child, and you will communicate with the researcher at least once daily by telephone about your child's progress. You can phone the researcher for assistance at any time during this phase and you can request that the researcher come to your home, if needed, to assist with TT implementation.

The total time commitment will involve the initial meeting with the researcher (approximately 1 hour), participation in the TT workshop (approximately 6 hours on one day), and implementation of the TT procedures at home with your child (at least 8 hours per day for up to 5 consecutive days). If your child is not toilet trained after 5 days, the researcher will provide as many visits as needed to your home to accomplish this, at your request.

Potential Risks

Your child may experience some amount of stress associated with the TT procedure because his or her regular routine will be disrupted for a few days while toilet training is the main focus. If your child indicates, through his/her behaviour or other communication, a desire not to participate or to take a break, this can occur immediately. In addition, you may experience some stress as you implement the TT intervention because of the amount of time that is involved and the fact that you will be using some skills that are new to you. You may phone the researcher at any time to ask questions or get advice, and you may stop participating or request to take a break from participating at any time.

Potential Benefits

The potential benefit is that your child will be toilet trained in a short period of time, which has many health, financial, and social benefits for both you and your child. For example, some of the benefits to you and your family include reducing or eliminating the cost of both diapers and the labour associated with changing diapers frequently throughout the day. Additional benefits include information about the effectiveness of the workshop, which may be of benefit to other parents.

Confidentiality

All information from this research study will be kept strictly confidential. Your child will not be identified by name in any reports of the completed study. All data records will be kept on a password-protected computer disk or in a locked file cabinet and will be destroyed 5 years after the results of the study are published. Only the principal investigator and the co-investigator will have access to the data.

Remuneration

You will be reimbursed by the researcher for the cost of any equipment, materials, or consumable items that are needed for the research. You will need to provide receipts for reimbursement. You will be provided with snacks and lunch on the day of the TT workshop.

Contact

If you have any questions or would like more information about this project, you may contact either Katherine Rinald at [REDACTED] or Dr. Pat Mirenda [REDACTED]. If you have any concerns about your child's treatment or rights as a research participant, you may contact the Research Subject Information Line in the UBC Office of Research Services at [REDACTED] or if long distance e-mail to RSIL@ors.ubc.ca

Consent

Your participation and that of your child is entirely voluntary. You may refuse to participate or withdraw from the study at any time without jeopardy to your current or future relationship with the University of British Columbia or any agency that provides services or support to your child and/or family.

Your signature indicates that you have received a copy of this consent form for your own records. Your signature indicates that you consent to participate in this study.

Please print your child's name, print your name, and sign the appropriate section below.

Child's name (please print): _____

Parent/Guardian's name (please print): _____

Parent/Guardian's signature: _____

Date: _____

APPENDIX C

Scheduled Sitzings PHASE 1 Data Sheet

Procedure: Prompt the child to sit on the toilet for 30 minutes.

- If the child pees, give praise, a reward, and a 5 minute break and then start the next sitting.
- If the child does not pee, give a 2 minute break (*watch closely for accidents!!!*) and then start the next sitting.
- If the child has an accident, clean up quickly and quietly and move the child back to the toilet to start the next sitting immediately. If possible, interrupt the accident so the child finishes peeing on the toilet. If any amount of urine goes into the toilet, treat it as a 'success' and follow the success procedure.

Sitting & Break Set 1

Child consumed at least ½ cup of liquid during this sitting.

☐yes ☐no

Did elimination occur? ☐yes ☐no

If no, skip to Sitting & Break Set 2. If yes, complete the rest of this data box.

If yes, record time: _____

Did elimination occur in the toilet or out of the toilet?

☐ in toilet ☐ out of toilet

If successful: initiated by... ☐ child ☐ adult

If successful: reward given: _____

Sitting & Break Set 2

Child consumed at least ½ cup of liquid during this sitting.

☐yes ☐no

Did elimination occur? ☐yes ☐no

If no, skip to Sitting & Break Set 3. If yes, complete the rest of this data box.

If yes, record time: _____

Did elimination occur in the toilet or out of the toilet?

☐ in toilet ☐ out of toilet

If successful: initiated by... ☐ child ☐ adult

If successful: reward given: _____

Sitting & Break Set 3

Child consumed at least ½ cup of liquid during this sitting.

☐yes ☐no

Did elimination occur? ☐yes ☐no

If no, skip to next data sheet. If yes, complete the rest of this data box.

If yes, record time: _____

Did elimination occur in the toilet or out of the toilet?

☐ in toilet ☐ out of toilet

If successful: initiated by... ☐ child ☐ adult

If successful: reward given: _____

Contact Katie anytime!

**3
consecutive
successes?**

If **YES**, move
to a
“Scheduled
Sittings
PHASE 2
Data Sheet.”

If **NO**, use
another
“Scheduled
Sittings
PHASE 1
Data Sheet.”

Scheduled Sitzings PHASE 2 Data Sheet

Procedure: Prompt the child to sit on the toilet for 25 minutes.

- If the child pees, give praise, a reward, and a 10 minute break and then start the next sitting.
- If the child does not pee, give a 2 minute break (*watch closely for accidents!!!*) and then start the next sitting.
- If the child has an accident, clean up quickly and quietly and move the child back to the toilet to start the next sitting immediately. If possible, interrupt the accident so the child finishes peeing on the toilet. If any amount of urine goes into the toilet, treat it as a 'success' and follow the success procedure.

Sitting & Break Set 1

Child consumed at least ½ cup of liquid during this sitting.

Did elimination occur? ☐yes ☐no

If no, skip to Sitting & Break Set 2. If yes, complete the rest of this data box.

If yes, record time: _____

Did elimination occur in the toilet or out of the toilet?

☐ in toilet ☐ out of toilet

If successful: initiated by... ☐ child ☐ adult

If successful: reward given: _____

Contact Katie anytime!

Sitting & Break Set 2

Child consumed at least ½ cup of liquid during this sitting.

Did elimination occur? ☐yes ☐no

If no, skip to Sitting & Break Set 3. If yes, complete the rest of this data box.

If yes, record time: _____

Did elimination occur in the toilet or out of the toilet?

☐ in toilet ☐ out of toilet

If successful: initiated by... ☐ child ☐ adult

If successful: reward given: _____

Sitting & Break Set 3

Child consumed at least ½ cup of liquid during this sitting.

Did elimination occur? ☐yes ☐no

If no, skip to next data sheet. If yes, complete the rest of this data box.

If yes, record time: _____

Did elimination occur in the toilet or out of the toilet?

☐ in toilet ☐ out of toilet

If successful: initiated by... ☐ child ☐ adult

If successful: reward given: _____

**3
consecutive
successes?**

**If YES, move
to a
“Scheduled
Sittings
PHASE 3
Data Sheet.”**

**If NO, use
another
“Scheduled
Sittings
PHASE 2
Data Sheet.”**

Scheduled Sitzings PHASE 3 Data Sheet

Procedure: Prompt the child to sit on the toilet for 20 minutes.

- If the child pees, give praise, a reward, and a 15 minute break and then start the next sitting.
- If the child does not pee, give a 2 minute break (*watch closely for accidents!!!*) and then start the next sitting.
- If the child has an accident, clean up quickly and quietly and move the child back to the toilet to start the next sitting immediately. If possible, interrupt the accident so the child finishes peeing on the toilet. If any amount of urine goes into the toilet, treat it as a 'success' and follow the success procedure.

Sitting & Break Set 1

Child consumed at least ½ cup of liquid during this sitting.

Did elimination occur? ☐yes ☐no

If no, skip to Sitting & Break Set 2. If yes, complete the rest of this data box.

If yes, record time: _____

Did elimination occur in the toilet or out of the toilet?

☐ in toilet ☐ out of toilet

If successful: initiated by... ☐ child ☐ adult

If successful: reward given: _____

Sitting & Break Set 2

Child consumed at least ½ cup of liquid during this sitting.

Did elimination occur? ☐yes ☐no

If no, skip to Sitting & Break Set 3. If yes, complete the rest of this data box.

If yes, record time: _____

Did elimination occur in the toilet or out of the toilet?

☐ in toilet ☐ out of toilet

If successful: initiated by... ☐ child ☐ adult

If successful: reward given: _____

Sitting & Break Set 3

Child consumed at least ½ cup of liquid during this sitting.

Did elimination occur? ☐yes ☐no

If no, skip to next data sheet. If yes, complete the rest of this data box.

If yes, record time: _____

Did elimination occur in the toilet or out of the toilet?

☐ in toilet ☐ out of toilet

If successful: initiated by... ☐ child ☐ adult

If successful: reward given: _____

Contact Katie anytime!

3 consecutive successes AND at least 1 child-initiated?

If **YES**, it's time to stop scheduled sittings; consult your handout and/or call Katie.

3 consecutive successes, but none child-initiated?

It's time to do chair sittings. Consult your handout and/or call Katie.

Don't have 3 consecutive successes? Use another 'Scheduled Sitzings Phase 3 Data Sheet'

APPENDIX D

Parent Social Validity Measure

1. My child's ability to use the toilet properly is important to me.

0	1	2	3	4	5
Not at all			Very much		

2. The strategies I learned were helpful for toilet training my child.

0	1	2	3	4	5
Not at all			Very much		

3. My child's ability to use the toilet increased as a result of the strategies I learned.

0	1	2	3	4	5
Not at all			Very much		

4. I am confident that I will be able to use the strategies I learned to address toilet training problems in the future.

0	1	2	3	4	5
Not at all			Very much		

Comments:

APPENDIX E

Parent Toilet Training Study

Child and Family Questionnaire

All of the following information is voluntary; please fill out only the parts you are comfortable sharing. The information you provide will be kept confidential and will never be connected to your name or your child's name.

The questionnaire should be filled out by the person most knowledgeable (PMK) about your child.

Part 1: Parent Information

PMK	Spouse/Partner
Date of Birth:	Date of Birth:
Highest level of education completed:	Highest level of education completed:
Occupation:	Occupation:
Country of Birth:	Country of Birth:
Marital Status:	Marital Status:

Part 2: Child Information

Date of birth: _____

Diagnosis: _____

Date of diagnosis: _____

Place of diagnosis: _____

Current services being received (e.g., behavioural intervention, preschool, speech-language pathologist, physical therapist, etc.):

Name of Service	# of hours per week	Month/year this service began (e.g., Sept/2010)

Testing information: If your child has undergone any type of standardized testing and you have been provided with reports from those who did it, it would be helpful for the researcher to see these scores (e.g., receptive language scores, expressive language scores, age equivalents related to any skills; standardized scores).

- ☐ Yes, I have some testing reports that I will share with the researcher.
- ☐ No, I do not have any reports or would prefer not to share this information.

Part 3: Toilet Training History

The following questions relate to your child's toilet training history and habits. Please answer them as best you can remember.

Please circle your answer below each of the next seven questions:

- Does your child stay dry for at least 2 hours at a time?
YES **NO**
- Does your child have a regular bowel movement schedule?
YES **NO**

3. Does your child follow simple instructions?

YES

NO

4. Does your child demonstrate discomfort with dirty diapers?

YES

NO

5. Does your child ever ask to use the toilet?

YES

NO

6. Does your child ever ask to wear underwear?

YES

NO

7. Does your child pull pants up and down independently?

YES

NO

Have you or anyone else ever tried to toilet train your child?

YES

NO

If yes, please describe what was done with as much detail as you can (use the back of this sheet if necessary)

Has your child ever successfully eliminated in the toilet?

YES

NO

If yes, approximately how many times? _____

If yes, please describe what happened (who took your child to the toilet or did s/he go alone; did you give your child a reward afterwards, etc.)

APPENDIX F

Pre-Toilet Training Checklist

Please plan to have the following items prepared before the workshop:

- ☐ Reward items
Have many available, and lots of variety. Don't forget to limit your child's access to them for at least 3 days before the workshop.
- ☐ Fun activities your child can do while sitting on the toilet or on a chair. Ideas: books, watching DVDs, colouring books, etc. Note that these items should be fun, but not even close to as motivating to your child as the 'reward' items above!
- ☐ Your child's favourite beverages
Have plenty available, and a few options that your child consistently enjoys. It is very important that beverages s/he likes are readily available.
- ☐ Some salty or otherwise thirst-inducing snacks
- ☐ A timer
- ☐ Multiple pairs of underwear
- ☐ A soft, comfortable toilet seat insert or other potty seat
- ☐ A footstool
- ☐ Rewarding items for yourself

Please contact Katie with any questions!

████████████████████ or ████████████████████

APPENDIX G

Pre-Toilet Training Data Sheet

Filling out this data sheet will help us to see patterns in your child's toilet training. Please fill it out for 5 days leading up to the toilet training workshop, **recording every time your child urinates or defecates (or, record the time you notice his or her diaper is dirty)**. A researcher will contact you each evening to ask for your information from the day.

DATE: _____ (please use as many forms as you need per day)

Time of Incident	Was it...	Happened in/on...
	☐ urine ☐ feces	☐ diaper ☐ toilet ☐ other: _____
	☐ urine ☐ feces	☐ diaper ☐ toilet ☐ other: _____
	☐ urine ☐ feces	☐ diaper ☐ toilet ☐ other: _____
	☐ urine ☐ feces	☐ diaper ☐ toilet ☐ other: _____
	☐ urine ☐ feces	☐ diaper ☐ toilet ☐ other: _____