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Parent Mediated Instruction of Functional Skills for Children with Autism

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PARENT MEDIATED INSTRUCTION OF FUNCTIONAL SKILLS FOR CHILDREN WITH AUTISM

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PARENT MEDIATED INSTRUCTION OF FUNCTIONAL SKILLS FOR CHILDREN WITH AUTISM

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This study adds to the literature on successful parent mediated behavioural intervention using a manual plus brief consultative model to assess outcomes for parent competency and child skill acquisition. Parent participants of young children with autism spectrum disorder, were asked to choose three functional skills to teach their child. A multiple baseline design across a set of behaviours was used to analyze no intervention, parent manual only, and parent manual plus brief behavioural consultation and their relationship with parent competency and child skill acquisition. Following baseline, parents were introduced to an instructional manual on the implementation of ABA teaching strategies. Behavioural consultation was provided in two home visits for a total of 3 hours and two follow-up maintenance visits were completed 2 weeks after home consultation.

Parent 1 demonstrated improvement in the overall mean score for competency at each phase, with scores maintained at follow up near 80%. For Parent 2, a steady increase in mean competency scores was observed from baseline to manual plus consultation. This increase was maintained at follow up with a mean score of 90%. Baseline results for child one show a high mean rate of errors and a low rate of correct and prompted trials. Following the introduction of the manual and manual plus consultation phases, correct and prompted responses increased and errors decreased to near zero for two skills, while the control skill responses remained variable. The results for Child 2 across phases show an increasing trend in correct responses, fewer errors and greater use of parent prompts. In the manual plus consultation phase, one skill achieved 100% correct, and a second skill was near errorless. The control skill showed stable improvement but below the level of the other two.

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Chapter I

INTRODUCTION AND REVIEW OF LITERATURE

Early Behavioural Intervention

Autism spectrum disorder (ASD) is a complex developmental disability that can significantly impair the communication, behaviour and social interactions of an individual. It is typically diagnosed in the early years of a child's life and is a lifelong neurological condition that has a wide range of severity (National Institute of Mental Health, 2013). The prevalence rate of this disorder is 1 in 88 children, with rates showing an increasing trend year over year (Centers for Disease Control and Prevention, 2013). Research has shown that providing intervention at an early age is one important factor in improving the developmental trajectory for children with autism and having the best outcomes (Harris & Handleman, 2000; Perry et al., 2011). As a result of the increasing number of children with this diagnosis and the focus on early forms of intervention, the demand for therapeutic services continues to grow. Behavioural interventions have been well researched and are commonly considered to be the most effective form of treatment for children with autism (Sallows & Graupner, 2005; Vismara & Rogers, 2010).

The delivery of a quality early intensive behavioural intervention (EIBI) program requires a great deal of precision, data collection and supervision. Therapists

who deliver intensive teaching require a high level of training in the application of behaviour analytic techniques, including education in the theory and principles of behaviour analysis at the undergraduate or graduate level and in the clinical application of teaching procedures. While formal training in applied behaviour analysis may be advantageous to allow parents to teach their children using behavioural techniques at the level of an experienced therapist, it may be less practical. This level of training is beyond the scope of many parents' financial ability, available time commitment or academic proclivity. However, parent involvement and collaboration in their child's developmental progress does seem like the most desirable outcome.

There are several challenges posed for ABA practitioners and parents of children diagnosed with ASD. These challenges may include finding the most appropriate methods to deliver behaviour analytic knowledge to parents, for example, instruction in a didactic format, small group, individual parent sessions, and augmentation of training with videos and use of on-line content. Associated with delivery methods is provision of the most appropriate level or amount of knowledge that will help support parents while creating an educational situation that will not overwhelm them. Importantly, parent training should involve the transfer of knowledge that can translate into practical application of parent teaching. In order to address the stated importance of parent collaboration with acknowledgment of the challenges in training, several parent training programs have been developed.

Recent Studies in Parent Mediated Delivery of ABA Programs

Research by Smith, Buch, and Gamby (2000) provided an interesting perspective on parent involvement by focusing on the provision of parent-directed ABA programs for children with autism. Smith et al. defined parent-directed programs as employing a professional to provide initial training to parents and therapists and then allowing parents to direct programming with the clinical work done primarily by therapists. In their study, Smith et al. delivered six 1-day training workshops to parents, over the span of 3 months. The content of the workshops included a systematic overview of teaching children with autism using intensive behavioural teaching, initially through one-to-one discrete trial teaching and gradually through use of more naturalistic instruction. Parents and volunteer therapists attended six workshops, each 2 hours long, spread over the course of 3 months. The workshops focused on early communication, following one-step instructions, imitation of non-verbal behaviours and simple play tasks with a gradual increase in complexity of skill level, such as peer play and simple conversational language. Parents were given instruction in ABA for the first part of the workshop, followed by observations of the trainer, parent, and therapist delivering teaching of simple receptive actions, motor imitation skills and management in reduction of tantrums. During Days 2, 3, and 4 of the workshops, parents were trained to elaborate on the skills from Day 1, and to expand their teaching skills to verbal imitation, match to sample tasks and selection of new targets. The final two workshops were dedicated to observation and constructive feedback of parent and therapist teaching skills.

Multiple child measures, including a cognitive test, the Reynell Developmental Language Scales (Reynell, 1990) and Vineland Adaptive Behavior Scales (Sparrow, Balla, & Cicchetti, 1984), and the Bayley Scales of Infant Development (2nd ed.) (Bayley-II) (Bayley, 1993) were conducted at the 2- to 3-year mark to assess each child's development. This study also employed an Early Learning Measure (ELM), developed by one of the authors, given for 5 consecutive months to measure the child's skill development. The two parent measures used in this study were the Parenting Stress Index (PSI) (Abidin, 1990) at the 3-month interval and the Parent Satisfaction Questionnaire (PSQ) at the 2- to 3-year interval. Returns from the PSQ reported that the "treatment had positive effects on the family and bolstered optimism about their child's future and increased their confidence in handling their child's behavior problems" (Abidin, 1990, p. 306). Child assessment outcomes showed that long-term gains were not attained and results appeared to be less favourable when compared to professionally run therapy. Smith et al. (2000) summarized the results as showing that although they found it manageable; parent directed ABA programs were less effective than professionally directed programs despite favourable short-term gains noted in the parent programs.

In a randomized control trial study by Johnston et al. (2007), 11 core sessions, and three optional sessions were presented to families along with manualized content and video vignettes. An additional three booster sessions, based on areas of need, were provided in the 2 months following completion of the core training. Parent training sessions were between 75 to 90 minutes long. The content of the core sessions focused

on remediation of the deficits of ASD, namely use of visual strategies, functional communication training, positive reinforcement procedures, generalization and maintenance. In addition, parents were also trained in techniques to determine the function of behaviour, promote pro-social behavior, and decrease non-compliance. Booster sessions were used for extra practice of techniques covered in core training and to problem solve any challenges to implementation. Johnston et al. (2007) also specified that participants were given homework related to the theory and practice of ABA.

The primary focus of the Johnston et al. (2007) article was discussion of the methods used in parent training and, although parent fidelity measures were taken, they were not reported in detail. Fidelity was assessed using a rating scale of 0 to 2 on a number of target skills, with a requirement of at least 80% correct in order for a parent to achieve therapist certification. This study highlighted the importance of a parent training manual to support consistency across trainers and families. The authors also noted that training content should balance uniformity with information that can be flexible enough to allow individualization. This was predicated on the assumption of a natural attrition rate for therapists and the need for consistent and accessible training materials for newly added therapists. Materials included videos vetted by the authors, practice scenarios, shadowing with experienced therapists and supervised training delivery.

An important factor to consider is the proportion of parent-mediated intervention that contributes to the overall treatment for the child. A recent study by Strauss et al. (2012) looked at the extent that parent teaching accounted for the correct balance of

teaching strategies and the impact on the child's behaviour. Strauss et al. noted that factors that lead to optimal outcomes for children, such as specific treatment models and type or amount of parent involvement remain largely inconsistent. In a related study, Sallows and Graupner (2005) showed that even without the resources, support or supervision of a clinic-based team of therapists, parent-mediated early intensive behavioural intervention (EIBI) resulted in significantly improved IQ scores. They also observed significant pre and post-test gains that differed very little across the children who received clinic-based compared to parent-mediated EIBI in the Autism Diagnostic Interview-Revised (ADI-R) (Lord, Rutter, & Le Couteur, 1994) for social skills, the Vineland Adaptive Behavior Scales (VABS) (Sparrow, Balla, & Cicchetti, 1984) and communication scores.

In an attempt to study one potential factor that contributes to successful parent-mediated EIBI, Strauss et al. (2012) compared a parent-mediated group to an eclectic group. The teaching responsibilities for the parent-mediated groups were gradually faded in over 4 weeks, with week one focused on group-based didactic content and then, in each subsequent week, a parent assisted other therapists and provided more 1:1 teaching to their child. Parents in this group continued to receive supervised guidance on introduction of new teaching targets, application of appropriate strategies and review of maintenance and generalization schedules. This group used a blend of instructional strategies including Pivotal Response Training, discrete trials, and differential reinforcement. Participants in the eclectic group received services for an average of 12 hours a week, compared to 14 hours for the parent-mediated group. The services for this

group included cognitive behaviour treatment, speech and music therapy, with delivery and supervision provided by staff. Strauss et al. did identify that discrete trial teaching (DTT) was used for children in both groups but it was unclear how much more DTT was done in the eclectic group. The provision of teaching was based on staff expertise and not guided by a behavioural or developmental protocol. Parents in the eclectic group received monthly supervision, compared to weekly access to a supervisor for the parent-mediated group.

Multiple child measures were taken at baseline and once again at a six month follow up by an independent Psychologist. Psychometric measures included the Vineland to measure adaptive behaviour, core symptoms of autism using the ADI-R and the Autism Diagnostic Observation Scale-General (ADOS-G) (Lord, Rutter, DiLavore, & Risi, 1999), language measures using the McArthur Communication Development Inventories (CDI) (Fenson et al., 1993) and mental development using the Griffith Mental Developmental Scales ages 2 to 8 (GMDS-ER 2-8) (Luiz et al., 2006). Data on child behaviour and child performance rates were also collected. Parent measures included the level of stress indicated by parents using the Parent Stress Index-Short Form (PSI-SF) (Abidin, 1999) and parent treatment fidelity.

At the 6-month follow-up assessment, children in the parent-mediated EIBI group showed a significant decrease in autism symptomology, improved mental development and increased use of expressive language over the eclectic group. All three of the main measures showed an advantage to the parent-mediated group. However,

adaptive behaviour scores (VABS) improved for both groups, with social adaptive behaviour scores improving more for the eclectic group.

The final key outcome measure from the study was on parent fidelity in implementation of several teaching techniques related to EIBI, including: data collection, introducing new teaching targets, implementation of discrete trial teaching and facilitated play. The parent-mediated group showed significant improvement within 6 months, achieving a high level of fidelity at the second measure on scores of discrete trial instruction, choice of new targets, data recording and facilitated play. The results from the Strauss et al. (2012) study are significant as they used standardized assessments administered by an independent Psychologist.

Crockett, Fleming, Doepke, and Stevens (2007) provided centre-based training for two parents to deliver discrete trial teaching to their 4 year-old children. Crockett et al. used a similar behavioural training package to that of Koegel, Russo, and Rincover (1977) by incorporating a manual as reference guide, utilizing videotape of the parent-child dyad interaction, provision of therapist modeling and behaviour specific feedback. The study by Crockett et al. placed emphasis on the steps to correctly deliver a specific skill to a criterion level. Parents were measured on the following behaviours: presentation of antecedents, delivery of consequences, conducting intertrial intervals and recording the child's responses. For the children, correct, incorrect, and prompted responses were recorded. Sessions were 2 hours long, with the first 80 min used for therapist instruction and the remaining 40 min used for parent demonstration and observation. The foundation skill of attending was the initial skill taught and parents

then selected the remaining three. Therapist instruction included a brief discussion of the skill, pre-recorded examples of the therapist implementing the skill, role play exercises and feedback on teaching trials. This procedure was used for four separate skills. As the parent demonstrated they had met criterion, they received the same training on the subsequent skill.

Crockett et al. (2007) used a multiple baseline across behaviours design which allowed for a check on generalization to untrained skills. Parent 1 showed considerable improvement in the number of correct teaching trials and following training on the first skill, there was evidence to suggest that some generalization did occur for the remaining skills. Parent 2 also showed marked improvement in DTT procedures, with a baseline mean of 7.5% improving to 94%. Generalization to untrained skills was also clearly evident for this parent following training on attending. Child measures did not show robust improvements despite improvement in parent teaching. Child attending increased slightly; however scores remained low. There was also a slight increase in the correct responding of the subsequent three skills chosen by the parents, matched by a slight increase in prompted responses. Incorrect responses for both children decreased or remained stable.

This study showed a consistent significant increase in parent proficiency of DTT following training, across four skills, but they were obtained at different rates. Although there was some improvement in Parent 1's performance, she required more training exemplars than Parent 2, who improved rapidly after receiving training in only one skill. It is difficult to assess the impact, if any, that parent improvement had on child

responses with mean scores for correct and incorrect responses moving only gradually or remaining unchanged. Follow-up measures were not completed but may have allowed for better assessment of child responding.

In recent study on Pivotal Response Training (PRT) by Coolican, Smith, and Bryson (2010), a brief 6-hour training was delivered to eight families of young children, unable to access EIBI, to determine if child outcomes improved across multiple behaviour domains. A second aspect to their study was interested in whether brief training would be sufficient to obtain parent fidelity in the procedures of PRT. Finally, they looked at any relationship between parent fidelity and improvements in child communication. Parents received three separate 2-hour training sessions on individual PRT techniques, with the first two sessions in a clinic and the third session at each participant's home. Data were taken through video recording and standardized assessment at pre-training, immediately following the three parent training sessions and at 2- to 4-months follow up. The primary child measures involved communication including functional verbal utterances and type of utterance using standardized assessments. The primary parent outcome measure was the fidelity of their implementation of five PRT procedures with fidelity criterion set at 75%. Two other measures were also collected from parents, including a satisfaction questionnaire and Parental Self-Efficacy Scale.

A summary of results for the child outcomes were as follows: all eight children showed an increase in functional verbal utterances immediately after training but results were mixed at follow up. Overall, the likelihood that the child would respond to

parents' prompts (responsivity) for utterances significantly increased after training and maintained at follow up. There was no significant change in age-equivalent scores on the standardized assessments from baseline to post-training. However, parent reports noted positive changes in their child's communication. For parent outcome measures, no parents met the criteria for fidelity of implementation of PRT prior to training. Post training showed that 5 of 8 (62.5%) parents met fidelity and 4 of 8 (50%) continued to meet fidelity when follow-up measures were taken. Overall, all parent's fidelity of implementation did improve significantly following their brief training in PRT. In the final evaluation by Coolican et al. (2010), they did not observe any significant correlation between fidelity of implementation and the child's functional verbal utterances or responsivity.

Vismara, Colombi, and Rogers (2009) provided research on the impact of parent training and long-term child effects for children under the age of three. In their study, a brief, time-limited, manualized training was used centered on the procedures outlined in the Early Start Denver Model (ESDM) (Dawson et al., 2010) was used. The ESDM is a blend of two models; the Denver Model and PRT. The Denver Model focuses on creating a rich environment and development of activities that foster a positive relationship between children and adults, utilizing daily routines to improve social-pragmatic language use. ESDM techniques combine a blend of behaviour analytic and relationship-based techniques. A manual that accompanies the training outlines 10-key strategies that include increasing a child's motivation and attention, prompting, shaping

and fading techniques, joint attention, non-verbal communication, imitation and functional approaches to behaviour.

Vismara et al. (2009) used 12 weekly one-hour sessions, to teach and demonstrate the ESDM procedures to parents. All sessions were conducted in a clinic playroom to allow optimal observation and data collection. Each weekly session followed a scheduled routine that involved a review of progress from the previous week, a 10 min parent-child play activity to evaluate if previously taught strategies were being used, discussion and therapist demonstration of a newly introduced strategy, parent practice within a play activity and feedback from the researchers. Modeling, practice and feedback continued until the parent met the mastery criteria. Before adjourning the session, parents identified opportunities for practice in the coming week. The study included generalization and maintenance sessions; the first two of these sessions were given at 2-week intervals and the final two were 1 month apart.

The first of the study's three main dependent measures was fidelity of implementation of ESDM strategies to assess the accuracy of parent implementation of fourteen adult behaviours. Secondly, the child social communication behaviours score and the third measure was taken from the Child Behavior Rating Scale (CBRS) (Mahoney & Wheeden, 1998), which uses a 5-point Likert scale to assess child engagement, problem solving skills, cooperation with adult instructions, engagement in new play activities and shared enjoyment of tasks. Additional assessments including the ADOS-G, Mullen and parent-child interaction were given prior to weekly teaching

sessions and again at the final generalization session to assess any change in the general characteristics of autism.

Outcome from the Fidelity of Implementation showed that parents had a moderate level of implementation prior to training (mean 55%), that improved to a high level of accuracy, with seven of eight parents achieving the mastery criterion of 85%, post training. At follow up, five of eight parents maintained their mastery with scores above the 90% threshold. Child spontaneous functional utterances showed baseline rates near zero and increased for all children once the ESDM techniques were used. Child imitative behaviours also showed consistent increases for six of eight children. Both behaviours continued to show a consistent increase in rate at follow up. Once parents had shown mastery on the ESDM techniques, children demonstrated the greatest corresponding rate of increase in verbal and imitative behaviour measures. Ratings from CBRS showed an improvement in child attention and social initiative behaviours for all children. These improved child outcomes were very similar to a previous ESDM study by Vismara and Rogers (2008).

Measures of Child Response to Parent Teaching

Studies have shown consistently favourable parent response when parents are trained to implement therapeutic procedures with fidelity, however results of research that have assessed the impact of parent training on a spectrum of child behaviours have been mixed. Previously reviewed studies have reported increases in child communicative attempts (Coolican et al., 2010), social initiations (Symon, 2005), and non-verbal imitation (Lafasakis & Sturmey, 2007). Upon review of the literature, there

is a paucity of research that exists in the area of parent mediated training and the impact on specific child skill acquisition. There have been studies that have compared the outcomes between parent mediated and therapist mediated EIBI (Diggle & McConachie, 2007; McEachin, Smith, & Lovaas, 1993; Sallows & Graupner, 2005; Smith, Buch, & Gamby, 2000). The general conclusion from this body of research suggests that outcomes of parent mediated intensive treatment are not as favourable as those delivered by clinic staff. Many of these studies did not examine specific child skill development in isolation but instead assessed overall level of function, for example as measured by standardized tests for IQ (Stanford-Binet), behavioural characteristics of autism (Childhood Autism Rating Scale-CARS), adaptive behaviour skills (Vineland Adaptive Behavior Scale), and language production (Clinical Evaluation of Language Fundamentals- CELF III).

Parent Training Manuals

There are some notable examples in the literature for the use of a manual as either the sole source of information or as an adjunct to parent consultation; however, there is a dearth of specific examples in the literature specific to the field of autism spectrum disorder. A recent review done by Schultz, Schmidt, and Stichter (2011) stated that 43% of parent education procedures targeting children with ASD used a manual. Hudson et al. (2003) developed a series of information booklets aimed at changing challenging behaviour to positive or pro-social behaviour for children with a developmental disability. In the Hudson et al. study, the researchers measured outcomes using 115 families across each of the three categories. All experimental groups showed

improvement in their sense of competence, and lowered levels of stress. Results from the self-directed group showed the greatest reduction in stress, daily hassles and also reported satisfaction with the skills that were taught and found the materials helpful. An interesting indirect finding from the research was the high dropout rate of families of children with autism, two thirds of families (68%), compared to only 14% of families with a child with Down Syndrome. This could mean that a variety of factors may lead families of children with autism to be less likely to complete parent education programs.

As suggested in the literature, there are several potential benefits in using a manual; there is little cost involved, it is portable and a variety of different languages can be provided. A manual would also likely be perceived as a low intensity intervention that may be an effective way to determine parent competency prior to delivery of a more intensive and costly intervention (Lerman, Swiezy, Perkins-Parks & Roane, 2000; Summers & Hall, 2008). Given that autism is diagnosed across all different socio-economic classes and cultures, a manual can be seen as an equitable way to provide at least some form of intervention support for the child and family.

Upon review of parent manuals, there are abundant examples of behaviour analytic approaches in use. Several components and shared strategies exist among these approaches. A brief list includes antecedent prompts to promote expressive language, behaviour specific feedback, antecedent environmental arrangement, contingent reinforcement and delivery of clear, brief instructions (Hudson et al., 2003; Koegel et al., 1989; Kuhn, Lerman, & Vorndran, 2003; Laski, Charlop, & Schreibman, 1988; Smith et al., 2000; Summers & Szatmari, 2009; Vismara et al., 2009). Parent manuals

make frequent use of scenarios to guide parents through practical application of procedures. They also use clinically relevant examples that discuss the relevant excess or deficit behaviours associated with autism and suggestions for how a parent may set up practice opportunities (Hudson et al., 2003; Kaufman, 1995; Summers & Hall, 2008). However, it is important to note that results of a component analysis by Hudson (1982) showed that a parent manual alone was not as effective as using other teaching strategies such as modeling and role playing.

Format of Parent Training

In their meta-analysis of parent training, Schultz et al. (2011) revealed that 80% of parent training programs used a 1:1 format for instruction and modeling of procedures. Given the emphasis on early intervention for children with autism spectrum disorder, it was not surprising that the summary results showed most of the parent training programs were aimed at young children, with two thirds designed for children five years of age or younger. Additionally, when parent training was in progress, the child was present in a clear majority (80%) of the programs. A valuable contribution to this field is the expanded role of assessment to include measures of parent behaviours and child behaviours, with 86% of studies (n=30) reporting on both measures (Schultz et al., 2011). Researchers are concerned with the contribution of parent fidelity to child skill acquisition and generalization to untrained skills (Matson & Neel-Schwalm, 2007; Van Oorsouw, Embregts, Bosman, & Jahoda, 2009). There are many commonalities to be found across parent training programs but where the greatest variance can be found is the frequency and duration of these programs. The range of frequency of training is

from 1 hour to 25 hours per week. The duration of training has an equally wide range with parents enrolled in some programs for a little as one week and others for as long as one year (Schultz et al., 2011). Taking into consideration the challenges that a diagnosis of autism may represent, any parent training programs should remain sensitive to the need for individualization and relative ease of implementation.

Teaching Functional Skills

Teaching functional skills to children with autism remains an important objective as it has been shown that children with this diagnosis continue to lag behind in daily living skills even into adulthood when compared to typically developing children (Woods, Kashinath, & Goldstein, 2004). Crockett et al. (2007) put it succinctly that the goal for any training endeavor should be to "provide parents with an effective way of teaching their children the many skills they will need to function optimally in their daily environments" (p. 25). As described by Woods et al. (2004), most family routines incorporate play, meal times, and functional routines such as hand washing that involves caregiver interaction on a regular basis. This interaction provides an ideal naturalistic teachable moment for the child's communication and initiation. By focusing the training on the parent to teach skills that are a part of a family's daily routine, there is an intrinsic advantage of naturally occurring opportunities. Given the importance of systematic generalization for skill development of children with autism, teaching in the home will help to promote skill development in the environment where it takes place most consistently (Baker, Landen, & Kashima, 1991; Huynen et al., 1996). Research by Baker et al. (1991) showed that by using a home training environment, parents can

spend more time with the child, and expose the child to a greater variety of possible teaching situations.

Summary

Given the significant increase in autism diagnoses in recent years, demand for quality intervention services continues to grow. These services are inherently expensive because they are highly individualized, require training in specific teaching techniques and are implemented with high intensity. Parent mediated intervention provides a realistic delivery option based on many considerations; significant cost reduction can be realized by not relying wholly on professionals to deliver treatment, parent input is enabled, generalization of skills can be naturally developed and stronger parent-therapist alliances can be developed. A substantial amount of research has also demonstrated that parents can teach a wide variety of skills with a high level of treatment fidelity. As a number of well-established parent training methodologies share similar techniques, there is an opportunity to develop sound training models. The research has demonstrated that parents are able to teach a diverse set of skills including functional daily living. A broad selection of assessment tools have been used to measure parent and child behaviours for fidelity, skill acquisition, parent satisfaction and generalization. This use of multiple tools provides a valuable chance to correlate parent behaviour with child outcomes to ensure effectiveness from multiple perspectives.

Statement of Purpose

In the parent training literature, there is a paucity of studies examining brief ABA training for parents to teach functional skills using a behavioural skills training approach. A review of current research shows inconsistency in the outcome measures used to assess for parent fidelity, child skill acquisition or improved child functioning. Parent training programs are often clinic-based with diminished access to in-situ environments and require that parents make a lengthy time commitment. This study proposed to compare three conditions: (a) no training (baseline), (b) parent manual only and (c) parent manual plus individual home consultation to determine the effect on parent teaching skills and child acquisition of functional skills. In each phase, parents were scored using a competency checklist on 16 skills across four domains. Following baseline measures parents were introduced to an operationalized manual that outlined general ABA teaching methods to follow when they taught their child three functional skills. The third phase utilized the manual in addition to 2 weekly 90-min home consultation sessions that used modeling, coaching and feedback by a therapist. Measures at each phase included: parent competency in implementation of behavioural teaching strategies, and child skill acquisition. A parent's perception of competency questionnaire was given at baseline and again at follow up. A follow-up visit, 2 weeks following completion of the individual home consultations was used as a probe to see if parent and child had maintained their skills and if generalization occurred to an untrained functional skill.

Chapter II

METHODS

PARTICIPANTS

Participants included two families with a child with a clinical diagnosis of ASD according to DSM IV-TR or DSM5 criteria (American Psychiatric Association, 2013). Families were recruited from an urbanized area in the southwestern part of Ontario, an area with a high level of socio-economic status relative to other jurisdictions in the province. Family 1 included two parents, Keon, a 3.6-year-old child with autism, and an older sibling. It was determined that the mother was the one most likely to complete the daily caregiving tasks and she was the recipient of weekly behavioural consultation, observation and data collection. Family 2 included two parents, Martin, a 4.5-year-old child with autism and a younger sibling. The mother in Family 2 was also identified as the most appropriate participant. Each family had a brief prescreening assessment to gather information on current child skill level using the Early Learning Measure (ELM) (Smith, Buch, Eikeseth, & Lovaas, 1995) contained in Table 1 (see Appendix), and a Vineland Adaptive Behavior Scales II (Sparrow, Cicchetti, & Balla, 2005) level of adaptive behaviour, current services the child is accessing and any past or current training received by the caregiver. Participant profiles and prescreening results are located in Table 2 (see Appendix). Families preselected three sets of closely related

functional skills; Family 1 chose the following skills ranked in order of priority: (a) use of the toilet, (b) eating with a utensil, and (c) put shoes on (no laces). Family 2 chose: (a) use of toilet, (b) dressing with four items of indoor clothing, and (c) brush teeth. An operational definition for each skill can be found in Table 3 (see Appendix). Both families reported that their choice of functional skills was based on the high frequency of use and the desire to have their child help with some aspects of daily living. Functional skills, alternately called adaptive skills, can be defined as behaviours used for meaningful interactions with the environment. Skills to be considered include those helpful in everyday living, within the child's ability and that lead to increased independence (Reitzel et al., 2013).

DESIGN

A multiple baseline design across a set of behaviours was used to analyze the different interventions and their relationship with parent competency and child skill acquisition across three different sets of skills. This design measured the impact of a parent training manual only, a parent manual plus consultation and baseline conditions for a third skill on parent use of behavioural teaching strategies and child skill acquisition (Cooper, Heron, & Heward, 2007). One skill set was measured during baseline and parent instructional manual, the second skill set was measured during baseline and parent manual plus behavioural consultation and the third skill set was measured during baseline only, without further intervention. Although unnecessary in this study, at any point, if a child had mastered one skill within the set they were to

move to the next skill. Follow-up data were collected 2 weeks following the final home consultation, approximately a week apart, to probe for parent performance on competency and child skill acquisition.

DEPENDENT MEASURES

Parent Rating Scale

The experimenter assessed 16 specific teaching skills from four domains using a parent competency rating scale listed in Table 4 (see Appendix). The competency rating scale has four domains: antecedent set-up, teaching implementation, prompt delivery, consequence delivery, and data collection. The observer rated each skill on a 3-point scale; 0 = skill is not observed, 1 = skill is sometimes observed, 2 = skill is observed most or all of the time, or N/A = not applicable. The rating scale was adapted from Summers and Hall (2008), consistent with Fovel (2002) on skills and behaviours determined to comprise competency in structured behavioural teaching. The parent competency rating scale was completed at baseline for all skills within the set, at each phase of the intervention and at each follow-up maintenance visit.

A second caregiver measure, the Parenting Sense of Competency (PSOC) (Johnston & Mash, 1989) was included to assess the satisfaction and self-efficacy through parent report Table 5 (see Appendix). The PSOC was administered pre and post intervention, initially at baseline and then again at the final follow-up visit.

Child Measures

Child skills were assessed at each point that a parent competency rating scale was administered. In the baseline condition, parents were asked to teach each skill to the best of their ability up to three times, for a total of nine trials to allow multiple opportunities to measure the child's response. During the manual plus consultation phase, after each parent had an opportunity to practice with the therapist, they were asked to complete the skill three times during the remainder of the session to measure child response. Each step was scored as correct, prompted or incorrect. The child data collection form is contained in Table 6 and Table 7 (see Appendix) and provides the hierarchy of prompts recorded during observation of the parent and child.

INTEROBSERVER AGREEMENT

Prior to baseline data collection, the secondary observer was trained on the use of the parent competency rating scale and child skill measure. Training included familiarization with the rating tool and practice scoring with a recorded video not associated with the study. Practice continued until there was agreement on at least 90% of the trials scored for child measures and 90% agreement on scores on the rating scale.

The reliability of the parent competency rating scale was measured by having a second observer view each video recorded session and independently enter a score for each skill observed. This observer was naive to the priority skill ranking and the phases. Each score was compared with the first observer. Agreements were defined as the score on each skill being the same for both observers. Inter observer agreement (IOA) was

calculated by dividing the number of agreements by the number of disagreements plus agreements multiplied by 100. IOA checks were completed for 37% of parent competency and child skill measures. Overall agreement was 89.3% for the parent competency measures.

Reliability for child skill measures was calculated by having a second observer view each video recorded session and independently enter a score of correct, prompted or incorrect on each trial delivered by a parent when no modelling was provided by the trainer. Each scored trial was compared to those of the first observer. An agreement was defined as matching scores for both observers. IOA was calculated by dividing the agreements by agreements plus disagreements multiplied by 100. IOA checks were completed for 35% of child skill measures and overall agreement was 89.5%

SETTINGS AND MATERIALS

All behaviour consultation sessions were held in the family home. This environment was considered a natural setting to utilize materials familiar to the caregiver and child. The most appropriate location in the home depended on the skill chosen by the caregiver, for example dressing was taught in the child's bedroom. Suggested materials for each functional skill were listed in the parent manual.

Parent Manual

The parent training manual was created specifically for this research project. The manual contained approximately 28 pages and was divided into teaching modules

with a brief post quiz on the content of that module. The modules covered the following content:

- Goals of the Manual,
- Overview of Applied Behaviour Analysis,
- Choosing and Defining a Skill,
- Home Consultation Session Agenda
- Trouble Shooting Ideas
- Practice Scenarios
- Sample Data Sheets
- Sample Parent Competency Rating Scale

Each module provided a brief review of theory from current evidence-based practice in the field autism intervention, with multiple examples and case studies to guide a parent through the key aspects of delivering teaching trials to a child with ASD.

DATA COLLECTION

Baseline measures were collected from video recorded sessions in the family home. Subsequent video recording took place at least once per session to allow the secondary rater to score parent behaviour using the competency rating scale, with a percentage score given. During each observation session, the caregiver was asked to teach the three designated functional skills, up to three times each to the best of their ability. At follow up, two more observations utilizing the competency rating scale were completed in the home to assess skill maintenance of the three functional skills and

generalization of parent competency to one untargeted skill. Figure 1 (see Appendix) shows the graph for total percentage score in parent competency in each of the four domains. A score of 2 (behaviour observed most or all of the time), 1 (behaviour is sometimes observed), 0 (behaviour is not observed), or N/A (behaviour is not applicable for this skill). A percentage was calculated for each domain by taking the sum of scores in the domain and dividing by the total score possible and multiplying by 100. A fidelity percentage was calculated for all domains combined by taking the sum from all domain scores and dividing by the total score possible and multiplying by 100. Each participant was also given the Parenting sense of competence (PSOC) questionnaire, (Johnston & Mash, 1989) to measure their satisfaction with teaching competence before and after the study. The PSOC asks parents to respond to 17 questions about their perceived self-efficacy using a 6-point Likert-type scale. In this study, parents were asked to answer only in reference to the child they are teaching the skill to and not to other children in the family.

Data collection for the child was based on a task analysis checklist developed for each functional skill to assess if the child had performed each step independently correct, incorrect or level of prompt given. The skills were assessed at each phase with the same video used to measure parent competency.

PROCEDURES

Baseline

For baseline sessions, parents were visited in their home by the first observer and video recorded. The observer asked parents to teach the first skill in each of their three previously identified skill sets to "the best of their ability" without any prompting or feedback. Parents were asked to try to teach each skill three times. Parents were instructed to teach one functional skill first, then the second and then the third. It was the family's responsibility to gather the necessary materials, choose an appropriate environment and initiate teaching.

Intervention

Parent manual only. Following baseline sessions, parents were asked to choose one skill to be taught using the parent manual. One week prior to the next observation, each family was provided with a brief orientation to the content of the manual, for example how the sections were divided and encouragement to complete each post module quiz. From that point, no further information or parent consultation was given on how to use the manual. Parents were asked to organize up to three opportunities to teach the target skill in each session and teach to "the best of their ability" while an observer video recorded the session. The observer avoided additional coaching or feedback that a parent may have solicited. When the parent had questions the observer re-directed them to consult the parent manual.

Parent manual plus in-home consultation. Following introduction of the manual, the next phase incorporated weekly 90-min home consultations that approximately followed a structure adapted from the blended Early Start Denver Model/PRT model (Vismara et al., 2009). Consultation focused on the skill identified as the top priority by the parent. For both children in the study, the skill chosen was use of toilet. Each home consultation started with a review of the previous week's goal, answer questions about the manual if necessary, additional modeling of the previous goal(s) (e.g., how to use errorless prompting), brief description of the goal, modeling of the teaching procedure and then parent practice with the therapist. Coaching and feedback continued until a 100% correct criterion across two consecutive trials per skill was met in practice with the therapist. With practice completed, the parent was asked to teach the first functional skill, the second and then the third (up to three trials each). Additional skills were chosen in case the child achieved mastery during this phase, however this only occurred for Child 2 in the final measure of phase two, therefore a new skill was not introduced. The consulting therapist recorded parent and child data for up to nine trials with feedback provided only for Skill 2. The final part of the consultation was a review of key strategies and to establish practice opportunities for skill two prior to the next home consultation. All sessions were video recorded to allow accurate data collection from both observers.

Control task. The third skill was measured at the same intervals as the other two skills. Skill 3, however, was not task-analyzed for parents and no coaching or feedback

was provided to the parent. Parents were asked to teach this skill to the best of their ability.

Generalization probes. Two weeks after the final consultation, two follow-up visits were scheduled for each parent. One day prior to these visits, parents were asked to identify a new functional skill to teach to their child. Parents were given assistance on creating a task analysis for this novel skill of their choice but no additional coaching or feedback was provided to the parent teaching the new skill. At the follow-up visit, parents were asked to teach this new skill to the best of their ability.

Maintenance probes. To assess if competency and child skills were maintained, parents were instructed to teach each current functional skill following the generalization probe. In each maintenance session, parents were asked to teach the three target skills to the best of their ability, one functional skill first, the second, and then the third. Parent and child responses were video recorded and scored following the visit. Following this observation parents received brief feedback by the therapist and answers to any questions related to the teaching strategies.

Chapter III

RESULTS

Parent Competency

Figures 1 and 2 (see Appendix) show the mean competency scores per phase achieved by Keon's parent and Martin's parent respectively. The mean percentage scores for parent competency are displayed for each domain: (a) setting the teaching environment, (b) attention and motivation, (c) prompting, and (d) reinforcement and data. Mean scores show that setting the teaching environment was the highest for families, specifically as the study went on, with both families at or near 100% in that domain after baseline scores of 61.1% and 72.2% for Families 1 and 2, respectively. Competency for the other three domains varied between families. The mean competency data demonstrated consistent improvement in parent skill throughout the study for both parents. The overall mean score for all skills and competency domains at each phase showed that Keon's parent (Family 1) improved from baseline scores of 22.2% (range 2.2% to 61.1%) to 80.2% (range 61.4% to 100%) at phase three. These competency scores were maintained at follow up with a mean score of 79.5% (range 100% to 68.8%). For Martin's parent (Family 2), a steady increase in mean competency scores was also observed from a baseline score of 46.3% (range 29.2% to 72.2%), to 68.2% (range 49.5% to 84.2%) in the manual only phase and 90% (range

77.5% to 100%) in manual plus consultation phase. This increase was maintained at follow up with a mean score of 90.4% (range 79.7% to 98.4%).

Figure 3 (see Appendix) shows results in Keon's parent competency separated by child skill during baseline, manual only, manual plus consultation and maintenance and generalization. For the child skill of *utensil use*, Keon's parent had a mean competency baseline score of 23.2%. When the manual was introduced, the mean score increased to 66.7% and improved to 90.6% at follow up. It is important to note that although consultation was not directed to this skill, when consultation started, an immediate improvement in competency score was observed, from 68.8% to 90.6%. For the child skill of *use of toilet*, the mean baseline score of 27.8% prior to home consultation. The mean competency score increased to 83.4% with the introduction of home consultation and increased further to 90.6% on both follow-up maintenance measures. The competency scores for teaching use of toilet also increased when the manual was introduced for utensil use. The control skill of *shoes on* showed variability with a mean score of 54.6% (range 28.1% to 83.3%) and a mean score of 61% at the maintenance visit. An increasing trend is evident with the control skill and competency scores have a single-session increase of 24% when consultation was introduced. Although improvement was observed overall, it is important to note competency was variable dependent on the skill, competency domain and if intervention was applied.

Keon's mother demonstrated relatively good *arrangement of teaching environment* demonstrating competency during 61% of the teaching trials, increasing to 78% during manual only, and 100% during manual plus consultation and at follow up.

Improvement was seen in the domain of child *attention and motivation*, from a baseline of 18.1%, to 63.9% when the manual was introduced, increasing further to 75.8% during manual plus consultation, but decreasing to 63.9% at follow up. The greatest relative improvement was seen in the domain of *prompting*, progressing from a mean baseline score of 6.9%, to 32.1% in the manual only phase, and 78.6% in the manual plus consultation phase with continued improvement in competency at follow up of 82.8%. This was a total mean increase of 75.9%. Keon's mother showed less progress in the domain of *reinforcement and data* collection, moving from a baseline of 2.8% to 68.8% at follow up.

At the follow-up visits, Keon's mother was asked to choose a new skill to teach that was used to probe for generalization. The skill of *put shirt on* was task analyzed and reviewed with the parent prior to teaching but she received no coaching or feedback while teaching. She achieved a mean competency rating score of 75%.

Results from Martin's parent (Family 2) shown in Figure 4 (see Appendix) display competency separated by child skill during baseline, manual only, manual plus consultation and maintenance and generalization. For the child skill of *dressing with four items*, Martin's parent had a mean competency baseline score of 40.6%. When the manual was introduced, the mean score increased to 79.8% and improved to 90.5% at follow up. It is important to note that a gradual consistent increasing trend in competency scores was observed throughout the manual only phase. For the child skill of *use of toilet*, the mean baseline score of 59.1% prior to home consultation, but an increase following introduction of the manual was noted. The mean competency score

increased to 96.2% with the introduction of home consultation and increased further to 97.9% on maintenance measures. For the control skill of *brush teeth*, Martin's parent demonstrated a gradual increase in competency scores but with some variability, the extended mean baseline score was 68.3% (range 43.8% to 87.5%), and further improvement at follow up with a mean score of 92.2%. Across all skills, Martin's competency scores showed an increasing trend with punctuations at the introduction of the manual and then consultation.

Martin's parent demonstrated consistent improvement in competency across skill domains with mean baseline percentage above Family 1. Competency scores for *setting the teaching environment* went from 72.2% at baseline to 84.2% when the manual was introduced. With the introduction of home consultation, Martin's mother demonstrated 100% competency which remained nearly unchanged at follow up with 98.4%. Scores for *attention and motivation* improved from 52.8% at baseline to 70.1% in the manual only phase, to 85.8% in manual plus consultation phase, and continuing to improve to 93.8% at follow up. Competency scores for *delivery of prompts* improved from 31% at baseline to 68.8% with manual only, demonstrating continued improvement to 96.7% when consultation was introduced, and maintained at 89.6% on follow-up measures. In the domain of *reinforcement and data,* baseline score was 29%, manual only phase increased to 49.5%, with continued progression when consultation was introduced, to 77.5% and maintained at 79.7% at follow up.

For the generalization probe, Martin's mother chose the skill of *cut with scissors*. This skill was task analyzed with the parent, but no further information was

shared. She was then asked to teach as best she could and received no modelling or coaching. She demonstrated a mean parent competency of 86.7% across the two follow-up visits.

Child Skill Acquisition

Figure 5 (see Appendix) shows Keon's skill acquisition data (incorrect, prompted and correct responses) across the skills of *use of utensil*, *use of toilet* and *shoes on*. The results show some differentiation across phases with a general trend of fewer child errors, an increase in independent responding and greater use of parent prompts delivered. For use of utensil, Keon was correct on average 29.2% of trials at baseline, over half of responses were prompted (58.3%), and he made errors on 12.5% of trials. During manual only, he was correct on 58.3% of trials with a gradual increase from 50% to 62.5%, prompted responses were 29.2% but gradually decreased from 37.5% to 25% and errors remained at 12.5%. Following consultation, he was correct on 79% of responses, prompted trials and errors decreased to 10.5%. Keon nearly maintained the rate of correct responses at follow up with 75%, prompted trials were at 18.8%, and incorrect responses decreased to 6.2%. For toileting, Keon made errors on an average of 87.5% of trials at baseline, and 77.5% during manual only, with 15% prompted responses and 7.5% correct responses. Following consultation, he made no errors and at follow up was incorrect only 6.3% of trials with 50% of trials prompted and nearly half independently correct (43.8%). For the control skill of shoes on, Keon showed consistent responding throughout all phases with an overall mean rate of 12.5%

correct responses, 23.1% prompted, and 59.8% incorrect responses and at follow up 25% were correct, 12.5% prompted, 62.5% of responses were incorrect.

Figure 6 (see Appendix) shows Martin's skill acquisition data (incorrect, prompted and correct responses) across the skills of *dressing with four items*, *use of toilet* and *brush teeth*. The results show an increasing trend in correct responses, fewer errors and greater use of parent prompts delivered. For dressing with four items, mean baseline scores for correct responses was 35.1%, incorrect responses on half of the trials (50.9%) and 14% were prompted responses. When the parent manual was introduced, Martin responded correctly to 61.1% of trials, prompted responses were 36.9% and errors were at 2%. In the manual plus consultation phase, correct responses increased to 66.9%, prompted responses were 29.9% and, at follow up, stable responding was observed with 63% of responses correct and 32% were prompted trials. For toileting, Martin's mean baseline was 45.8% for correct and prompted responses and 8.3% for errors. In the manual only phase, correct responses increased to 70.1% and 29.9% were prompted with no errors. In the manual plus consultation phase, Martin was correct on 85% of trials, the remainder were prompted and he was correct on all trials at follow up. For the control skill of brush teeth, mean scores were as follows: Martin was correct for 21.8% of trials, prompted for over half of trials (55.1%), and incorrect for 23.1% of responses. At follow up, mean scores increased to 30.3% for correct responses, 69.7% prompted responses, and no errors. When examining the data for Family 2, it should be noted that this parent used far more prompting from the outset, as the parent reported

difficulty with non-compliance and therefore commonly gave prompts immediately upon delivering an instruction.

Chapter IV

DISCUSSION

This study adds to the literature on successful parent mediated behavioural intervention using a manual plus brief consultative model to assess outcomes for parent competency and child skill acquisition. Previous studies, such as Summers and Hall (2008), used a manual to assess parent's correct implementation of ABA strategies but did not take data on child response. Other studies have examined the effects of parent-mediated intervention using broader child measures for adaptive behaviour and cognitive functioning (Sallows & Graupner, 2005; Smith et al., 2000). More closely associated with this study, there are examples in the literature that contain results demonstrating greater independence in child responding as a result of targeted teaching by a parent (Coolican et al., 2010, Lafasakis & Sturmey, 2007). The general results of the study are similar to those achieved by Crockett et al. (2007) that demonstrated two parents were able to acquire a set of teaching strategies and use them with a high degree of accuracy that may be used in functional everyday routines. A general correlation can be seen between previous exposure to ABA and the level of parent competency observed at each phase for both families. From the competency rating scores, it appears having some previous experience to applied behaviour analysis may provide a foundation of learning to allow easier application of teaching. Martin's parent had mean

baseline scores that were 24.1% higher than Keon's parent (46.3% compared to 22.2%), with mean scores remaining consistently higher throughout all of the phases (manual only—68.2% to 48.8%, manual plus consultation—90% to 80.2% and follow up—90.4% to 79.5%). Vismara et al. (2009) reported similar results of significant improvement in parent teaching when using a manual and brief consultative model but did not have a control skill. The majority of parents participating in Vismara et al. (2009) demonstrated competency scores greater than 90% following training. It should also be noted that although both parents in this study demonstrated significant improvement in skills ranked as first or second priority, parent and child mean scores for the control skill were less for Family 1 (shoes on) and variable for Family 2 (brush teeth). For Keon's mother, generalization of teaching implementation did not occur as she deviated very little from her typical routine and it was observed that she completed many of the steps for him without prompting a response.

Results from the child data show defined trends of increased correct responding with fewer errors made. For Keon, baseline scores demonstrated very limited success in participating in typical daily living routines, but following introduction of the manual plus consultation phase non-responding or errors significantly decreased on two of three skills. Anecdotally, Keon increased his time seated on the toilet from a mean of 18 s during baseline, to 2 min 20 s at follow up and errors were reduced to 0%.

Anecdotal results for Martin showed he was successfully urinating in the toilet at each visit following introduction of the manual plus consultation. It was also encouraging to observe that delivery of prompts were given within 1-2 s to provide near

errorless teaching on all skills with the exception of dressing that had a mean rate of incorrect responses of 5%. At parent request, the functional skill of dressing with four items of clothing was included in the study and was task analyzed into 19 steps. This skill involved more complexity that required greater attention to all necessary materials and chaining discrete responses together. Results from both parents in this study were similar to those found by Crockett et al. (2007) that a significant increase correct responses and prompted responses were observed and a concurrent decrease in incorrect responding.

As a method to determine social validity and receive feedback on the study, the widely used PSOC (Johnston & Mash, 1989) was administered pre and post intervention. The PSOC is a 17-item questionnaire on a 6-point scale from 1- strongly agree to 6- strongly disagree. A lower score is a generally desired outcome demonstrating greater parent sense of control and efficacy. The combined score for Parent 1 decreased from a pre-intervention score of 3.31 to 2.67 following the study. Results from the subscales showed a greater sense of satisfaction and efficacy reported by Keon's mother. For Parent 2, a decrease was also demonstrated on the combined score, from an initial score of 3.56 to 2.75 at study completion. The sub scales for Parent 2 showed improvement in both the control and efficacy domains.

The PSOC measure provided this study with valuable psychometric information on a parent's sense of ability with a different perspective than that of implementation fidelity. Although the scores should be interpreted with caution given the brief nature of

the intervention, both parents reported a similar decrease in scores meaning a greater sense that they can be effective when teaching their child.

Finally, this study used brief consultation, a total of approximately three hours per family which is a departure from current literature with examples of a greater number of consultation hours, for example 6 hours used by Coolican et al. (2010) and 12 hours used by Stahmer and Gist (2001) and Vismara et al. (2009). Within a brief consultative model, it remains difficult to assess if the impact of a manual is contingent on direct interaction with a therapist or not. The value of a manual as an adjunct to brief consultation is the low cost, portability and that it can be translated into different languages (Lerman et al., 2000; Summers & Hall, 2008).

Limitations

This study has several limitations that should be considered. First, only two families were involved. It would be beneficial to deliver this brief intervention model to additional families to determine if the results can be replicated. This may be helpful to identify if any competency domains are more easily mastered. Second, a longer follow-up period would allow for better assessment of the maintenance of the parent teaching competency and child skill. A longer follow up may also allow further measurement of generalization to novel or more complex tasks. For example, the results from the Coolican et al. (2010) study noted that results were mixed for child responding and approximately half met parent fidelity criteria of 75%, at the 2- to 4-month follow up.

This study does not allow for accurate assessment of the relative contribution of the parent manual and the home behavioural consultation. A component analysis of

contributing factors for effective child skill maintenance and parent generalization to novel functional skills would be beneficial. Another limitation of the current study is the role that order effects and practice effects may have played in the improvement of parent competency and child skill acquisition. Parent competency scores improved following baseline with the introduction of the manual, with a greater increase when consultation was introduced; however, the control skill also showed a general increasing trend. It remains unclear what spillover effect the manual, consultation or additional practice may have had on teaching competency of the control skill.

Next Steps

Several areas of interest may be followed from this study including examination of stimulus generalization by involving a spouse or other close caregiver to observe if they are able to meet criteria for parent competency. Although the PSOC was completed as pre and post measures of parent satisfaction, it would be informative to use additional methods to solicit feedback from families to determine a parent perspective on the salient features of the manual and consultative process. The manual was focused on a general overview of supported behavioural teaching strategies and did not provide other information such as function of behaviour, promotion of pro-social behaviour and methods to decrease non-compliance such as the manual developed by Johnston et al. (2007). Finally, while parents in this study were asked to teach simple early functional skills, often skills of daily living are more complex in nature and require a several skills to be chained together in sequence. This area should be explored to convey the level of

parent teaching competency that may be required and how that may impact the child's successful acquisition of the skill.

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APPENDIX

Table 1

Early Learning Measure

ELM DATA SHEET

Child's Name _____ Date_____

Assessor's Name _____

Receptive Commands

	First Attempt	Second Attempt		First Attempt	Second Attempt
1. "come here"			11. "stand up"		
2. "put the block in the basket"			12. "turn around"		
3. "give me a hug"			13. "jump"		
4. "hands quiet"			14. "sit down"		
5. "wave bye-bye"			15. "stomp feet"		
6. "raise your arms"			16. "touch knees"		
7. "touch toes"			17. "touch ears"		
8. "touch head"			18. "shake your head"		
9. "touch tummy"			19. "touch shoulders"		
10. "clap"			20. "cough"		

Nonverbal Imitation (*Instruct "do this" while performing the actions*)

	First Attempt	Second Attempt		First Attempt	Second Attempt
1. arms out			11. make fist		
2. Clapping			12. Wave		
3. touch head			13. stomp feet		
4. touch tummy			14. shake head (no)		

5. touch shoulders			15. throw kiss		
6. arms up			16. turn around		
7. touch knees			17. Jump		
8. touch table			18. place object on table		
9. touch elbow			19. raise one arm		
10. touch ears			20. touch toes		

Expressive Commands (*Ask, "what is it?" while presenting the objects.* ***For items 18-20 ask, "what colour?"***)

	First Attempt	Second Attempt		First Attempt	Second Attempt
1. ball			**11.** table		
2. cup			**12.** keys		
3. doll			**13.** foot (child's)		
4. shoe			**14.** tummy (child's)		
5. nose (child's)			**15.** pen		
6. book			**16.** head (child's)		
7. block (natural)			**17.** watch		
8. phone			**18.** red (block)		
9. car			**19.** blue (block)		
10. basket			**20.** yellow (block)		

Verbal Imitation (*Instruct, "Say ...."*)

	First Attempt	Second Attempt		First Attempt	Second Attempt
1. "ahh"			**11.** "ball"		
2. "mmm"			**12.** child's name		
3. "k"			**13.** "nose"		

4. "d"			**14.** "book"		
5. "p"			**15.** "shoe"		
6. "eee"			**16.** "cat"		
7. "mama"			**17.** "dog"		
8. "dada"			**18.** "banana"		
9. "baby"			**19.** "mommy"		
10. "cookie"			**20.** "daddy"		

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Table 2

Parent and Child Profiles

Parent Profile	Child Profile
Parent 1 Level of Education: o B.A. and Montessori Diploma Level of behaviour analytic training: o none Current behavioural interventions being received: o 1 hour per week Communication Disorders Assistant o 1 hour per week behaviour therapy Parenting Sense of Competence Scale o Pre-measure: 3.31 o Post measure: 2.67	Child 1: Keon 3.6yrs ELM results: Domain 1 Receptive Communication: 0% Domain 2 Nonverbal Imitation: 10% Domain 3 Expressive Commands: 0% Domain 4: Verbal Imitation: 0% **ELM total mean score: 2.5%**
Parent 2 Level of Education: o High School Diploma, 2 years of University Level of behaviour analytic training: o Attended approximately 3 workshops of autism, communication and play skills. Occasional observation of in-home ABA sessions Current behavioural interventions being received: o 6 hours per week with an ABA therapist Parenting Sense of Competence Scale o Pre-measure: 3.56 o Post measure: 2.75	Child 2: Martin 4.5yrs ELM results: Domain 1 Receptive Commands: 30% Domain 2 Nonverbal Imitation: 35% Domain 3 Expressive Commands: 35% Domain 4 Verbal Imitation: 60% **ELM total mean score: 40%**

Table 3

Task Analysis of Functional Skills Used for the Study

Skill	Descriptive task analysis	Response + = independent correct Pr. = record level of prompt given - = incorrect
Use of toilet	1. Use both hands to hold each side of pants	+ ____ -
	2. Pull pants down below the knee	+ ____ -
	3. Use both hands to hold each side of underwear (or pull-up)	+ ____ -
	4. Pull underwear (pull-up) down below the knee	
	5. Sit on toilet ___ seconds	+ ____ -
	6. Use both hands to pull underwear (or pull-up) up to waist	+ ____ -
	7. Use both hands to pull pants up to waist	+ ____ -
	8. Flush toilet	+ ____ -
		+ ____ -
		% ind. correct _____ % prompted _____ % incorrect _____
Eat with a utensil	1. Pick up spoon	+ ____ -
	2. Hold spoon in hand with proper orientation	+ ____ -
	3. Hold bowl with other hand	+ ____ -
	4. Scoop spoon into bowl	+ ____ -
	5. Lift spoon to mouth with no more than 50% spillage	+ ____ -
	6. Mouth closes over spoon to capture food	
	7. Remove spoon	+ ____ -
		+ ____ -
		% ind. correct _____ % prompted _____ % incorrect _____
Put on shoes (no laces)	1. Hold shoe in hand	+ ____ -
	2. Put toes on shoe	+ ____ -
	3. Hold back of shoe	+ ____ -
	4.Pull shoe over heel	+ ____ -
	5. Hold 2nd shoe in hand	+ ____ -
	6. Put toes in shoe	+ ____ -
	7. Hold back of shoe	+ ____ -
	8. Pull shoe over heel	+ ____ -
		% ind. correct _____ % prompted _____ % incorrect _____

Table 3 continued

Skill	Descriptive task analysis	Response + = independent correct Pr. = record level of prompt given - = incorrect
Dressing- 4 pieces pf indoor clothing	1. Take underwear in both hands	+ ____ -
	2. Put one leg through	+ ____ -
	3. Put other leg through	+ ____ -
	4. Pull up to waist	+ ____ -
	5. Take shirt in both hands	+ ____ -
	6. Pull shirt over head	+ ____ -
	7. Put one arm through arm hole	+ ____ -
	8. Put other arm through arm hole	+ ____ -
	9. Pull shirt down to waist	+ ____ -
	10. Take pants in both hands	+ ____ -
	11. Put one leg through	+ ____ -
	12. Put other leg through	+ ____ -
	13. Pull pants up to waist	+ ____ -
	14. Take first sock in both hands	+ ____ -
	15. Pull over toes	+ ____ -
	16. Pull sock over heel and ankle	+ ____ -
	17. Take second sock in both hands	+ ____ -
	18. Pull over toes	+ ____ -
	19. Pull over heel and ankle	+ ____ -
		% ind. correct _____ % prompted _____ % incorrect _____
Brush teeth	1. Pick up toothbrush	+ ____ -
	2. Open toothpaste tube	+ ____ -
	3. Apply toothpaste onto brush	+ ____ -
	4. Turn on water	+ ____ -
	5. Wet brush	+ ____ -
	6. Brush top teeth for 30s	+ ____ -
	7. Brush bottom teeth for 30s	+ ____ -
	8. Spit into sink	+ ____ -
	9. Rinse brush with water	+ ____ -
	10. Turn off tap	+ ____ -
	11. Replace tooth brush	+ ____ -
		% ind. correct _____ % prompted _____ % incorrect _____

Table 4

Parent Competency Rating Scale

Explanation of scores:
2 – behaviour is observed most or all of the time
1 – behaviour is observed sometimes
0 – behaviour is not observed at all
N/A – behaviour is not applicable for the situation

Parent behaviour	Items that represent the criteria for correct performance	Score
1. Sets up teaching materials and environment	1. All materials required for the skill are present	2 1 0 N/A
	2. Materials are arranged in a way to allow ease of access for parent	2 1 0 N/A
	3. Reinforcers are readily available	2 1 0 N/A
	4. Teaching area is kept organized and as free from distraction as possible	2 1 0 N/A
Total behaviour score (total score/total possible score) x 100 =		
2. Ensures child is attentive and motivated	1. Child is ready to learn (orienting to parent)	2 1 0 N/A
	2. Got the child's attention before giving an instruction	2 1 0 N/A
	3. Instruction was brief, clear and appropriate to task	2 1 0 N/A
	4. Instruction was not repeated	2 1 0 N/A
Total behaviour score (total score/total possible score) x 100 =		
3. Uses appropriate prompts	1. prompt was given within 3secs of the instruction if child did not respond	2 1 0 N/A

Table 4 continued.

Explanation of scores: 2 – behaviour is observed most or all of the time 1 – behaviour is observed sometimes 0 – behaviour is not observed at all N/A – behaviour is not applicable for the situation		
Parent behaviour	**Items that represent the criteria for correct performance**	**Score**
	2. when prompt was given it brought about correct responding	2 1 0 N/A
	3. following incorrect response, increased level of prompt was given	2 1 0 N/A
	4. following correct response, prompt was faded on following teaching trial	2 1 0 N/A
Total behaviour score (total score/total possible score) x 100 =		
4. Reinforcement and data recorded	1. Correct response was followed by praise or tangible	2 1 0 N/A
	2. Reinforcement was given immediately	2 1 0 N/A
	3. Reinforcement was given contingently on a better quality response	2 1 0 N/A
	1. Data recorded prior to the start of next teaching trial/instruction	2 1 0 N/A
Total behaviour score (total score/total possible score) x 100 =		

Table 5

Parenting Senses of Competence Rating Scale

Parent/Guardian's Name:_____

Child's Name_____

☐ **Pre-** ☐ **Post-** **Date Completed:**_____

Parenting Sense of Competence Rating Scale

Please complete the following, thinking only about the child involved in our program (not any other children you have). Please indicate the degree to which you agree or disagree with the following items by placing the appropriate number in the space provided.

1 = Strongly Agree 2 = Agree 3 = Somewhat Agree 4 = Somewhat Disagree
5 = Disagree 6 = Strongly Disagree

_____1. The problems of taking care of a child are easy to solve once you know how your actions affect your child, an understanding I have acquired.
_____2. Even though being a parent could be rewarding, I am frustrated now while my child is at his/her present age.
_____3. I go to bed the same way I wake up in the morning, feeling I have not accomplished a whole lot.
_____4. I do not know why it is, but sometimes when I'm supposed to be in control, I feel more like the one being manipulated.
_____5. My mother/father was better prepared to be a good other/father than I am.
_____6. I would make a fine model for a new mother/father to follow in order to learn what she/he would need to know in order to be a good parent.
_____7. Being a parent is manageable and any problems are easily solved.
_____8. A difficult problem in being a parent is not knowing whether you're doing a good job or a bad one.
_____9. Sometimes I feel like I'm not getting anything done.
_____10. I meet my own personal expectations for expertise in caring for my child.
_____11. If anyone can find the answer to what is troubling my child, I am the one.
_____12. My talents and interests are in other areas, not in being a parent.
_____13. Considering how love I've been a mother/father, I feel thoroughly familiar with this role.
_____14. If being a mother/father of a child were only more interesting, I would be motivated to do a better job.
_____15. I honestly believe I have all the skills necessary to be a good mother/father to my child.
_____16. Being a parent makes me tense and anxious.
_____17. Being a good mother/father is a reward in itself.

(Johnston & Mash, 1989)

Table 6

Child Skill Data Sheet

Measure:_____ Family:_____

Skill	Descriptive task analysis	Response + = independent correct **Pr.** = record level of prompt given - = incorrect
Eating with utensil (spoon)	1. Pick up spoon	+ ____ -
	2. Hold spoon in hand with proper orientation	+ ____ -
	3. Hold bowl with other hand	+ ____ -
	4. Scoop spoon into bowl	+ ____ -
	5. Lift spoon to mouth with no more than 50% spillage	+ ____ -
	6. Spoon enters open mouth	+ ____ -
	7. Mouth closes over spoon to capture food	+ ____ -
	8. Remove spoon	+ ____ -
		% ind. correct _____ % prompted _____ % incorrect _____

Prompt level and data code	Description
Full physical – FP	Hand over hand physical guidance of a child's motor movement(s). The child is not required to perform any part of the response on their own.
Partial physical – PP	Guidance through physical touch to guide a child's motor movement(s). A decrease in intensity, force or location of the touch that requires the child to make part of the response on their own.
Gesture – G	A motor gesture, including pointing, motioning or nodding to direct a child's attention to a specific stimulus
Verbal – Vbl	Verbalizations given to help responding. This can include a full sentence or word, partial word or sound
Visual – Vis	Pictures, photographs or line drawings

Table 7

Prompting Hierarchy and Definitions

Prompt Level and Data Code	Description
Full Physical – FP	Hand Over Hand Physical Guidance Of A Child's Motor Movement(S). The Child Is Not Required To Perform Any Part Of The Response On Their Own.
Partial Physical – PP	Guidance Through Physical Touch To Guide A Child's Motor Movement(S). A Decrease In Intensity, Force Or Location Of The Touch That Requires The Child To Make Part Of The Response On Their Own.
Gesture – G	A Motor Gesture, Including Pointing, Motioning Or Nodding To Direct A Child's Attention To A Specific Stimulus
Verbal – Vbl	Verbalizations Given To Help Responding. This Can Include A Full Sentence Or Word, Partial Word Or Sound
Visual – Vis	Pictures, Photographs Or Line Drawings

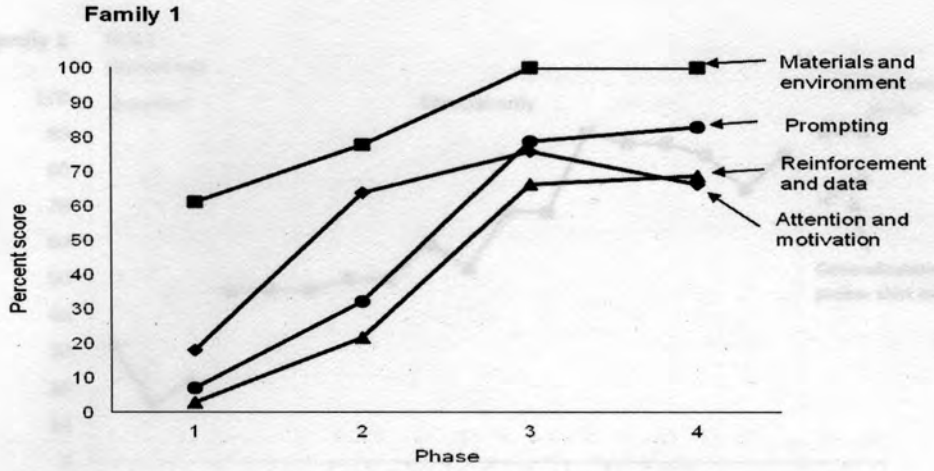

Figure 1. Parent 1 mean percentage of correct implementation of 16 competency skills across baseline, manual only, manual plus consultation and follow-up phases. Competency rating scale is divided into 4 domains: Materials and environment, Attention and motivation, Prompting Reinforcement and data.

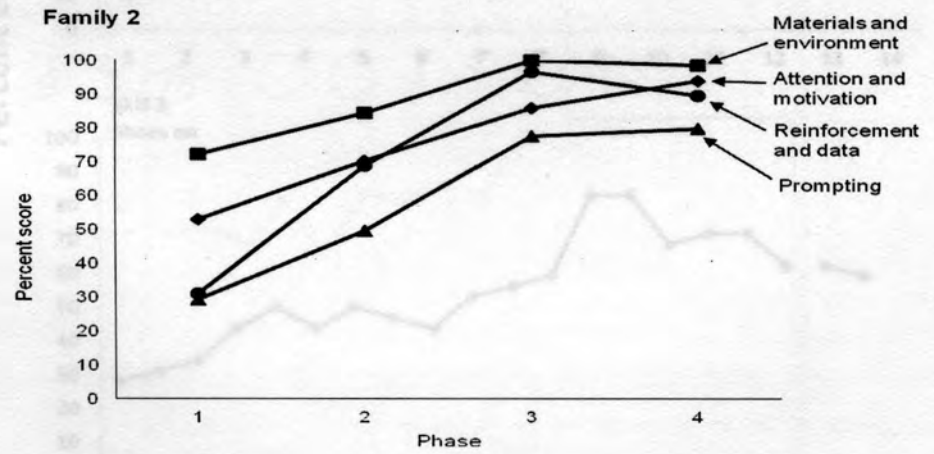

Figure 2. Parent 2 mean percentage of correct implementation of competency skills across baseline, manual only, manual plus consultation and follow-up phases. Competency rating scale is divided into 4 domains: Materials and environment, Attention and motivation, Prompting Reinforcement and data.

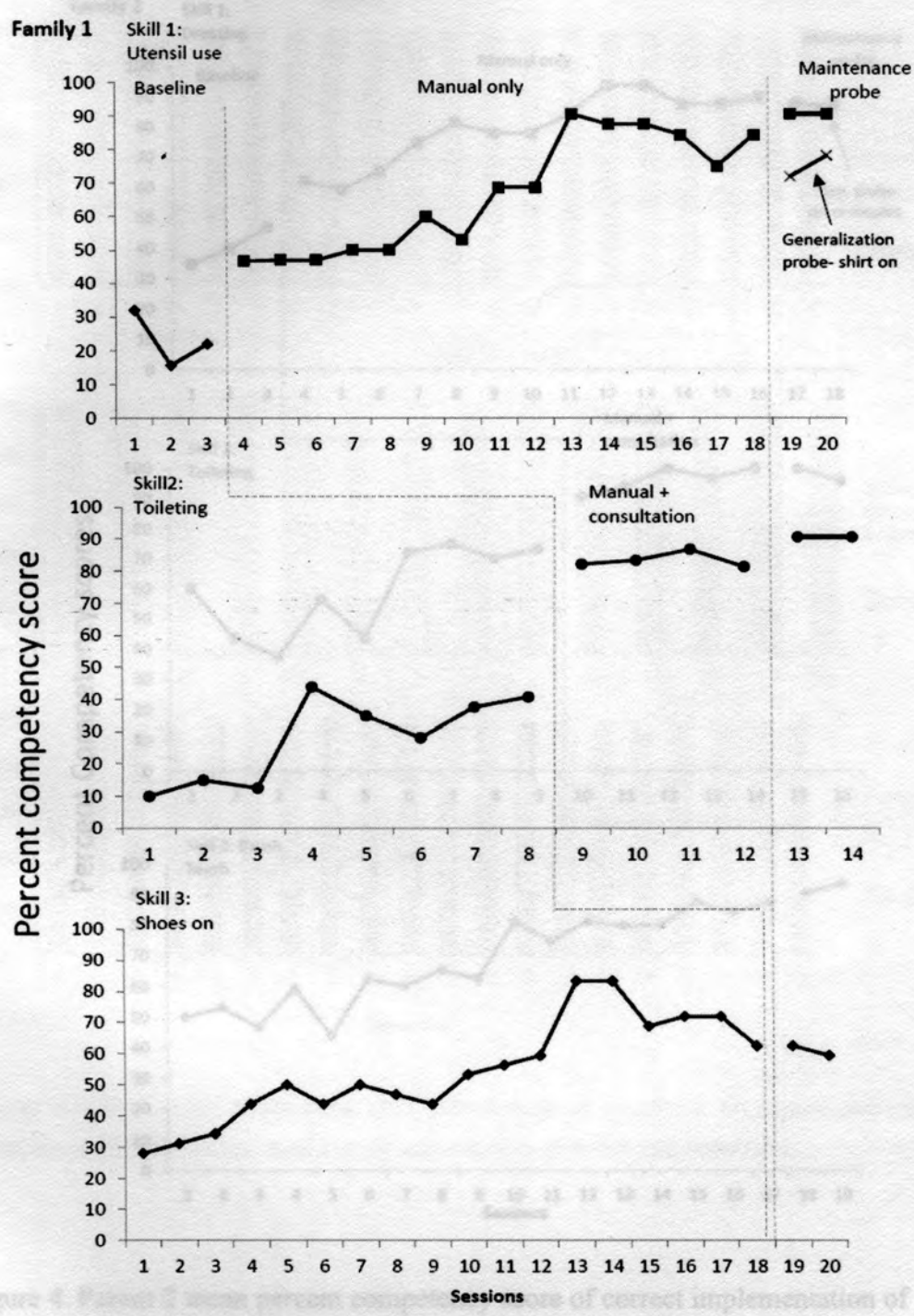

Figure 3. Parent 1 mean percent competency score of correct implementation of teaching across child functional skills.

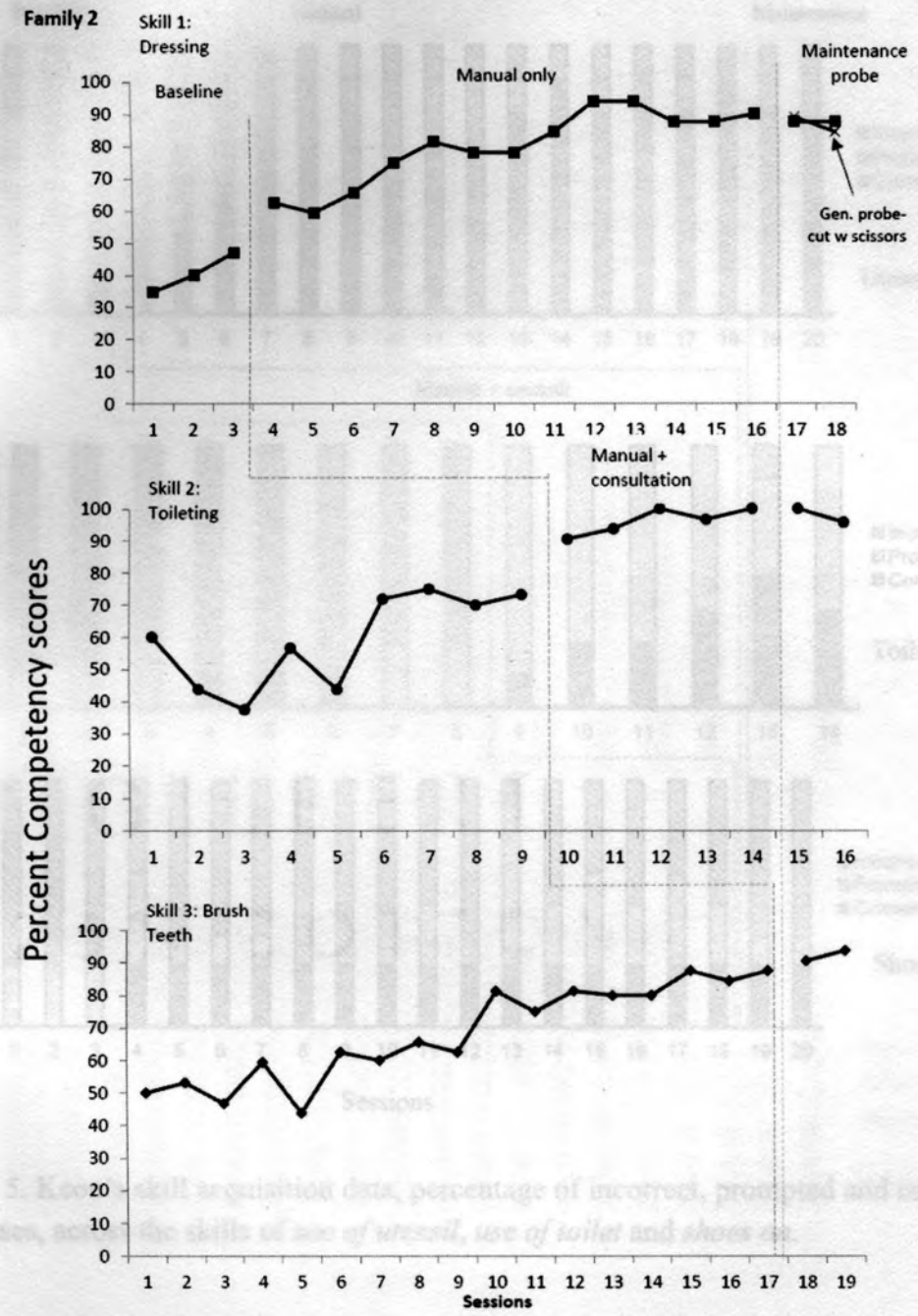

Figure 4. Parent 2 mean percent competency score of correct implementation of teaching across child functional skills.

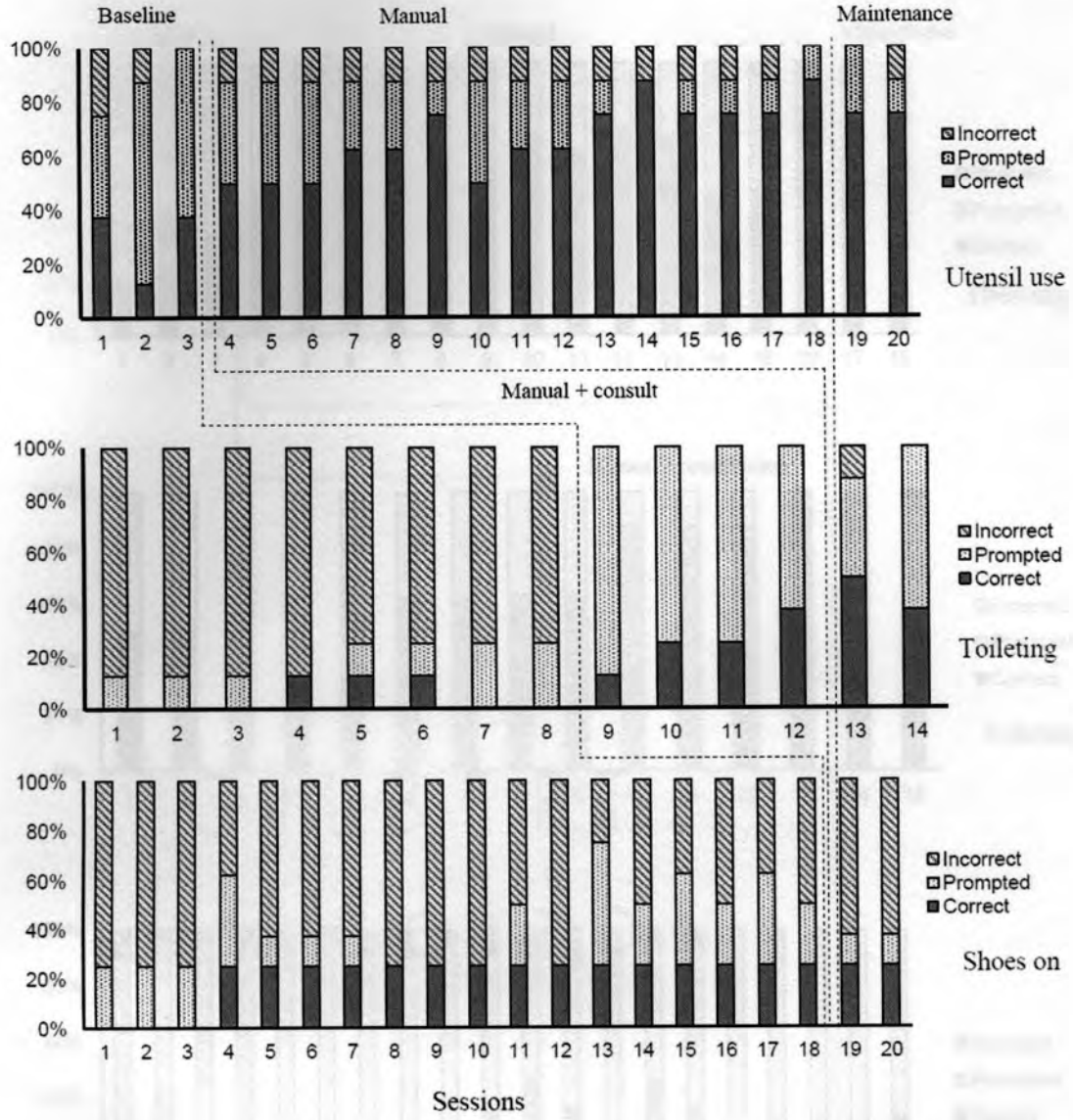

Figure 5. Keon's skill acquisition data, percentage of incorrect, prompted and correct responses, across the skills of *use of utensil*, *use of toilet* and *shoes on*.

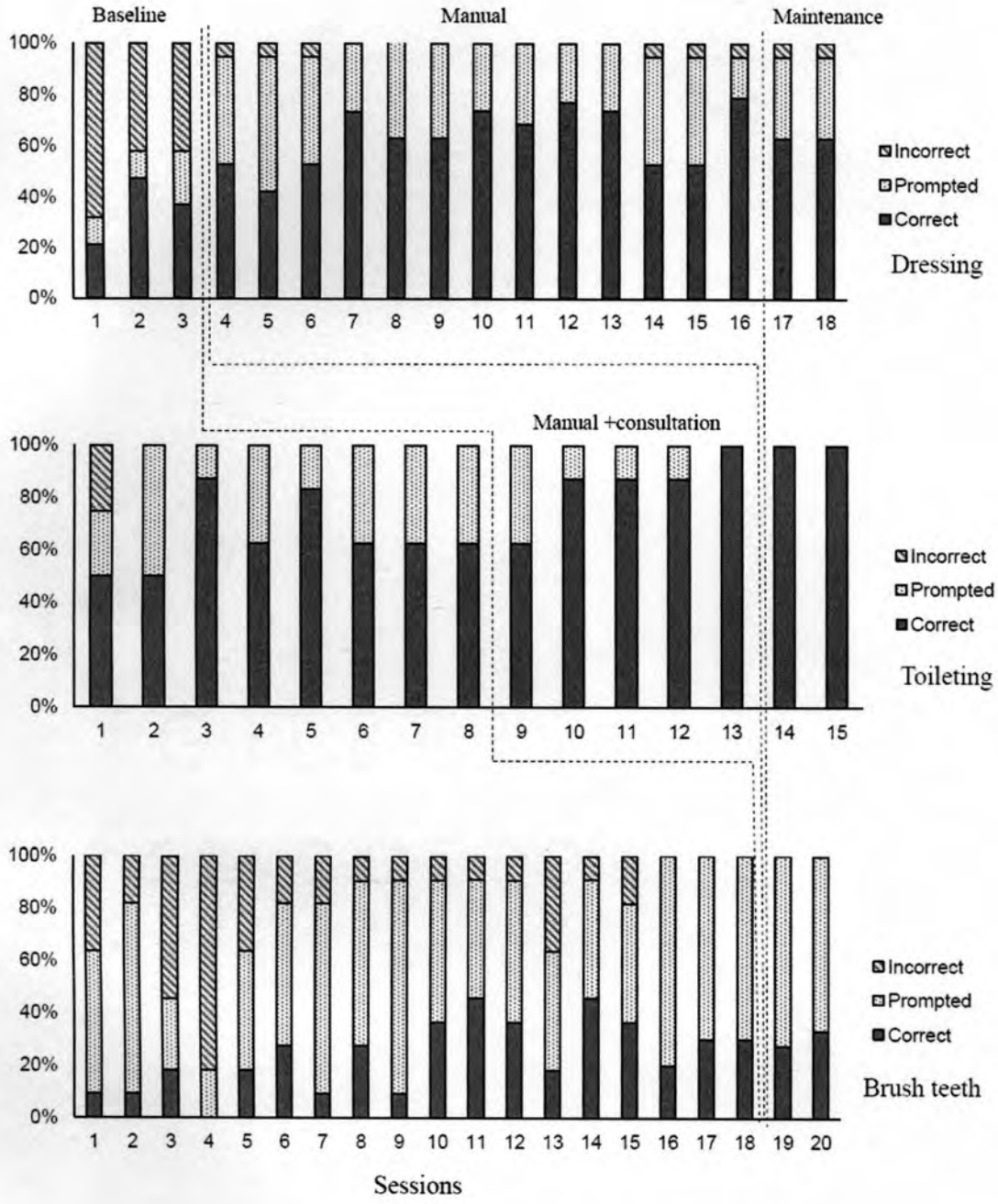

Figure 6. Martin's skill acquisition data, percentage of incorrect, prompted and correct responses, across the skills of *dressing with 4 items*, *use of toilet* and *brush teeth*.