TEACHING PARENTS TO PROMOTE LANGUAGE USE OF
CHILDREN WITH AUTISM SPECTRUM DISORDERS WITHIN FAMILY ROUTINES
USING ENHANCED MILIEU TEACHING

by

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Abstract

Children with autism spectrum disorder (ASD) often do not acquire language naturally within ecological systems (i.e., parent-child interaction in daily routines); therefore some of these children have significant delays in social communication skills. Language interventions such as discrete-trial teaching procedures, the verbal behavior approach, and naturalistic language teaching approaches have been developed to improve language use among children with ASD. However, few research studies have examined the generalization and maintenance effects of language intervention implemented by parents on child’s communication skills across natural family routines. The purpose of this study is to evaluate the effectiveness of a language intervention model that synthesizes three theoretical frameworks, enhanced milieu language teaching (EMT), general case programming principles, and the activity setting (i.e., daily or weekly routine) as a unit of analysis and intervention for promoting generalized language use by young children with ASD. The study employed an empirical case study design with one parent-child dyad. Parent training was presented in a two-day workshop. Results showed improvements in parent use of EMT and in child use of language in indirectly trained and non-trained (i.e., generalization) family routines in the home. These improvements maintained at one and two months post-intervention. The results are discussed with reference to previous research, contributes, future directions, and implications for practitioners and researchers who are involved in language promotion interventions.
Preface

Ethics approval was given by the Behavioural Ethics Research Board (BREB) on April 26, 2012. The certificate number is H12-00397.
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Chapter 1

Introduction

One of the core features of autism spectrum disorders (ASD) is impairment in communication (American Psychiatric Association, 2000). Children with ASD often have language development delays and poor social communication skills (Charlop & Haymes, 1994; Rutter, 1978). Children with ASD have significant delays in or the absence of spoken language (e.g., 40% never obtain speech; Howlin, Goode, Hutton, & Rutter, 2004; Mancil, 2009). Others that have developed speech rarely initiate or sustain appropriate conversations with others (e.g., asking questions, requesting information, expressing affection, or requesting interactions; Carr & Kologinsky, 1983).

Ecological Systems Theories and Child Language Development

Typically developing children acquire language through interactions with the immediate family environment and daycare environment (Bronfenbrenner, 1995; Vygotsky, 1978). However, children with ASD do not develop language naturally within the social environment (Bronfenbrenner, 1995). They generally show a lack of, or a reduced number of, important referential gestures, such as showing, giving, pointing, following eye gaze, using eye gaze to communicate, or having joint attention. These deficits hinder their ability to acquire language within the social environment (Charman et al., 2003; Stone, Ousley, Yoder, Hogan, & Hepburn, 1997). Below, I briefly review ecological theories relevant to children’s development of language in the home and community.

According to Bronfenbrenner’s ecological systems theory (1995), child development occurs within a complex system of relationships affected by multiple levels of the environment.
The innermost of the environment in which the child is embedded is the microsystem – the activities, roles, and relationships in which the child directly participates. At the microsystem level, a child’s learning is affected by parent-child interactions. For example, an attentive and responsive child is likely to evoke positive and patient reactions from parents, whereas a distractible and unresponsive child is not likely to receive similar reaction from parents. The second level of Bronfenbrenner’s model is the mesosystem, which encompasses connections among various microsystems, such as home, school, neighborhood, and child-care centre. For example, a child’s academic achievement at school is facilitated when parents are actively involved in school life and promote academic learning at home. The third level, the exosystem, is made up of social settings that the child may not directly participate in but that can affect their experience in immediate settings. The parents’ workplace, for example, can affect the child, such as flexible work schedules, parental leave, on-site child care, and general working atmosphere.

The outer level of Bronfenbrenner’s model, the macrosystem, consists of general beliefs, cultural values, laws, and resources, which determines the support that the child may receive at inner levels of the environment. For example, in countries where there are mandates for generous benefits to employed parents and high-quality standards for childcare, the child is likely to have favourable experiences in immediate settings. Finally, the temporal dimension of the model, the chronosystem, refers to changes in beliefs, values, technologies, and social circumstances over time. For example, children today have access to a vast realm of information given the rise of the digital age. The arrival of a new sibling, for example, has very different consequences for a stay-at-home toddler compared to a school-age child with many relationships and activities beyond the family. Therefore, according to ecological systems theory, typical child development occurs
within a network of interdependent structures and is influenced by a complex system of relationships.

Vygotsky’s social interactionist theory of child development (1978) views the child as developing and functioning within a social context. Within this theory, social interaction is essential for child development. When a child interacts with a more knowledgeable other (MKO), who has a better understanding or a higher ability level than the child with respect to a particular task, process or concept, the child learns within a reciprocal experience with the MKO. The MKO can be a teacher, coach, or older adult, but could also be peers, a younger person, or computers. Vygotsky pointed out that the MKO structures activities so that the child’s role is within the child’s zone of proximal development (ZPD), which is defined as the distance between the child’s ability to perform a task under adult guidance and/or with peer collaboration and the child’s ability to solve the problem independently. The adult’s role in the ZPD is a joint participant in everyday activities (Schneider & Watkins, 1996). For example, when playing doctor and patient, a child may know the actions of the pretend play activity, but does not know the particular language of the specific role play. A mother then may teach the child how to use appropriate play language during the pretend play. Thus, the child’s performance under adult guidance is at a higher level than he/she is capable of independently. The adult adapts their support to help the child participate in activities to promote the child’s development. The process is referred to as scaffolding. This is consistent with social constructivist theory (Ratner & Bruner, 1978) that typically developing children acquire meaningful use of language in the context of meaningful parent-infant interaction and parent scaffolding behaviour.

According to Bronfenbrenner’s ecological systems theory (1995), all relationships are bidirectional, which means that parents affect children’s behaviour but children’s characteristics
also affect parents’ behaviour. Children learn language through the reciprocal, bidirectional influence of the communication environment, the responsiveness of communicative partners, and the child’s own developing communicative competence (Wetherby, Warren, & Reichle, 1998). Schopler and Reichler (1971) studied the personalities and behaviors of parents who have children with ASD and found that the parents’ personalities fall within the normal range, deviating from the general population only in that they react with perplexity and confusion to their unresponsive children. Parents of children with ASD rarely receive positive responses from their children during parent-child interaction. Over time, their communicative interactions decrease and children with ASD experience fewer communication opportunities. This creates a poor learning environment for children with ASD. Given this, it is important for parents to implement evidence-based language teaching procedures in the home setting to improve the language learning environment and create more communication opportunities for their children with ASD. This is consistent with social interactionist views of development because interventions for children with atypical development are based on an implicit belief that social interactions provide the context for and have the potential to affect the trajectory of atypical child language development (Schneider & Watkins, 1996). In addition, based on Vygotsky’s ZPD, parents play an important role (i.e., as a MKO) in promoting their child’s language development through their use of scaffolding behaviour. Thus, ecological systems theories suggest the critical importance of empowering parents of children with ASD to implement language promotion strategies in the home to promote their children’s use of language.

**Language Intervention Literature Review**

To address the communication needs of children with ASD, several language interventions have been developed since the 1960s and 1970s. Discrete-trial teaching procedures
(Lovaas, 1981, 2003; Prizant, Wetherby, & Rydell, 2000), the verbal behavior approach (Sundberg & Michael, 2001; Sundberg & Partington, 1998), and naturalistic language teaching approaches (Hart & Risley, 1968; Hemmeter & Kaiser, 1994; Koegel, O’Dell, & Koegel, 1987) are all well-researched language teaching approaches that are effective in improving social communication in children with ASD. These language teaching approaches and their evidentiary base are described below.

**Discrete trial teaching procedure.** Discrete trial teaching (DTT) was developed by I. O. Lovaas (1981, 2003) and is characterized by a highly structured and adult directed instructional methodology (Lovaas, 1977; Lovaas, Freitag, Gold, & Kassorla, 1965; Lovaas, Koegel, Simmons, & Long, 1973). In this approach, an interventionist works one-to-one with a child and breaks down a continuous flow of instructions into small discrete units of instruction (Smith, 2001). The five components of a discrete trial are: Cue, prompt, response, consequence, and intertrial interval. This teaching method allows children to easily discriminate the components of language in every discrete trial set. For example, when an interventionist is teaching the child to label ‘ball,’ the interventionist presents the child with a ball and a verbal cue, “what is this?” in a distraction-free environment. If the child does not respond, then the interventionist provides a prompt to help the child respond correctly, for example, the interventionist may say, “ball” and then repeat the verbal cue “what is this?” If the child says “ball” or an approximation of the word, then positive reinforcement, such as praise and tangible reinforcement, is delivered to the child. The interventionist then pauses before administering the next instruction. A defining feature of the approach is that it takes the child out of “natural” conditions of everyday life at home or in the classroom and provides language instruction in a highly controlled situation (Delprato, 2001).
Research on the effectiveness of DTT has shown improvements in communication skills among children with ASD, such as receptive language (Lovaas, 1977), expressive language (Howlin, 1981), and conversation (Krantz, Zalenski, Hall, Fenske, & McClannahan, 1981). Buffington, Krantz, McClannahan, and Poulson (1998) taught four children with ASD to request attention, express affection, and describe items using DTT in a highly structured and distraction-free classroom setting. They found that all four children acquired the communication skills when teaching techniques, such as modeling, prompting, and reinforcement, were systematically employed. Results also suggested that children successfully generalized their verbal and gestural responses across novel stimuli and settings. However, DTT has been criticized for a lack of communicative spontaneity during language training (Chiang & Carter, 2008; Koegel et al., 1987). In reply to this criticism, Smith (2001) pointed out that after children have acquired the new forms of behavior and they are able to discriminate between cues, other effective teaching methods may be incorporated to expand a child’s communication skills.

**Verbal behavior approach.** More recently, the verbal behavior approach (VBA) has emerged as an alternative teaching approach for many clinicians. VBA applies a Skinnerian theoretical framework to guide language instruction. The approach focuses on teaching four verbal operants that are directly applicable to the assessment and teaching of language to children with language deficit (Skinner, 1957; Sundberg & Michael, 2001; Sundberg & Partington, 1998). The four verbal operants are echoics (i.e., repeating the verbal behavior of another speaker), mands (i.e., requesting), tacts (i.e., labeling), and intraverbals (i.e., responding to the verbal behavior of another speaker). Each operant is taught using the natural controlling variables specific to its function and also considers the presence of operant-specific antecedents and consequences, as well as motivating operations (Shillingsburg, Kelley, Roane, Kisamore, &
Brown, 2009; Sundberg & Partington, 1999). An echoic is evoked by a verbal stimulus that has point-to-point correspondence with the evoked response and is maintained by generalized conditioned reinforcement (Sundberg & Michael, 2001), for example, an adult says “airplane” and the learner imitates “airplane.” A mand is a verbal operant that is evoked by a motivating operation and maintained by specific reinforcement related to the motivating operation (Shillingsburg et al., 2009), for example, during VBA training, the mand, “I want airplane” may be evoked by waiting a period of time when the learner does not have access to his favourite toy airplane. The learner’s verbal request for the toy airplane results in access to the toy airplane. In contrast, a tact is emitted in the presence of nonverbal stimuli and is maintained by generalized conditioned reinforcement (Shillingsburg et al., 2009). For example, after the presentation of the visual “airplane,” a learner emits the word “airplane,” which results in praise from the trainer. An intraverbal is evoked by a verbal stimulus and is maintained by generalized conditioned reinforcement, but the response does not have point-to-point correspondence with the evoked response (Shillingsburg et al., 2009). For example, after presentation of the phrase, “what flies in the sky?” the learner may emit the word “airplane,” resulting in praise from the trainer. In summary, VBA systematically trains language acquisition across a variety of functions and considers the natural maintaining consequences. VBA is often implemented in natural environments that target ‘generalization of acquired responses and variations of those responses across a variety of appropriate stimulus conditions’ (Carr & Firth, 2005, p.19).

Ingvarsson and Hollobaugh (2010) investigated the effects of VBA by teaching children with ASD to mand for answers to unknown questions and to acquire novel intraverbal responses. They employed echoic prompting and prompt delay procedures and found that all four participants learned to mand answers to unknown questions by saying, “I don’t know, please tell
me.” In addition, three participants successfully generalized the response to non-targeted unknown questions, different people, and different settings. However, one participant showed limited response generalization. Another participant needed additional reinforcement during the generalization phase in order to acquire novel intraverbal responses.

Jennett, Harris, and Delmonlino (2008) compared the effectiveness of DTT versus VBA in teaching children with ASD to make requests. They conducted two concurrent multiple probe designs to control for order effects. Half of the participants were trained with the VBA followed by DTT, and the other half of the participants were trained with DTT followed by the VBA. Results indicated that five of six participants learned requesting faster, emitted more independent requests, and engaged in fewer challenging behaviors in the VBA condition. At various points of both the trainings, parents reported that their children generalized spontaneous requesting at home, which is something that was not observed prior to the training sessions. Yet, all participants requested more number of items in the DTT condition.

**Naturalistic language teaching approaches.** Naturalistic language teaching approaches focus on teaching language in the social environment. These include enhanced milieu language teaching (EMT; Alpert & Kaiser, 1992; Hemmeter & Kaiser, 1994; Kaiser, 1993), the natural language paradigm (Koegel et al., 1987; Laski, Charlop, & Schreibman, 1988), and incidental teaching (Hart & Risley, 1968, 1975). The “natural” environment may be defined as any setting that the child would typically spend time, such as the home, school, or community (Mancil, 2009). These naturalistic language teaching approaches all take place across a variety of settings, incorporate loosely teaching structure, and use a variety of stimuli and naturalistic reinforcers. These approaches are child-initiated and focus on following the child’s lead.
Empirical studies have examined the effectiveness of naturalistic language teaching approaches on improving language development among children with ASD. These approaches have been shown to be effective in expanding children’s social communication skills, such as requesting (Rogers-Warren & Warren, 1980), spontaneous social phrases (Charlop & Trasowech, 1991; McGee & Daly, 2007), descriptions of play activities (Ingenmey & Van Houten, 1991), reciprocal interactions and initiations with peers (McGee, Almeida, Sulzer-Azaroff, & Feldman, 1992), spontaneous use of prepositions (McGee, Krantz, & McClannahan, 1985), and frequency of parent and child verbalizations (Ingersoll, Dvortcsak, Whalen, & Sikora, 2005; Laski et al., 1988).

In a clinic setting, Koegel et al. (1987) taught therapists to employ the naturalistic language paradigm with children with ASD. Results indicated that procedures successfully produced increases in the number of correct imitative and spontaneous utterances among the children with ASD. In addition, Hemmeter and Kaiser (1994) successfully taught four parents in a clinic setting to implement EMT strategies with children with developmental delays. Results showed an increase in the frequency of children’s spontaneous utterances and communication targets during intervention. Parents also were able to use the strategies in the clinic and to generalize strategy use to the home. Hancock and Kaiser (2002) taught three therapists in a clinic setting to use EMT strategies with children with ASD. Results showed increases in number and percentage of adult use of EMT strategies, percentage of child utterances that were expanded and followed by responsive feedback, and parent-child turn-taking ratio. Three out of four children showed generalization to home with parents, with the greatest changes in language skills occurring immediately after intervention, which suggested an indirect intervention effect on child’s communication behavior across settings.
In a home setting, Laski et al. (1988) trained parents of children with ASD to implement the naturalistic language paradigm strategies. Parent training was initially conducted in a therapy room with a table and two chairs. Training consisted of describing the techniques, modeling the techniques, and later, coaching by the researchers in participants’ homes. Data were collected during free-play in home settings. Results showed that parents successfully acquired the skills and generalized the skills across settings. There also was an increase in child’s vocalizations (e.g., imitating, responding and spontaneously vocalizing). However the language intervention only focused on teaching mands rather than teaching all verbal operants, such as mands, tacts, and intraverbals.

In a school setting, Hart and Risley (1975) employed incidental teaching with children experiencing language delays in a preschool setting. Incidental teaching occurs when a child initiates learning trials by showing interest in an activity or item. Then the adult uses the child-selected item as the focus of a learning trial to promote language use (i.e., the child requests for the item) and the natural consequence for the use of language (i.e., the child gains access to the item; Charlop-Christy & Carpenter, 2000). Results showed an increase in children’s unprompted use of compound sentences to request items from the classroom teachers and their peers. McGee, Krantz, and McClannahan (1985) taught classroom teachers to implement incidental teaching and successfully improved the use of prepositions among children with ASD. They found that children generalized the use of prepositions across non-trained settings and activities. Recently, Ryan, Hemmes, Sturmey, Jacobs, and Grommet (2008) taught special education classroom teachers in a brief workshop format to implement incidental teaching. Three levels of intervention were conducted across a series of experiments. In the first experiment, researchers provided multiple individualized training, including written and verbal instructions, modeling,
rehearsal, and feedback. Training continued until the three participants each reached the mastery criteria. In the second experiment, the participants were taught to implement incidental teaching procedures with a small group (three-person) format that occurred once for 20 minutes. The format included written description, teaching scenarios and videotaped demonstration of procedures. In the third experiment, the researchers provided large group training (40-people) to the participants, which included written instruction, modeling, role-play, and feedback. Results showed an increase in teachers’ use of incidental teaching and students’ frequency of initiation toward teachers within unstructured school time in all three training experiments. This study suggested that training implementers in a workshop-based intervention may be effective and a less costly alternative training method. The researchers also suggested that the key to effective incidental teaching training is to help teachers to generalize the use of incidental teaching techniques across children, materials, routines and settings. One limitation of the study was that it did not include a careful assessment of the language skills of each child and personalize target language behavior for each child.

**Short-comings in the current literature.** Although rich databases of research have reported the effectiveness of various language intervention approaches on improving social communication of children with ASD, there are several limitations to the current research literature. Many of the language interventions are not embedded within family routines in everyday setting (Hancock & Kaiser, 2002; Laski et al., 1988; Woods, Kashinath, & Goldstein, 2004). This contrasts with Bronfenbrenner’s ecological systems theory (1995), which argues that children acquire language within natural family routines and parents are the primary teachers for language acquisition. Also, intervention approaches, such as EMT or the natural language paradigm, are predetermined packages of intervention strategies, and thus are not individualized
to the child or family (Woods et al., 2004). When implementing language intervention within typical family routines, it is critical to consider family values, strengths, and systems, so that meaningful change can be achieved (Dunst, Bruder, Trivette, & Hamby, 2006). Furthermore, EMT and naturalistic language paradigm interventions often fail to take into consideration the verbal operants beyond mands, such as tacts and intraverbals (Sundberg & Michael, 2001). However, it is important to target other verbal operants for a child to acquire and use the various functions of language communication (Harjusola-Webb & Robbins, 2011). In addition, researchers have reported limited generalized use of teaching strategies by parents across routines until additional support was provided (Woods et al., 2004). For parents to become competent implementers who can promote language acquisition throughout the daily routines of family life, systematic generalization promotion strategies will be beneficial to ensure the generalization of acquired skills by parents and their children (Kaiser & Trent, 2007). Finally, no studies have documented the maintenance effects of EMT implemented by parents on child’s communication skills across natural family routines (Kathinath, Woods, & Goldstein, 2006).

To address these shortcomings in the current literature, I propose a synthesis of three intervention approaches into one model to promote generalized language use by young children with ASD.

**Language Intervention Model**

I plan to synthesize embedded interventions in which the activity setting as a unit of analysis (Gallimore, 2005), EMT strategies (Kaiser & Hester, 1994; Kasier & Trent, 2007) and general case programming (Horner, McDonnell, & Bellamy, 1986; Sprague & Horner, 1984) into a language intervention model within a Vygotskian social interactionist framework. This model aims to capitalize on the strengths of these evidence-based constructs or teaching methods
and to combine their effectiveness to promote generalized and enduring intervention effects on social communication among children with ASD.

**Activity setting as a unit of analysis.** The activity setting of daily and weekly family routines constitutes the unit of analysis that makes up the fabric of family and community life of young children (Dunst, Hamby, Trivette, Raab, & Bruder, 2000; Gallimore, 2005; Pretti-Frontczak & Bricker, 2004). The definition of a family routine is guided by the elements of an activity setting (i.e., time and place, people present, resources, tasks and their organization, goals and values, and parent-child interaction; Gallimore, 2005). Guided by an ecological perspective (Vygotsky, 1978), Pretti-Frontczak and Bricker (2004) proposed to embed early childhood interventions within family activity settings because activity settings represent the contexts of children’s development and provide rich learning opportunities and experiences. The use of the activity setting as a unit of analysis provides parents with a naturally occurring framework within which they can embed teaching strategies to facilitate their child’s development (Kashinath et al., 2006). Also the activity setting takes into consideration family’s cultural values and beliefs, rituals and routines, and customs that define family expectations of how activity settings should look like as part of daily life (Dunst et al., 2006). Embedding intervention within family routines also may promote maintenance because family routines provide natural opportunities for reinforcement such as access to requested food or activities (Mobayed, Collins, Strangis, Schuster, & Hemmeter, 2000). Finally, embedding intervention in family routines may promote generalization by ensuring that language use is taught across different routines that involve different materials, activities, people, and settings (Mobayed et al., 2000).

A few studies in the language promotion literature have utilized the routines as a unit of analysis and intervention, for example, Mobayed et al. (2000) taught parents of children with
speech delays to embed incidental teaching procedures within daily routines. The researchers used an ecological inventory process to identify target routines with parents. During parent training on the incidental teaching procedures, researchers provided written description, oral explanation, coaching, and feedback. Results found an increase in the parent’s use of the incidental teaching procedures across two activities in the home environment and an increase in the children’s prompted and unprompted use of the target language skill (e.g., requesting “more”). These outcomes maintained three to eight weeks after termination of the intervention. However, no formal assessment of generalization was conducted.

Stiebel (1999) taught three parents of children with ASD to communicate using augmentative and alternative communication (AAC) in the home setting during daily routines. In phase one, parents were trained to teach children how to use the AAC (i.e., picture cards) using the natural language paradigm approach. Results documented an increase in child spontaneous AAC use and parent-provided communication opportunities within trained routines; however, generalization was not observed across non-trained routines. In phase two, researchers taught the parents problem-solving skills by discussing intervention implementation barriers and brainstorming solutions to increase AAC use and opportunities for communication. After the problem-solving intervention, both child and parent behaviors generalized across five non-trained routines. Overall, the results indicated that embedding intervention in family routines was feasible and functional for the families, and it successfully promoted child’s language use across the family’s home and community routines.

**Enhanced milieu teaching.** EMT is a well-defined naturalistic communication intervention that promotes functional communication among children with ASD (Hancock & Kaiser, 2002; Kaiser & Hester, 1994). This adult-mediated teaching intervention involves the use
of naturally occurring communicative opportunities and child interests, adult responsiveness to child’s communicative attempts, and effective teaching procedures to facilitate language development (Hancock & Kaiser, 2006). The milieu language teaching model includes three components: (a) environmental arrangement, (b) responsive interaction strategies, and (c) milieu teaching techniques (Kaiser & Trent, 2007). Environmental arrangement is a collection of methods used by adults to sabotage situations to facilitate the child’s communication, such as offering choices, pausing within a routine, waiting with a cue, providing inadequate portions, and withholding assistance (Hancock & Kaiser, 2006; Hemmeter & Kaiser, 1994). Responsive interaction strategies are implemented by adults to model new language forms and to build social conversational interaction, including noticing and responding, taking turns, mirroring and mapping, and expanding (Kaiser & Trent, 2007). Milieu teaching techniques are used to prompt, model, and reinforce the use of new language forms in functional contexts. Examples include time-delay, open-ended prompt, model, and the use of natural and direct reinforcement (Charlop, Schreibman, & Thibodeau, 1985; Halle, Baer, & Spradlin, 1981; Hancock & Kaiser, 2006; Hart & Risley, 1975; Warren, McQuarter, & Rogers-Warren, 1984).

Researchers have reported that EMT is easy to integrate into a child’s everyday routine and activities (Goldstein, 2002; Harjusola-Webb & Robbins, 2011; Mancil, 2009). For example, Harjusola-Webb and Robbins (2011) taught seven preschool teachers to implement EMT procedures during daily routines at school. Results documented an increase in the frequency of teacher-use of EMT strategies and an increase in the frequency of children’s expressive communication. In addition, EMT has been shown to facilitate generalization of communication skills across materials, people, and settings (Goldstein, 2002; Mancil, 2009). For example, Kaiser, Hancock, and Nietfeld (2000) taught six parents in a clinic setting to employ EMT procedures.
Results indicated that parents generalized the use of intervention techniques at home and four of the six children generalized their use of the communication behaviors taught. The EMT approach also capitalizes on the child’s motivation to respond and uses direct and natural reinforcers (Charlop, Schreibman, & Thibodeau, 1985; Warren, McQuarter, & Rogers-Warren, 1984). Studies have shown that teachers and parents can effectively implement EMT procedures to improve children’s communication skills (Hancock & Kaiser, 2002; Ross & Greer, 2003). Researchers also have pointed out that EMT is a cost-effective language intervention, compared to the DTT approach (Christensen-Sandfort & Whinnery, 2011).

In a school setting, Christensen-Sandfort and Whinnery (2011) examined the effects of EMT procedures when implemented by a special education classroom teacher within two classroom routines. The teacher attended two 90-minute, one-on-one EMT workshop-based trainings. The trainer discussed the EMT strategies, modeled the strategies, role-played, and provided feedback to the teacher. In addition to the workshop-based training, the teacher received four sessions of practice in the use of the strategies within structured and unstructured classroom routines and received feedback from the experimenter. Results indicated that the teacher-implemented EMT intervention successfully increased spontaneous speech in three students with ASD.

In a home setting, Woods et al. (2004) trained four parents of toddlers with developmental delays to embed EMT strategies in daily routines. The interventionist and the parents collaboratively identified family routines (i.e., indoor play routines) and selected two EMT strategies. The strategies built on the parents’ skills, met the individualized communication objectives for the child, and were a good contextual fit for the parents. During one training session, an interventionist taught the parents individually in each family home to implement one
target EMT strategy within indoor play routines. Training consisted of written description, discussion, video samples, modeling, and practice of the target EMT strategy. Study results indicated that all four children made gains in individualized communication objectives and all the parents increased the frequency of use of target EMT strategies within indoor play routines. However generalization was limited in three of the four dyads across caregiving and outside play routines. In the generalization feedback phase, the interventionists provided further coaching and discussed implementation obstacles with the parents. Feedback was found to be effective in promoting use of strategies during generalization (i.e., non-trained) routines. The study demonstrated the effects of EMT intervention on improving children’s communication skill when parents embedded EMT strategies in daily routines. The experimenters pointed out the value of individualized parent-implemented intervention, which involves selecting EMT strategies carefully to match the specific needs of each child and family. The limited generalization of parent strategy use initially in this study and the limited selection of target family routines are two shortcoming of this research study.

Although EMT uses family routines as the contexts for language intervention, it does not explicitly use the theoretical construct of the activity setting as its unit of analysis and intervention. In my model, I integrate EMT with the rich theoretical foundation of the activity setting as a unit of analysis. The activity setting offers an operational definition of family routines that includes both objective and subjective elements (i.e., time and place, people present, resources, tasks and their organization, goals and values, and scripts of interaction). The construct is based on cross-cultural ethnographic studies of families around the world, and allows for a holistic and culturally responsive analysis of family routines.
**General case programming.** General case programming (GCP) is defined as a systematic method for selecting teaching examples that represent the full range of stimulus variations and response requirements in the generalization setting (Horner, McDonnell, & Bellamy, 1986; Sprague & Horner, 1984). It incorporates aspects of training sufficient exemplars and programming common stimuli, which are technologies that have demonstrated their effectiveness in promoting generalization in the research literature (Stokes & Baer, 1977). GCP aims to build generalized responding across settings using specific procedures to select and sequence teaching examples (Horner, Sprague, & Wilcox, 1982; O’Neill, 1990). The procedures of GCP are: (a) define the instructional universe, (b) select teaching and test situations, (c) sequence teaching examples, (d) teach within selected settings, and (e) test acquired skills in non-trained settings to assess generalization. Previous research on GCP has demonstrated its effects on teaching communication and social skills to children with severe disabilities (e.g., O’Neill, Faulkner, & Horner, 2000; O’Neill & Reichle, 1993).

O’Neill et al. (2000), for example, used GCP to teach generalized manding to students with severe disabilities across a range of school settings and situations. The researchers implemented mand training within daily routines in targeted school settings. Five categories of manding situations were identified: (a) requesting assistance to open food packages or containers, (b) requesting food items that were placed out of reach, (c) requesting access to toys or objects that were out of reach, (d) requesting assistance with dressing, and (e) requesting assistance to move from one area to another (e.g., through closed doors). Experimenters selected three to five categories of manding situations for each student, and within each category, three to five specific examples were chosen to serve as training situations, and an additional three to five examples were selected to serve as generalization assessment situations. The principles of GCP were
incorporated in the study when experimenters strategically sampled the range of stimulus characteristics found in the instructional universe (i.e., settings, locations, and materials). Results showed that all three students demonstrated generalized manding using their specific forms of communicative responses (e.g., pointing to actual item, pointing to a card with the word “Want” on it, pointing to a card with the word “Want” on it and then a picture representing the relevant object or situation). However, the students did not have access to their manding cards during the baseline phase; therefore it was unclear whether the students would have demonstrated manding using the cards prior to the training. In addition, the study focused solely on teaching manding and did not teach other important verbal operants. Lastly, the researchers commented that the lengthy process of implementing GCP, such as defining the instructional universe and selecting examples for teaching and testing, was not viewed as user-friendly for teachers and other service providers. Therefore further research on efficient and effective implementation of GCP may be useful to bridge the gap between research and clinical practice.

More recently, Kashinath et al. (2006) taught five parents of children with ASD (aged between two and six years) to implement EMT strategies within daily routines using GCP. Each family selected two routine classes out of six identified routine classes (i.e., play routines, outdoor or recreation, caregiving routines, household chores, community activities, and other disability-related routines) and three EMT strategies out of the six strategies. They did so to ensure a good contextual fit between the target routines, the EMT strategies selected, and the family’s interaction style. The EMT strategies were environmental arrangement, the use of natural reinforcement, the use of time delay, contingent imitation, modeling, and gestural and/or visual prompts. Parent training consisted of written descriptions of the strategies, video samples of other parents’ use of the strategies, interventionist modeling the use of strategies with the child,
parents practicing the strategies with the child, problem-solving on implementation barriers, and discussion on implementation of the strategies in other non-trained routines. The bi-weekly intervention was 60 to 90 minutes long, which lasted for five to six months. The study employed a multiple-baseline design across three strategies with four replications (i.e., a total of five families). Results showed an increase in the frequency of parents’ use of EMT strategies and frequency of children’s communication outcomes (e.g., use of single words, multiword utterances, gestures). Also, the parents and children demonstrated generalization across routines, both within the same routine class and across routine classes. This study successfully combined the use of EMT strategies, GCP, embedding instructions within daily routines, and parent-implemented intervention. However, the limited number of EMT strategies selected by each parent may have reduced the amount of generalization that was available to promote children’s communication.

The proposed language-promotion model. The parent-implemented language-promotion model integrates three evidence-based practices that can be taught through a two-day workshop consisting of two 3-hour evenings. After the workshop, if there is no improvement in child or parent behaviour, I plan to provide up to five in-home coaching sessions and observe whether or not improvement in parent and child behavior occurs. If needed, the supplemental in-home coaching session would consist of reviewing the EMT strategies, coaching the parent within the training routines, providing feedback, and discussing implementation obstacles with the parent and how to overcome them.

During a two-day workshop, I taught the parent of the child with ASD to implement EMT strategies in natural family routines. The workshop consisted of seven topics: (a) Who benefits most from this workshop, (b) why do you need to help your child to speak (i.e., typical
and atypical language development), (c) what do you want your child to say (i.e., verbal behaviour and augmentative alternative communication), (d) when and where do you want your child to talk (i.e., activity setting as a unit of analysis and intervention), (e) EMT procedures, and (f) common implementation barriers and solutions. During the workshop, the parents assessed their child’s current use of verbal operants. They also identified four family activity settings (i.e., routines) across two of the three classes of routine (i.e., play, caregiving and household chores) in which child language was promoted. The identified family routines served as the contexts for language assessment and intervention. Next, the parents defined the elements of each routine, and the language functions and content that the child was expected to use in each routine. Following this, the parents and I used principles of GCP to strategically select two training routines that sampled the full range of stimulus and response variation (i.e., type of routine, language function, and language content) in the instructional universe of language use within the four routines. Lastly, I then taught the parents how to embed EMT strategies into the two selected training routines to increase their child’s communication behaviors. The parents then selected EMT strategies that best fit each training routine and the language that the parents aimed to promote in the routines. By the end of the workshop, the parents had completed the workshop exercises and generated the following information: (a) family routines targeted for training and generalization; (b) language content within each routine; (c) specific EMT strategies to use across the two training routines; and (d) implementation barriers and solutions. Taken together, the workshop exercises and their customized content had became an individualized manual that the parents used to guide their use of EMT strategies within family routines in the home. The individualized manual can be found in Appendix A.
By integrating three evidence-based practices in the proposed language-promotion model, I sought to activate a synergy between the three practices, drawing from the idea that the whole may be greater than the sum of its parts; that is, I sought to enhance the power of these evidence-based practices to efficiently and effectively promote parent use of language promotion strategies and child language in the home. I intended to maximize the quality and quantity of parent-child interaction by teaching parents to embed language promotion strategies in daily family routines (Harjusola-Webb & Robbins, 2011; Kaiser & Trent, 2007). Finally, I intended to maximize the promotion of generalization of parent-implemented language intervention, and child language use by using GCP to select family routines for training that sampled the range of stimulus variation and response requirements of language promotion and usage in the home (Horner et al., 1982).

Research Questions

The study investigated two research questions:

(1) Is there a strong association between a two-day workshop designed to empower a parent to use and generalize the use of EMT strategies in family routines with a young child with ASD and improvements in: (a) parent use of EMT strategies; and (b) child use of language in trained and non-trained family routines in the home?

(2) How does the participating parent view the social validity of the workshop-based language promotion intervention?
Chapter 2

Research Methodology

Participant Recruitment

After the initial proposal of the study was approved by my research committee, I obtained approval for the study from the Behavioral Research Ethics Board (BREB) of the Office of Research Services and Administration at the University of British Columbia (see Appendix B). To recruit a family with a child with ASD and delays in communication developments, I contacted behavioral consulting agency representatives at local agencies that supported children with ASD and provided them with information about the purpose of the research, the basic procedures involved, and the selection criteria required for participation. Agency representatives gave a letter of initial contact (see Appendix C) to families whom had showed interests in participating in the study.

If a family was interested in participating in the study and contacted me or gave consent to agency representatives to release contact information to me, they received additional information about the study’s purpose, procedures, and timeline. The family also was contacted for a telephone pre-screening interview. The telephone interview questions are displayed in Appendix D. At the end of the telephone interview, if it appeared that the family met the study’s criteria, I requested the family’s consent to participate in more in-depth screening activities. The family that showed interest in participating then signed an informed consent form for screening (see Appendix E). The consenting family was then screened to determine if the child and parent met the selection criteria. The screening activity consisted of a language assessment and an interview of the family to confirm information from the telephone interview. The family who
met the study’s criteria for participation was sent two informed consent forms; one for study participation and one for permission to videotape the child and family in the home (see Appendices F and G). After the family signed both informed consent forms, the family was enrolled in the study.

Participants

Jay (a pseudonym) was 5 years 1 month old when the study began. He was diagnosed with Down syndrome during pregnancy and was diagnosed with autism at the age of 4 years 7 months. He is the first child in a middle-class Caucasian family. He lived at home with his father, Jacob, his mother, Cady, and his younger brother, Mike. For the duration of the study, in addition to the five months prior to it, Jay participated in a home-based treatment program based on applied behaviour analysis. He received an average of 8 -10 hours of 1:1 structured teaching weekly during this time. In addition, he attended kindergarten 5 days a week with one-on-one support.

Jay had made gains in language use through his in-home treatment program, but was not using language spontaneously with his parents at home. For example, when he requested for items at home, he would often point to the items. When he requested the termination of an activity, he would scream. Jay’s father also noticed that Jay did not comment on things in his environment spontaneously and would sometimes respond to questions, but not consistently. His father also reported that Jay did not engage in serious problem behaviors during family routines in the home.

Jay’s father, Jacob, the parent participant in the study, also met all of the criteria of the study. He: (a) resided in the Lower Mainland of BC, with no intention of moving within the next
three months; (b) read and spoke English; (c) had no previous training in incidental teaching, natural environmental teaching techniques, naturalistic language paradigm, or EMT procedures; (d) had at least a post-secondary educational background; (e) reported no other physical or mental illnesses that would prevent participation in the study; (f) was willing to commit to be the primary language teacher for his child; and (g) was willing to be videotaped in the target routines.

In discussion with Jay’s parents, they decided that the father would serve as the parent interventionist in the four target home routines. The reason for this decision was that the mother worked full time outside the home and the father was a stay-at-home parent who took care of Jay and his toddler brother during the day. Consequently, all observation sessions within the home were conducted with the father and his two sons.

Prior to enrolling the family in the study, the Verbal Behavior Milestones Assessment and Placement Program (VB-MAPP; Sundberg, 2008) was used to assess Jay’s language ability. The language skill criteria for child participant were to attain at least five points on the mand and tact sections in the VB-MAPP. This assessment was administered by the researcher who has experience assessing children with ASD. According to the VB-MAPP, Jay scored 6/15 (Level 2 of 3) on the mand section indicating he was able to mand at least 10 different mands independently and 5 new mands without specific training. He also scored 8/15 (Level 2 of 3) on the tact section of the VB-MAPP indicating he was able to tact at least 200 nouns and/or verbs. These assessment results indicated that Jay met the language skill criteria for child participant.
**Settings**

The parent training workshop took place at a local public library meeting room. Data collection was conducted in the family’s home. With the family, four family routines were collaboratively identified and defined. The definition of family routines was guided by the six elements of an activity setting as defined by Gallimore (2005). Specifically, the father and I collaboratively described: (a) the time and place of each routine, (b) the people present, (c) the material resources used, (d) the tasks and how they were organized, (e) the family’s goals and values that informed the routine, and (f) the common patterns of parent-child interaction that would occur during each routine. The definitions of the selected family routines were summarized in a one-page operational definitions (see Table 2.1). A copy was given to Jacob to refer to during the study. Since Jay’s brother was an active member in all the family routines, he was included during the data collection.
Table 2.1: Operational Definition of Family Routines

**Reading Routine**

| Time and Place | In Aug 2012, routine occurred after breakfast (8:15 am)  
Between Sept 2012 and March 2013, routine occurred after afternoon snack (3:45 pm)  
on the sofa in the living room |
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>People Present</td>
<td>Jay, Father, younger brother</td>
</tr>
<tr>
<td>Material Resources</td>
<td>books, drinks</td>
</tr>
<tr>
<td>Tasks Involved</td>
<td>Selecting books from bookshelf, reading book</td>
</tr>
<tr>
<td>Child and Family Goal</td>
<td>Family will read books together</td>
</tr>
</tbody>
</table>

**Getting Ready to Go Outside Routine**

| Time and Place | In Aug 2012, routine occurred after reading book and going to the toilet (8:45 am)  
Between Sept 2012 and March 2013, routine occurred after reading (4:15 pm)  
on the front doorway entrance area |
<table>
<thead>
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</thead>
<tbody>
<tr>
<td>People Present</td>
<td>Jay, Father, younger brother</td>
</tr>
</tbody>
</table>
| Material Resources | Between Aug 2012 to Sept 2012: sandals, hat, sunscreen  
Between Oct 2012 to March 2013: socks, shoes, jacket |
| Tasks Involved | Locating clothing items, putting on clothing items               |
| Child and Family Goal | Child will get himself dressed to go outside                     |

**Play Outdoor Routine**

| Time and Place | In Aug 2012, routine occurred after reading book and going to the toilet (8:45 am)  
Between Sept 2012 and March 2013, routine occurred after reading (4:15 pm)  
at the back deck |
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>People Present</td>
<td>Jay, Father, younger brother</td>
</tr>
<tr>
<td>Material Resources</td>
<td>Outdoor: bat, ball, golf stick, buckets, basketball net</td>
</tr>
<tr>
<td>Tasks Involved</td>
<td>Hitting ball with a bat/ golf stick, putting ball into net</td>
</tr>
<tr>
<td>Child and Family Goal</td>
<td>Family will play with sport equipments together</td>
</tr>
</tbody>
</table>

**Snack Routine**

| Time and Place | In Aug 2012, routine occurred after playing outside (10:00 am)  
Between Sept 2012 and March 2013, routine occurred after school 3:15 pm |
|----------------|-------------------------------------------------------------------|
in the kitchen and at the dining table

<table>
<thead>
<tr>
<th>People Present</th>
<th>Jay, Father, younger brother</th>
</tr>
</thead>
<tbody>
<tr>
<td>Material Resources</td>
<td>cup, plate, water jug, food containers, spoon, variety of food (e.g., cheese, gorilla bars, crackers, grapes, apple, banana, yogurt, etc.)</td>
</tr>
<tr>
<td>Tasks Involved</td>
<td>Eating snack that are presented on the dining table</td>
</tr>
<tr>
<td>Child and Family Goal</td>
<td>Family will eat snack at the table together</td>
</tr>
</tbody>
</table>
Measurement

The study used a multiple probe technique (Horner & Baer, 1978) to monitor the dependent variables and to document implementation of the independent variable. Observations (i.e., probe observation sessions) were conducted intermittently throughout the study. Horner and Baer (1978) suggested that the use of a multiple probe technique is appropriate when prolonged baselines are impractical or could have a negative effect on participants (i.e., reactivity). This design also may be more feasible and acceptable when conducting research in family contexts with parents as implementers of the independent variable (Buschbacher, Fox, & Clarke, 2004; Clarke, Dunlap, & Vaughn, 1999; Lucyshyn, Albin, Horner, Mann, Mann, & Wadsworth, 2007).

**Dependent variables.** This study aimed to investigate the implementation of EMT strategies by parents in family routines. Accordingly, the dependent variables chosen for this study were parent use of EMT strategies and child communicative behaviors.

**Parent’s use of EMT strategies.** Parent use of EMT strategies was defined as the implementation of the EMT strategies as outlined in a parent workshop workbook; for example, providing an inadequate portion of a preferred item, expanding on a child’s utterance, and using natural reinforcement in response to the child’s communicative behavior. The operational definitions of EMT strategies are presented in Table 2.2.
Table 2.2: Operational Definitions of EMT Strategies

### Environmental Arrangement

**Offering Choice:** defined as parent providing two or more items from which the child may select.

(a) Examples: parent says, “Do you want blue cup or red cup?”, parent presents two books to the child.

(b) Non-examples: parent says “Do you want this book?”, parent presents two books to the younger brother.

**Pausing within a routine:** defined as parent setting up a routine in which the child expects certain actions and then the parent waits before doing the expected action again.

(a) Examples: parent tickles the child and pause, parent pauses right before opening the door and wait.

(b) Non-examples: parent uses verbal prompts, parent reads words in a book and pauses.

**Waiting with cue:** defined as parent presenting an item associated to the context and then waits before completing the expected action.

(a) Examples: parent presents an empty cup and waits, parent presents a closed book and waits, parent withholds shoes, jacket and hat, parent holds ball as cue before hitting with a bat, parent places food out of reach.

(b) Non-examples: parent uses verbal prompts, parent reads words in a book and pauses.

**Inadequate portions:** defined as parent providing an inadequate portion of a preferred item.

(a) Examples: parent gives small portion of crackers or drink, parent closes the book abruptly in the middle of the book.

(b) Non-examples: parent reads words in a book and pauses.

**Assistance:** defined as parent arranging situation or material so that the child needs parent’s assistance in order to get preferred item or object.

(a) Examples: parent gives the child shoes but does not help, parent gives incorrect personal belongings, parent presents packaged food that is unopened.

(b) Non-examples: parent gives the child socks and the child is able to put them on independently.

### Responsive Interaction

**Notice & respond:** defined as parent noticing the child’s communicative attempts and responds by labeling what the child is doing.
(a) Examples: child points to a picture in the book and parent labels “butterfly!”, child reaches for the food package and parent labels “it’s a blueberry bar.”

(b) Non-examples: child points to a picture in the book and says “butterfly.”, child gives the food package to parent and parent opens it without labeling the item.

*Take turns:* defined as parent repeating the child’s vocalization exactly without clarification or evaluative remarks.

(a) Examples: child says “ball” and parent copies “ball”, child labels “cup” and parent repeats “cup”.

(b) Non-examples: child requests for yogurt and parent clarifies “yogurt?”

*Mirror & map:* defined as parent naming an object or activity, or describing what is occurring in the environment.

(a) Examples: parent labels book titles, parent describes the picture in a book, parent labels “1, 2, 3, throw” as he gets ready and throws the ball, parent comments “we are eating”, “we are sitting”, “pour the water”, “it is daddy’s turn” as parent and/or the child perform the action.

(b) Non-examples: parent gives instructions, e.g., “go put this on the sofa”, “get up”, “pitch the ball” prior to the parent’s or child’s action, parent says “say ball.”, parent compliments “good job pitching the ball.”

*Expand:* defined as parent imitating the child’s utterance and then expands into a more complete form of utterance.

(a) Examples: child says, “pitch.” and parent expands the utterance, “pitch ball with a bat.”, child comments “fix it mommy glue” and parent expands “mommy fixes the book with glue.”

(b) Non-examples: parent comments on things without child’s utterance.

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**Milieu Teaching**

*Time delay:* defined as parent presenting an object of interest or a question to the child and waits briefly (3-5 seconds) before giving the child a verbal prompt to respond.

(a) Examples: parent asks “what’s this?” and waits at least 3 seconds with an expected look.

(b) Non-examples: parent implements pausing within a routine or waiting with cue, parent provides gestural prompt, parent asks a question and only waits for 2 seconds and then says something, such as repeating the question or providing a verbal prompt.

*Open-ended question:* defined as parent:

1) attending to the child’s focus of interest and presents a verbal open-ended question.
2) If the child responds correctly, the parent provides access to the child’s requested item.
3) If the child does not respond or does not respond correctly, present another question or a model to the child.
(a) Examples: parent asks “what do you want to play?” during play time, parent asks “what do you see?” during book reading, parent says “tell me what you want to eat” during snack time.
(b) Non-examples: parent asks “what do we need?”, “do you want to play?”, “which one should we play with?”

*Model:* defined as parent modeling or demonstrating a required verbal behavior.

1) If the child does not respond or does not repeat the model exactly, the parent gives another model.
2) If the child responds correctly, the parent acknowledges and provides access to the child’s requested item.

(a) Examples: child reaches for the banana and the parent models “I want banana.” If the child does not respond or does not repeat the model correctly, then the parent repeats the model, “I want banana.” If the child says “I want banana” then the parent provides a banana.

(b) Non-examples: parent implements mirror and map.

*Use of natural reinforcement and praise:* defined as parent verbally acknowledges a child’s communication attempts and provides access to objects or events in response to child’s requests.

(a) Examples: parent provides a tangible item or access to events only after the child requests; child says “I want socks.” then the parent gives the child socks and praises the child.
(b) Non-examples: parents compliments “good hit”, child requests for “more reading” and parent keeps reading
Child’s communicative behaviors. A child’s communicative behavior was defined as any spontaneous or prompted behavior. The coded child’s communicative behaviors were identified as a mand, tact, intraverbal or echoic. For example, in an interaction regarding blocks, the parent gave one block to the child and waited. The child then responded spontaneously by saying, “I want block.” Alternatively, the child might respond incorrectly by saying, “Bus.” In this case, the parent modeled, “I want block.” The child then imitated the parent’s model of the correct response. The correct or corrected response would be coded, respectively, as a spontaneous or a prompted child’s communicative behavior. A mand was defined as a request for an item, action, attention, or information. For example, during snack time, the child requests, “Grapes please.” A tact was defined as labeling/naming some sensory nonverbal stimuli such as an object, picture, adjective, location, smell, taste, noise, or feeling. For example, during outdoor play time, the child sees an airplane flying in the sky and labels, “Airplane.” An intraverbal was defined as responding to someone else’s verbal behavior with no visual or other stimuli informing the response. For example, when preparing to go outside, the parent asks, “Whose shoes are these?” and the child replies, “Mommy’s shoes.” An echoic was defined as repeating what is heard. For example, during reading time, the parent says, “A pink elephant.” And the child imitates, “A pink elephant.” The operational definitions of communicative behaviours are presented in Table 2.3.
Table 2.3: Operational Definitions of Verbal Behaviours

**Echoic:** defined as child repeating what is heard.

(a) Examples: parent labels “1, 2, 3, throw” and the child imitates “1, 2, 3, throw”, parent models “help me please” and the child copies “help me please”.
(b) Non-examples: parent comments “the book is broken” and then the child says “broken book, fix book daddy”.

**Mand:** defined as child requesting for an item, action, attention, or information.

(a) Examples: parent asks “do you want this?” and the child replies “no.”, child requests, “Simon says”, child requests parent to pitch the ball by saying “1, 2, 3/ pitch/ kick off.”
(b) Non-examples: child imitates what he heard from other people, child says “I want” but did not complete the request within 5 seconds.

**Tact:** defined as child labeling/naming some sensory nonverbal stimuli such as an object, picture, adjective, location, smell, taste, noise, or feeling.

(a) Examples: child labels items or reads words in a book, child labels “1, 2, 3” as he hits the ball, child names “shoes” as he walks to the door with shoes in his hands.
(b) Non-examples: child imitates what he heard from other people, child makes requests.

**Intraverbal:** defined as child responding to someone else’s verbal behavior with no visual or other stimuli informing the response.

(c) Examples: parent asks “What do you see?”/ “Whose turn is it?”/ “What will we do?”/ “Is this your jacket?” and child replies independently.

(d) Non-examples: child imitates what he heard from other people, parent asks “do you want grapes?” and child imitates “grapes!”
**Social validity.** The father evaluated the social validity of the workshop-based language promotion approach using two social validity questionnaires. The first questionnaire was administered at the end of the workshop and was designed to evaluate the social validity of the workshop. A 10-item instrument was used once to assess the acceptability and importance of the goals, procedures, and outcomes of the workshop. The second questionnaire, also consisted of 10 items, was administered to the father twice during the intervention phase and once during the follow-up phase. This questionnaire evaluated the social validity of parent implementation following the workshop; that is, the acceptability and importance of the goals, procedures, and outcomes of parent implementation in the home. The father rated each item on a Likert-type scale from 1 to 5 (1 = disagree; 5 = agree). For each of the father’s evaluations an average social validity rating across 10 items was computed, and this average was used as a formative rating of social validity. These social validity evaluation forms are displayed in Appendices H and I.

**Competency self-evaluation questionnaire.** The father also self-evaluated his implementation of EMT strategies using a competency questionnaire. The questionnaire was administered at the end of the sixth observation session during the intervention phase and was designed to be used as a guide to determine the feedback that would be most beneficial to the father. The father self-evaluated his conceptual understanding of why he used each of the 13 EMT strategies by rating each item on a Likert-type scale from 1 to 5 (1 = I do not understand why I use this strategy; 5 = I have a good understanding of why I use this strategy). The father also self-evaluated his confidence in implementing each of the 13 EMT strategies by rating each item on a Likert-type scale from 1 to 5 (1 = I do not feel confident using this strategy; 5 = I am confident that I am doing this strategy right).
Measurement procedures. I served as the observer in the home throughout the study. During an observation session, using a digital video camera, I videotaped parent-child interaction within target family routines in the home. Observations began one week after the two-day workshop was completed. Doing so gave the father time to set up the home environment for language promotion and to begin the use of selected strategies with Jay in the home. An observation session lasted until the end of the routine or up to 5 minutes, whichever came first. Across observation sessions, both trained and non-trained routines were observed. Then, in a data room with a video monitor and computer, videotaped data were downloaded into the computer and scored by a trained observer. A computer software media player program (i.e., Windows Media Player) was used to code parent and child behaviors (i.e., percentage of intervals of parent use of EMT strategies and child communicative behaviors, respectively). When coding an observation session, I used the built-in “count-up” clock feature in Windows Media Player to track the intervals (i.e., 20 second intervals). Data sheets were used to record the occurrences and non-occurrences of parent and child behavior (See Appendix K).

A partial interval recording procedure using a 20-second interval was used to measure parent use of EMT strategies and child communicative behaviors. Parent use of EMT strategies was coded when the parent demonstrated accurate use of one of the EMT strategies at any time during a 20-second interval. The EMT strategies included: (a) offering choice, (b) pausing within a routine, (c) waiting with cue, (d) providing inadequate portions, (e) withholding assistance, (f) noticing and responding, (g) taking turns, (h) mirroring and mapping, (i) expanding, (j) using time delay procedure, (k) using open-ended prompt, (l) providing models, and (m) using natural reinforcement and praise (See Table 2.2 for operational definitions of each strategy). The number of occurrences of parent use of EMT strategies was divided by the number of intervals in the
family routine, multiplied by 100% to yield a percentage of parent EMT strategies use during the family routine.

Child communicative behavior was coded when the child gave a spontaneous or prompted behavior at any time during the 20-second interval. The coded child communicative behavior also was identified as a mand, tact, intraverbal, or echoic (See Table 2.3 for operational definitions of each communicative behaviour). The number of occurrences of child communicative behavior was divided by the number of intervals in the family routine to yield a percentage of intervals of child communication behavior. The number of occurrences of the child use of each verbal operant was divided by the number of intervals in the family routine, multiplied by 100% to yield a percentage of intervals of child use of each verbal operant during the family routine.

**Interobserver Agreement (IOA)**

**Observer training.** In order to obtain interobserver agreement data, I trained a fellow graduate student to implement the scoring procedures described above. I developed a manual for observers that provided the operational definitions, examples and non-examples of target behaviors, and a data sheet for recording the occurrences and non-occurrences of parent and child behavior (see Table 2.2; Table 2.3; & Appendix K). Initial training and feedback was provided in a 3 hour session. A training criterion of 80% interobserver agreement across two consecutive observations was achieved before coding began.

**IOA procedures.** The graduate student and I, separated by one meter and a visual barrier, simultaneously observed the videotape of a probe session and coded parent and child target behaviors. IOA for each of the variables was calculated using the following formula: $P_A =$
\[ \frac{N_a}{N_a + N_d} \times 100 \]  

\( N_a \) refers to the number of agreements. \( N_d \) refers to the number of disagreements.

For general IOA, an agreement was defined as both observers recording the occurrence of target behaviours during the same 20-second interval. For example, for child communication behaviour, during the same 20-second interval, when both observers observed child use of language, an agreement was reached regardless of whether they both coded the language as a mand, tact, intraverbal, or echoic. However, if one observer observed child use of language, but the other observer did not code any child behaviour during the same 20-second interval, then an agreement was not achieved. For parent use of EMT strategies, during the same 20-second interval, when both observers observed parent use of EMT strategies, an agreement was reached regardless of whether they both coded the strategy as, for example, a time delay, pausing within a routine or waiting with a cue. However, if one observer observed parent use of EMT strategies, but the other observer did not observe any parent behaviour during the same 20-second interval, then an agreement was not achieved.

For detailed IOA, an agreement was defined as both observers recording the occurrence of the same type of target behaviours. For example, for child communication behaviour, during the same 20-second, when both observers coded child use of \( \textit{mand} \), then an agreement was achieved. However, if both observers observed child use of language, but one observer coded child behaviour as \( \textit{mand} \) and the other observer coded child behaviour as \( \textit{intraverbal} \), then an agreement was not achieved. For example, for parent use of EMT strategies, during the same 20-second, when both observers coded parent use of \( \textit{time delay} \), then an agreement was achieved. However, if both observers observed parent use of EMT strategies, but one observer coded
parent behaviour as *waiting with a cue* and the other observer coded parent behaviour as *providing assistance*, then an agreement was not achieved.

**IOA for parent use of EMT strategies.** For percentage of intervals of parent use of EMT strategies, IOA checks were completed on 33% of the observation session data, balanced across phases. The average general IOA for percentage of intervals of parent use of EMT strategies across indirectly trained routines was 86% (range, 83 - 89%). The average detailed IOA for indirectly trained routines was 77% (range, 71 - 80%). The average general IOA for percentage of intervals of parent use of EMT strategies across non-trained routines was 92% (range, 90 - 93%). The average detailed IOA for non-trained routines was 82% (range, 77 - 90%).

**IOA for child communicative behavior.** For percentage of intervals of child communicative behavior, IOA checks were completed on 33% of the observation session data, balanced across phases. The average general IOA for percentage of intervals of child communicative behavior across indirectly trained routines was 89% (range, 80 - 94%). The average detailed IOA across indirectly trained routines was 82% (range, 77 - 88%). The average general IOA for percentage of intervals of child communicative behavior across non-trained routines was 95% (range, 93 - 97%). The average detailed IOA across non-trained routines was 84% (range, 78 - 90%).

**Research Design**

This study employed a single subject empirical case study design with one parent-child dyad, using a multiple probe strategy. The design consisted of three phases: baseline, intervention, and follow-up. This design does not control for all threats to interval validity and therefore is unable to confirm, unequivocally, a functional relation between the independent and dependent variables. Although a single-subject case study is not a true experimental design,
specific features of the single subject case study design can rule out some threats to internal validity in a manner that closely resembles true experimental research (Kazdin, 1992). These features include continuous assessment of objective data, stable levels of performance before and after intervention, and immediate and large treatment effect (Kazdin, 1992). In this quasi-experimental design, if the data have these characteristics, then six of eight threats to internal validity can be ruled out. As noted by Kazdin (1982), with these six rival alternative hypotheses ruled out, single-subject case study designs offer a strong basis for drawing scientifically valid inferences about the impact of an intervention on the dependent variables. However, properties of this design are unable to unequivocally rule out two threats to internal validity, which are history and maturation. Nonetheless, Kazdin (1992) argued that although case study designs cannot replace the value of experimentation, they are strong designs that can contribute greatly to the development of scientifically usefully information (Kazdin, 1992).

**Procedures**

**Preparation/pre-baseline.** After consent forms were signed by the family, I assessed the child’s language ability using VB-MAPP. I also asked Jay’s father to identify four family routines in the home in which he would like to see Jay’s use of language improve. The father was asked to select routines that sampled across two of the three routines classes (i.e., play, caregiving and household chores). Jay’s father and I selected four routines that were more likely to be successful considering factors such as child interest, frequency of occurrences of each routine, parent comfort, time availability, materials of interest, and opportunities for the child to use communication skills (Woods et al., 2004). In the four routines selected, both the father and Jay enjoyed participating in the routines, and the routines occurred daily. Usually, they were not in a hurry to complete the routines and so Jay’s father was able to comfortably focus on
implementing the language promotion strategies in the routine. In addition, the routines naturally contained multiple opportunities for Jay to use language skills. Lastly, Jay did not display significant problem behavior in the selected routines, or exhibit affect that indicated that the target routines were aversive.

**Baseline.** Baseline measurement was conducted in the family’s home. Observation sessions were conducted in the family’s living room, dining room, back deck, and the front doorway entrance area where target family routines naturally occurred. A video camera was set up to capture parent-child interaction during the target routines. After reviewing the operational definition of the routines, Jacob carried out the four identified routines as he would usually do. Six baseline probe observation sessions were conducted to establish stable levels of parent and child target behaviours.

**Intervention.** The intervention consisted of a two-day workshop-based training for the parents, which consisted of two 3-hours evenings. Jay’s father was the research participant and interventionist but Jay’s mother, Cady, also was invited to attend the workshop so both of them could implement the language promotion strategies at home. The workshop was designed for a group of parents. However, in this research study, only one family participated in the parent training workshop.

The workshop included powerpoint presentations, video examples, role-play activities, and exercises in which parents, step-by-step, generated an individualized language intervention plan for their child and family. The exercises identified the target routines that represented the general case, the language goals and expectations that would be promoted across the target routines, and the specific language promotion strategies that would be implemented in each
target routine. The family’s individualized language intervention program was organized in a workbook to support their implementation at home to promote child language use. The individualized workbook consisted of descriptions of the four identified family routines, language content within each routine, specific strategies selected for the two training routines, and specific implementation barriers and solutions for the two training routines. It also included a description of all the EMT strategies, the powerpoint slides from the workshop, the start-up checklist, the daily set-up checklist and the customized daily implementation checklist. During the workshop, the parents will complete the workshop exercises to generate the individualized language intervention program. The workshop workbook is presented in Appendix A. The workshop consisted of six topics. These are described below beginning with day one topics and followed by day two topics.

**Who benefits most from this workshop.** I identified the parents and children as those who would find the workshop most beneficial. Parents who are dedicated to be the primary language teachers of their children are more likely to implement the strategies regularly at home. Children who can imitate words and enjoy interacting with their parents also are more likely to be responsive to the language promotion strategies.

**Why do you need to help your child to speak (i.e., Typical and atypical language development).** I explained the typical development of language and communication skills, which emerge directly out of social interactions with other people in natural family activity settings (i.e., routines; Vygotsky, 1978). I provided an understanding about the core deficit of social communication among children with ASD and the need to create a rich learning environment for these children to develop communication skills. Since children with ASD have difficulty maintaining and generalizing skills that they have acquired, I emphasized the importance of
teaching language in natural environments (i.e., family routines) by natural communicative partners (i.e., parents) to enhance the maintenance and generalization of acquired communication skills. I also described the effect of natural reinforcement in the context of language acquisition.

**What do you want your child to say (i.e., Verbal behaviour and augmentative alternative communication).** I addressed the functional properties of language based on Skinner’s (1957) analysis of verbal behavior. I first defined the verbal operants (i.e., echoic, mands, tacts, and intraverbals). I then illustrated each verbal operant using multiple pictorial and video examples across children’s daily family routines. In addition, I provided an illustration of a three-year-old boy with the diagnosis of ASD, assessed his verbal operant repertoire, and reported the time and settings in which he emits the verbal operants. After that, Jay’s parents participated in a workbook exercise in which they assessed their child’s current use of verbal operants, and identified the time and settings in which Jay used these verbal operants.

**When and where do you want your child to talk (i.e., Activity setting as a unit of analysis and intervention).** I explained that the activity setting is a unit of analysis in which intervention can be embedded efficiently and effectively. I then introduced the three routine classes (i.e., play routines, caregiving routines, and household chore routines) and operationally defined each routine class in terms of six components: (a) time and place, (b) people present, (c) resources, (d) tasks and their organization, (e) goals and values, and (f) parent-child interaction (Gallimore, 2005). Then I returned to the illustration of the three-year-old boy with the diagnosis of ASD and identified six family routines in which his parents would like their child to increase language use. I mentioned the factors to consider when selecting family routines for embedding intervention; for example, child’s interest, frequency of occurrence of each routine, materials of interest, and no signs of problem behavior related to the routine. After that, I illustrated how the
three-year-old boy’s parents identified the materials involved, language function, and language content for their son. Due to the research design, all four routines were selected in collaboration with the participating family prior to the baseline phase in order to collect baseline data. Jay’s parents were asked to select routines that sampled across the three routines classes (i.e., play, caregiving and household chores). In the workshop, they engaged in a workbook exercise to further define each routine in terms of six components (i.e., (a) time and place, (b) people present, (c) resources, (d) tasks and their organization, (e) goals and values, and (f) parent-child interaction; Gallimore, 2005). Next, they identified the language function, and language content that the child was expected to use in each of the four routines. Then, based on this information, Jay’s parents and I collaboratively selected two family routines for training. We used general case programming principles to strategically select training routines that represented the full range of stimulus variations and response expectations across all four family routines.

During day two, I introduced augmentative and alternative communication, such as the use of pictorial representation or sign, as an alternative mode of communication. I informed Jay’s parents that the use of augmentative and alternative communication would increase the likelihood that the child would communicate successfully in both the trained and non-trained family routines.

**EMT intervention.** I defined the goal and purpose of EMT intervention, which is to use child interests and initiations as opportunities to model and prompt language in everyday contexts. Research has suggested that EMT is ideally suited for parents to implement in everyday interaction (Hancock & Kaiser, 2006). I then defined the three components of EMT (i.e., environmental arrangement, responsive interaction, and milieu teaching techniques), and provided a rationale for each component. I also described specific strategies within each
component, discussed the implementation procedures, and provided pictorial and video examples of the use of each strategy across the three routine classes (i.e., play routines, caregiving routines, and household chore routines). For responsive interaction and milieu teaching techniques, the parents also watched video examples to identify the strategies used, the children’s responses and how to implement the strategies in their home. Continuing with the example of the three-year-old boy with ASD and his family, I illustrated the selection of strategies that best fit the family routines and the implementation procedures of each strategy. Jay’s parents then engaged in a workbook exercise in which they selected strategies that best fit each training routine and its language targets. During the workshop, Jay’s parents were asked to complete the same exercise for the two non-trained routines in their own time. Lastly, they role-played the implementation of the selected EMT strategies in simulated examples of the (trained) target routines. For example, the parents had selected getting ready to go outside as one of their training routines. We simulated the routine and practiced implementing the EMT strategies. The parents began by creating situations in which Jay’s mother (acting as the ‘child’) needed the adult’s assistance to put on a jacket. When the ‘child’ said nothing, the father provided an open-ended prompt, such as “Tell me what you want.” Then the ‘child’ requested “jacket” and the father helped her with the jacket and added “It’s cold outside. We wear jacket.” (i.e., EMT strategy: mirroring and mapping). Next, the father waited with a pair of shoes and the ‘child’ requested “I want shoes please.” After that, the father modeled putting on shoes and labeled “shoes on our feet” and the ‘child’ imitated the action and the verbal behavior. Lastly, the father stood beside the door and waited. The ‘child’ requested “Can I go outside please?” The father opened the door as the natural reinforcement and provided social praise, such as “Let’s go have fun!”
**Common implementation barriers and solutions.** In this final topic of the workshop, I presented common implementation barriers when implementing EMT. Jay’s parents then filled out an implementation barriers checklist to select the specific obstacles that might have applied to their family. Following this, Jay’s parents and I collaboratively brainstormed solutions to overcome these potential implementation obstacles. They then wrote down the finalized solutions to obstacles in their workshop exercise booklet.

**Workshop summary and conclusion.** Following the completion of the six topics of the two-day workshop, I gave Jay’s parents’ three checklists and taught them how to use them. These were (a) a start-up checklist, (b) daily set-up checklist, and (c) daily implementation checklist. These checklists are described below.

*The start-up checklist.* On the blank start-up checklist, Jay’s parents and I collaboratively identified the tasks to be completed before implementation at home, and the required materials. They were asked to complete the tasks on the start-up checklist before implementing EMT at home. For example, Jay’s parents decided to rearrange the seating arrangement at the dining table so that Jay would sit between the father and his brother. This initial environmental arrangement was designed to facilitate communication between Jay and his brother.

*The daily set-up checklist.* The daily set-up checklist consisted of: (a) a section to fill-in the EMT strategies that Jay’s father was planning to use during the training routines; and (b) a section to briefly self-evaluate the set-up prior to implementation. The father was encouraged to use the daily set-up checklist on a daily basis to self-monitor and self-evaluate his set-up of the environment. He wrote down the EMT strategies and used a Yes-No categorical scale to evaluate his set-up.
The daily implementation checklist. The parents also received an implementation checklist that was customized to their child and the two targeted training routines. The checklist included: (a) a list of the EMT strategies that they could use in each training routine; (b) a section to briefly evaluate improvements in child language behavior; and (c) a section to briefly evaluate the social validity of parent implementation in the home (i.e., the acceptability and importance of goals, procedures, and outcomes). Jay’s father was encouraged to use the implementation checklist on a daily basis to self-monitor and self-evaluate his use of EMT strategies and child language progress. He used a 5-point Likert-type scale to self-evaluate his use of EMT strategies (1 = not in place; 5 = fully in place). He used a simple number estimate to evaluate child progress in language use across the three verbal operants (i.e., requests, labels, answers questions; 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 +). He used a 5-point Likert-type scale to evaluate social validity (1 = disagree; 5 = agree). After customizing and reviewing the implementation checklist with the parents, I concluded the workshop by encouraging the parents to: (a) implement the EMT strategies in their daily family routines; (b) use the completed exercises in their workbook to facilitate and prompt their use of EMT strategies within daily family routines in the home; and (c) use the implementation checklists on a daily basis to self-monitor and self-evaluate the use of EMT strategies and Jay’s progress in his language use.

At the end of the workshop, Jay’s parents had completed the workshop exercises in the workbook. In doing so, the completed workbook had become an individualized manual that the parents used to guide their use of EMT strategies in the home. The individualized manual consisted of descriptions of the four identified family routines, language content within each routine, specific strategies selected for the two training routines, and specific implementation barriers and solutions for the two training routines. It also included a description of all the EMT
strategies, the powerpoint slides from the workshop, the start-up checklist, the daily set-up checklist and the customized daily implementation checklist. Jay’s parents used the customized workshop workbook and checklists to remind them of: (a) the time and place of the routines, (b) the materials needed in each routine, (c) the expected language content in each routine, (d) the EMT strategies to use in the two training routines, (e) the implementation barriers that may occur across the training routines; (f) and the solutions they can implement in training routines to prevent or overcome these barriers. At the end of the workshop, the father evaluated the social validity of the workshop. He completed a questionnaire consisting of 10 items about the acceptability and importance of the goals, procedures, and outcome of the parent training workshop.

Following the workshop, Jay’s father was given a week to set up the home environment guided by the start-up checklist and to begin incorporating EMT strategies into his interactions with his child in the target family routines in the home. I then initiated data collection in the target family routines once a week during the intervention phase. The father did not receive direct training or feedback during the observation visits.

After collecting the first four data points during the intervention phase, since there was significant improvement between baseline and intervention phases, I did not provide in-home training sessions for the father. This was a component of the workshop-based language intervention that would have been implemented if the child and parent(s) had shown little to no improvement during implementation in the home.

After six data points during the intervention phase were collected, Jay’s father completed an EMT implementation competency self-evaluation questionnaire. The competency
questionnaire was used as a guide to determine the feedback that would be beneficial to the father during a mid-intervention feedback session. The father self-evaluated his conceptual understanding of why he used each of the 13 EMT strategies and his confidence in implementing each of the 13 EMT strategies.

I then provided a 45-minute feedback session to the father. The feedback session consisted of: (a) providing general praise for his contribution to his child’s language development; (b) watching baseline and intervention phase videos; (c) discussing the effects of EMT strategies on his child’s use of language; (d) highlighting his competent implementation of EMT strategies in the routines; (e) discussing error patterns in his use of some of the EMT strategies; and (f) explaining the importance of maintaining a high levels of implementation in order for his child to demonstrate maintenance of intervention effects.

Following the sixth observation session across the four routines, due to the weather, the play outside routine was no longer feasible. Therefore Jay’s father and I collaboratively decided to change the location of the play routine to the living room. I provided a blank workshop exercise form to the father and asked him to use the exercise form to identify the materials involved, language function, and language content for his son, and select EMT strategies that best fit the modified play routine and its language targets. From the seventh data point onward, the play routine occurred in the living room of the family’s home.

During the parent implementation in the home phase, Jay’s father completed a social validity questionnaire twice, during the first week and third week of intervention. The questionnaire consisted of questions about the acceptability and importance of the goals, procedures, and outcomes of parent implementation in the home.
**Follow-up.** Follow-up data were collected once per month for two months after the parent implementation phase. During follow-up sessions, Jay’s family was observed and videotaped during the four target family routines. This was to examine the maintenance of parent and child behavior over time. After each follow-up session, I provided feedback to Jay’s father by e-mail on his implementation of EMT strategies. In the e-mail message, I provided general praise for his contribution to his child’s language development, discussed error patterns in his use of some of the EMT strategies, and suggested ways in which the father could improve his use of EMT strategies in the target routines. In addition, the father completed the social validity questionnaire.
Chapter 3

Results

Results of implementation of the workshop-based language promotion intervention are presented in this chapter. The goals of this study were to investigate whether there was an association between a two-day workshop designed to empower parents to use and generalize the use of EMT language promotion strategies in family routines with young children with ASD and improvements in: (a) parent use of EMT strategies; and (b) child use of communicative behaviors in indirectly trained and non-trained family routines in the home. In addition, another goal was to assess the social validity of the workshop-based language promotion intervention.

Direct observation data of parent use of EMT strategies and child communicative behaviors were displayed graphically and analyzed using visual analysis. The level, trend, and variability of parent and child behaviours were analyzed across baseline, parent implementation, and follow-up phases. In the quasi-experimental, case study design, the presence of a correlational relationship between the independent and dependent variables was assessed by looking for stable improvements in parent use of EMT strategies and child communicative behaviors when comparing the baseline phase to the intervention phase. The acceptability and importance of the goals, procedures, and outcomes of the language promotion intervention were assessed by examining the parent’s rating of the social validity of the intervention.
Implementation of Workshop-based Language Promotion Intervention Results

Three dependent variables were used to evaluate the effects of implementation of the language promotion intervention: (a) parent use of EMT strategies, (b) child communicative behaviors, and (c) social validity rating. Results across these three variables are summarized below.

**Parent use of EMT strategies.** Figure 3.1 shows the percentage of intervals of parent use of EMT strategies in indirectly trained and non-trained family routines in the home. The trained routines were defined as the target routines in which parents selected EMT strategies that best fit each routine and its language targets, and role-played the implementation of the selected strategies in simulated examples during the workshop. The non-trained routines were defined as the routines in which parents did not select strategies and role-play the implementation of strategies during the workshop. Overall, the data revealed marked improvements in parent use of EMT strategies from the baseline phase to the intervention phase.

**Baseline.** During the baseline phase, in the indirectly trained routines (i.e., reading and getting ready to go outside), the father’s baseline data showed an initial increasing trend, which stabilized at the last two data points. The average percentage of parent’s use of EMT strategies in indirectly trained routines was 41% of intervals across six baseline probe observations (range, 30% - 50%). In the non-trained routines (i.e., playing outside and snack time), there was an increasing trend across the first three data points, which stabilized during the last three data points. The average percentage of
parent use of EMT strategies in non-trained routines was 42% of intervals across six baseline probe observations (range, 23% - 53%).

**Intervention: Parent implementation.** During the intervention phase, for the indirectly trained routines, there was an increase at the point of intervention in parent use of EMT strategies with a slightly increasing trend over time. The average percentage of parent use of EMT strategies in indirectly trained routines increased to 73% of intervals across the nine probe observations (range, 57% - 93%). Across non-trained routines, there was a dramatic increase in parent use of EMT strategies at the point of intervention followed by a slightly increasing trend over time. The percentage of parent use of EMT strategies increased to an average of 86% of intervals across the nine probe observations (range, 70% - 93%). When comparing baseline phase data to intervention phase data, the percentage of non-overlapping data for father use of EMT strategies in trained and non-trained routines was 100%.

**Follow-up.** In the indirectly trained routines, parent use of EMT strategies was maintained at 1 and 2 months post-intervention. The percentage of parent use of EMT strategies in indirectly trained routines averaged 81% of intervals across two follow-up probe observations (range, 80% - 82%). In the non-trained routines, results also were maintained at 1 and 2 months post-intervention. The percentage of parent use of EMT strategies averaged 79% of intervals across two follow-up probe observations (range, 77% - 80%).
Figure 3.1. Percentage of intervals of parent use of EMT strategies. Note. Indirectly trained routines = Reading and getting ready; Non-trained routines = Play outside and snack; * = 45 minutes of feedback session.
**Child communication behaviours.** Figure 3.2 displays the percentage of intervals of child communication behaviours in indirectly trained and non-trained routines in the home. In general, marked improvements were observed in child communication behaviours from the baseline phase to the intervention phase.

**Baseline.** In the indirectly trained routines, Jay’s baseline data showed an initial increasing trend in the percentage of child language use with a marked deterioration during the last probe observation session. The percentage of intervals of child communication behaviours in indirectly trained family routines averaged 25% (range, 13% - 40%). In the non-trained routines, baseline data showed a stable trend across the first three probe observations with some variability and deterioration across the last three probe observations. The percentage of intervals of child communication behaviours averaged 35% across the non-trained routines (range, 23% - 47%).

**Intervention: Parent implementation.** During the intervention phase in both the indirectly trained and non-trained routines, a dramatic improvement in Jay’s language use was evidenced at the point of intervention with an overall improving trend across the subsequent eight probe observations. The percentage of child’s communication behaviours in indirectly trained routines averaged 62% of intervals across the indirectly trained routines (range, 40% - 88%). Across non-trained family routines, the percentage of child communication behaviours also dramatically increased to an average of 77% of intervals (range, 57% - 87%). When comparing baseline phase data to intervention phase data, the percentage of non-overlapping data for child use of language in trained and non-trained routines was 100%.
**Follow-up.** The follow-up probe observations evidenced maintenance of the outcomes achieved during the intervention phase. During follow-up at 1 and 2 months post intervention, Jay’s language use maintained at an average of 73% of intervals across the indirectly trained routines (range, 60% - 85%) and an average of 72% of intervals across the non-trained routines (range, 70% - 73%).
Figure 3.2 Percentage of intervals of child communicative behavior. Note. Indirectly trained routines = Reading and getting ready; Non-trained routines = Play outside and snack; * = 45 minutes of feedback session.
Social validity. Two social validity questionnaires were used to evaluate, respectively, the workshop and parent implementation. The workshop social validity questionnaire was administered once at the end of the workshop to evaluate the acceptability and importance of the goals, procedures, and outcomes of the workshop. Jay’s father’s average social validity rating was 4.8 on a 5 point Likert-type scale (1 = unacceptable and unimportant; 5 = acceptable and important). Overall, Jay’s father viewed the workshop to be acceptable and important. The parent implementation social validity questionnaire was administered to the father twice during the intervention phase and once during the follow-up phase. Across the three evaluations (1 = disagree; 5 = agree), Jay’s father’s average social validity rating was 4.5 (range = 4.4 – 4.7). Specifically, the average rating of the goals of parent implementation was 5. The average rating of the procedures of parent implementation was 4.4 (range = 4.2 – 4.6). The average rating of the outcomes of parent implementation was 4.4 (range = 4.3 – 4.6).

Table 3.1 presents the comments made by the father during the intervention phase regarding the acceptability and importance of the language promotion intervention in the home. Overall, the father perceived the goals, procedures, and outcomes of parent implementation as acceptable and important.

Competency self-evaluation questionnaire. The father self-evaluated his implementation of EMT strategies using a competency self-evaluation questionnaire following the sixth observation session. The father’s average rating of his conceptual understanding of why he used the 13 EMT strategies was 4.8 on a 5 point Likert-type scale (1 = I do not understand; 5 = I understand well). His average rating of his
confidence in implementing the 13 EMT strategies was 4.2 on a 5 point Likert-type scale (1 = I am not confident; 5 = I am confident).
Table 3.1 Father’s Social Validity Comments during Intervention Phase Organized by Goals, Procedures and Outcomes

<table>
<thead>
<tr>
<th>Goals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appropriateness of the goals:</td>
</tr>
<tr>
<td>Yes, we would love to help J talk.</td>
</tr>
<tr>
<td>Recommending the intervention to other parents:</td>
</tr>
<tr>
<td>Yes, it will be helpful for other parents and kids.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Procedures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level of difficulty of the strategies:</td>
</tr>
<tr>
<td>It will become easier to use the strategies at home. Right now I’m often rushed with the kids and don’t have time.</td>
</tr>
<tr>
<td>It’s easy to embed within routines, but sometimes I tend to forget to use them.</td>
</tr>
<tr>
<td>Level of difficulty of the set-up checklist and implementation checklist:</td>
</tr>
<tr>
<td>The checklists are not difficult to use but time consuming with two kids running around.</td>
</tr>
<tr>
<td>Unanticipated problems: Not at all.</td>
</tr>
</tbody>
</table>

<table>
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<tr>
<th>Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level of benefit to child:</td>
</tr>
<tr>
<td>J is talking more. I think so. He’s screaming less!</td>
</tr>
<tr>
<td>Yes, and when he talks, he seems happier.</td>
</tr>
<tr>
<td>Support during training activities:</td>
</tr>
<tr>
<td>Yes, [the workshop trainer] has been professional, friendly and polite.</td>
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Chapter 4

Discussion

Summary of Results

The study investigated two research questions about the effectiveness of a two-day workshop designed to empower parents to use and generalize the use of EMT language promotion strategies. The study investigated two research questions:

(1) Is there a strong association between a two-day workshop designed to empower a parent to use and generalize the use of EMT strategies in family routines with a young child with ASD and improvements in: (a) parent use of EMT strategies; and (b) child use of language in trained and non-trained family routines in the home?

(2) How does the participating parent view the social validity of the workshop-based language promotion intervention?

The results for one parent and a young child with Down Syndrome and ASD offer evidence of a strong association between the workshop-based language promotion intervention and improvements in the parent’s use of EMT strategies and in the child’s use of language within two family routines, in which the father received workshop based (i.e., indirect) training. There also was a strong association between the workshop-based language promotion intervention and the generalization of the parent’s use of language promotion strategies and the child’s use of language to two non-trained (i.e., generalization) family routines.

In terms of the rules of evidence of single case methodology, a basic effect was demonstrated for both parent EMT usage and child language use. Results show that the father’s
use of language promotion strategies was associated with large increases in Jay’s use of language (Roberts & Kaiser, 2011). Specifically, following the parent training workshop, there were immediate and dramatic improvements in the father’s use of EMT strategies and in Jay’s communication behaviour within indirectly trained and non-trained routines. Moreover, one interesting finding was that parent EMT strategy implementation and child communication behaviour were both higher in the non-trained (i.e., generalization) routines compared to the indirectly trained routines.

In addition, a brief 45 minutes feedback session with the father following the sixth observation session was associated with the maintenance of improvements in the father’s use of EMT strategies and in Jay’s communication behaviour, as well as further improvement in the father’s use of EMT strategies in the non-trained routines. Data also indicated that when Jay reached a high level of communication behaviour, the father showed a slight decrease in his level of EMT implementation. These improvements in parent EMT implementation and child communication behaviour were maintained one and two months after the termination of the parent implementation phase. The parent implementation phase is when I, the workshop trainer, scheduled weekly observations in the home to observe the four target routines. No direct training was provided at any point during the parent-implementation phase. Feedback to the father was only provided during a 45 minute feedback session following the sixth observation session. As well, social validity results show that both the workshop and parent implementation, guided by a customized language promotion manual, were acceptable and important to the family. In regard to the two-day workshop, the father rated the goals, procedures, and outcomes highly ($\bar{x} = 4.8$). In regard to parent implementation, which involved the father’s independent use of two implementation checklists, Jay’s father similarly rated the goals, procedures, and outcomes
highly (\(\bar{x} = 4.5\)). During the parent implementation phase and follow-up phase, Jay’s father reported that Jay engaged in more talking and less screaming at home. He added that when Jay talked, he seemed to be happier than when he did not talk. He reported that the set-up checklist and implementation checklist were easy to fill out, but he struggled to find the time to complete the checklist, given two young children actively running around in the home. Overall, he recommended that other parents use the language intervention because it was helpful in promoting his child to talk in the home.

The study employed a single subject, quasi-experimental, case study design. Due to the limitations of the research design, a function relation between the independent variable and the dependent variables cannot be concluded. Although the case study design offers a strong basis for drawing scientifically valid inferences about the effectiveness of the intervention, it cannot entirely rule out the potential effects of history and maturation (Kazdin, 1982, 1992). Nevertheless, characteristics of this study rule out specific threats to interval validity in a manner similar to a true experiment. These characteristics include repeated measurement of objective data, relatively stable levels of performance in the baseline and in the intervention phase, immediate and large basic effects following intervention, and 100% non-overlapping data from baseline to intervention phases (Kazdin, 1992).

Findings in Relation to Literature

The study offers a modest but compelling contribution to the literature on parent-implemented language intervention in natural home settings (Gillet & LeBlanc, 2007; Kashinath et al., 2006; Peterson, Carta, & Greenwood, 2005). Similar to the Peterson et al. study (2005) and Kashinath et al. study (2006), in my study, Jay’s father implemented a language promotion
intervention within natural family routines in the home to promote his child’s use of language. In
the Peterson et al. study, the three participating parents received 21 to 25, 60-minute training
sessions on a weekly basis across five to six months during the intervention phase. This included:
(a) reviewing the intervention procedures with the parents; (b) the researchers modeling the
procedures with the child while the parents observed; (c) and parents practicing the language
promotion strategies with their child while receiving feedback and coaching from the researchers.
Kashinath and colleagues conducted a similar set of parent training procedures during the
intervention phase within 60 to 90 minute training sessions on a biweekly basis across five to six
months. Unlike these studies, in this study, the participating parent received training on the
implementation of language promotion strategies only during a two-day workshop. During the
workshop, I role played implementation of the language promotion strategies in simulated
exemplars of two target family routines, but after the two day workshop, I provided no additional
training support to the family. During observations sessions, I did not model skills with the focus
child before the observation and nor did I provide feedback after the observation session was
completed (with the exception of mid-treatment 45 minute feedback session). Despite this
significant difference in the amount of parent training provided, the results obtained with one
parent-child dyad was consistent with the results obtained by Kashinath et al. and Peterson et al.
in regard to improvements in parent use of language promotion strategies, and in child use of
language in trained and/or non-trained routines. To be sure, the studies by Kashinath et al. and
Peterson et al. both used experimental single case research designs and so they were able to
document the effectiveness of their language promotion intervention with the participating
children and families. The use of an empirical case study design in this study does not permit
such a high level of inference in regard to the results I obtained. Nevertheless, these results are
intriguing in that they suggest that a language promotion model that is more synthetic in terms of
the theoretical frameworks and evidence-based practices embedded in it, may produce equally
meaningful outcomes with considerably less effort.

The study extends the literature of general case programming (GCP) on language
promotion (Kashinath et al., 2006; O’Neill et al., 2000). Similar to O’Neill et al (2000), the
language functions selected were guided by the verbal behaviour theoretical framework (Skinner,
1957) and were taught across a range of natural settings to promote generalization. However
O’Neill et al (2000) only targeted generalized mands, but not other verbal operants (i.e., tacts,
intraverbals, and echoics). In this study, the language that was promoted sampled across the four
verbal operants, which was consistent with the construct of verbal behaviour as defined by
Skinner (1957). The study is consistent with Kashinath et al (2006) who also utilized GCP to
strategically select routines across routine classes. However, unlike the Kashinath et al study, we
did not discuss with the father, at any point during the intervention phase, how the EMT
strategies can be incorporated across non-trained routines. The literature was extended by
demonstrating the power of GCP as a design element when selecting routines for language
promotion in the home. During the workshop, the parents first identified family routines in which
child language was to be promoted. The parents then defined the elements of each routine and
the language functions and content that the child was expected to use. After that, the parents and
I used principles of GCP to select two routines that sampled the stimulus and response
requirements, in terms of language usage by the child, of a wider range of activity settings in the
home. Based on the analysis of the general case, two training routines were selected that I
predicted would promote generalization to two non-trained routines that possessed similar
stimulus and response characteristics. Study results were in line with these predictions, with generalization being demonstrated in both parent and child behaviour.

The study provides additional evidence of the application of the activity setting as a unit of analysis and intervention to language promotion (Mobayed et al., 2000; Stiebel, 1999). The use of the routine as a unit for analysis and intervention was associated with parent use of EMT strategies within targeted family routines and the promotion of child language use relevant to each routine. Similar to the research of Stiebel (1999) on language promotion, the implementation of language promotion strategies by a parent that were specifically selected for their goodness-of-fit within target family routines appeared to magnify the effectiveness of the parent’s use of the strategies. The integration of the activity setting as a unit of analysis with GCP and EMT strategies helped to build an individualized language intervention that possessed a good contextual fit with family goals and settings. Doing so appeared to contribute to the maintenance and generalization of the parent’s implementation of EMT strategies and the child’s use of language in the indirectly trained and non-trained routines (Dunst et al., 2000; Gallimore, 2005).

Outcomes from the study suggest that in the analysis of family routines, some routines naturally lend themselves to more language promotion opportunities because of the elements of the routine (i.e., time and place, people present, resources, tasks and organization, goals and values, and parent-child interaction; Gallimore, 2005). Specifically, some routines contain rich language promotion opportunities. Other routines are of greater interest to the father and/or the child. For example, in this study, Jay’s father and Jay showed great enjoyment and enthusiasm during the snack routine and the outdoor play routine compared to the preparing to leave home and reading routines.
Unique Contributions to Literature

The study offers two unique contributions to the language intervention literature: (a) a workshop that synthesizes three evidence-based practices; and (b) a workshop in which parents were active partners in the design of a customized language promotion intervention for their child and family.

**A workshop designed to synthesize three evidence-based practices.** This study offers to the current language intervention literature, a language-promotion model that integrated three evidence-based practices – EMT, the activity setting as a unit of analysis, and GCP – within a two-day workshop. The study illustrates how a parent was able to increase his use of language promotion strategies in the home through an individualized language package that was designed in collaboration with the parent during a two-day parent training workshop. The father’s use of EMT empowered him to promote his child’s use of language within family routines. The use of GCP was associated with the father generalizing the implementation of EMT strategies to non-trained routines with his son by himself. The application of the activity setting as a unit of analysis ensured a good contextual fit with family goals and settings, and appeared to contribute to the maintenance and generalization of parent use of EMT strategies and child use of language. As suggested in the intervention, the whole appeared to be greater than the sum of its parts in regard to the outcomes that were achieved; that is, the outcomes achieved in this study may have been greater than would have occurred if each of the three components were implemented in isolation of the others.

The main intervention in the language-promotion model was the individualized language promotion manual that was generated in collaboration with Jay’s parents during the parent workshop. The father used the manual to guide his use of EMT strategies within family routines
in the home. Unlike other studies, the workshop trainer in this study did not provide any direct training to the parent, such as demonstrating the strategies with the child in the home, coaching the father to use the strategies in the home, or providing ongoing feedback to the father. The 45-minute feedback session that occurred following the sixth observation session was the one and only exception. Despite the limited nature of the intervention, following the two-day workshop, results showed immediate improvement in parent use of EMT strategies and in child use of language.

One explanation for these results is that the set-up checklist and implementation checklist played a significant role in facilitating the parent’s implementation of language intervention in the home. Research has indicated that a well-designed checklist can improve intervention outcomes (Gawande, 2009). Kasier and Hancock (2003), in their parent training procedure for language promotion, included an implementation checklist in their parent education package. In this study, checklists were used to serve as: (a) a reminder about the set-up and the EMT strategies selected for the two indirectly trained routines; and (b) a self-evaluation tool focused on the goals, procedures, and outcomes of implementation. During the first five weeks of the intervention phase, Jay’s father filled out the checklists to guide his implementation of EMT strategies. Thus, the immediate improvement of the baseline in parent’s use of EMT strategies was associated with the use of the checklist. However, after five weeks, Jay’s father reported that he had stopped using the checklists because he perceived that that he had little to no time to fill them out. Nevertheless, the results show that the father maintained his use of EMT strategies during the remainder of the intervention phase and during follow-up phase.

During the intervention phase (i.e., home implementation), the father evaluated his self-efficacy using a competency checklist. Results show that he rated highly his conceptual
understanding of why he used the EMT strategies and his confidence in implementing the strategies. This may partly explain why the father no longer used the checklists to guide implementation. Data showed maintenance of parent and child outcomes as well as continued improvement. Also as the child progressed, EMT strategy use results indicated that the father began to use different EMT strategies to build upon the child’s improved language use. For example, the child commented spontaneously, “Daddy drinks.” And the father expanded, “Daddy is drinking water.”

A workshop in which parents were active partners in the design of a customized language promotion intervention for their child and family. The study provides a demonstration of how a parent can effectively collaborate with a workshop trainer to create an individualized language promotion intervention that promotes child use of language within natural family routines. During the two-day workshop, Jay’s parents completed the workshop exercises and generated a customized language intervention manual guided by the workshop trainer. This manual was used to guide Jay’s parents’ implementation of EMT strategies in the home. As Kasier and Hancock (2003) pointed out, an important process of parent teaching is to work collaboratively with parents in setting goals and selecting strategies. There also is evidence from positive behavior support research with families to suggest that the collaborative design of intervention is associated with meaningful and durable treatment outcomes (Buschbacher, Fox, & Clarke, 2004; Lucyshyn, Albin, & Nixon, 1997; Lucyshyn, Albin, Horner, Mann, Mann, & Wadsworth, 2007; Moes & Frea, 2002).

Limitations

Research design. Although there was an immediate and dramatic improvement in Jay’s use of language and Jay’s father’s use of EMT strategies with 100% non-overlapping data for
parent and child behaviours when comparing baseline phase data to intervention phase data, one nevertheless must be cautious when interpreting the results. Although the empirical case study design controlled for six threats to interval validity, the design did not entirely rule out the potential effects of history and maturation. However, as suggested by Kazdin (1992) when immediate and large changes in behavior are evidenced within a case study design, history and maturational factors are unlikely to account for the results.

**External validity.** The results of this study, although encouraging, are based on the implementation with one parent-child dyad within four family routines. Therefore, the ability to draw conclusions about the potential impact of the workshop-based language promotion intervention with other families of children with ASD is limited. Although there is experimental and empirical case study support for the efficacy of the EMT approach with other families of children with ASD and language delays in the home (Hemmeter & Kaiser, 1994; Kaiser et al., 2000; Peterson et al., 2005), this study is the first example of the synthesis of three evidence-based constructs or teaching methods within a two-day workshop on promoting child language use in the home. Thus it is necessary to be cautious in extrapolating these results to other families of children with ASD or language delays.

**Workshop participation.** The workshop was designed for a small group of parents (i.e., six to eight parent pairs), but only one pair of parent participated in the workshop in this study. For this reason, the effectiveness of the parent training workshop with a small group of parents cannot be assessed.

**Inclusion criteria.** Although the participating family demonstrated impressive improvements in parent and child target behaviours immediately following the workshop, the
inclusion criteria ruled out some families who could benefit from the study. First, children who echo or talk frequently or who have one to two-word phrases in their repertoire were not included. Second, children who engage in problem behaviours within family routines were not included. Lastly, families had to have at least four family routines in which problem behaviours were not predominately occurring. Thus, the effectiveness of the intervention with families of children with ASD and significant problem behaviours cannot be assessed.

**Implications**

Results of the study offer three implications for practitioners and researchers who are involved in parent-implemented language intervention.

**Enhanced language promotion model.** The study demonstrates an enhanced language promotion model for parents of children with language delays. This study integrated three evidence-based approaches, enhanced milieu teaching, the activity setting as a unit of analysis, and general case programming, into one comprehensive synthesized language intervention. The model appears to promote a good contextual fit with family life. Specifically, the intervention: (a) used the family routine as the unit of analysis and intervention, (b) customized the language intervention to the specific elements of family ecology in which the language was to be promoted, and (c) easily embedded by parents into a child’s everyday routine and activities. A contextually appropriate language intervention enhanced the meaningfulness, functionality, and durability of the parent-implemented language intervention.

**Workshop-based parent training.** The study provides an empirical case study example of a workshop-based parent training model. As noted by Schultz, Schmidt, and Stichter (2011), though one-on-one approach to teaching parents may provide highly individualized learning
opportunities, a group approach could be a cost-effective way to implement parent training. In this study, during the workshop, a parent dyad role-played the implementation of the selected EMT strategies in simulated examples of the two target routines (indirectly trained) and generated an individualized language promotion manual to guide their implementation of EMT strategies across four target routines (indirectly trained and non-trained) in the home. Throughout the parent implementation phase, the workshop trainer, did not provide direct language intervention to Jay or direct training to Jay’s father in the home. Results indicated immediate and dramatic improvements in parent use of EMT strategies and child use of language at the point of intervention and outcomes were maintained at one and two months post-intervention.

**Parent as primary language interventionist.** This study provides a demonstration of how a parent of a child with ASD can serve as his child’s primary language interventionist in the home to promote meaningful and durable language intervention effects (Kashinath et al., 2006; Stiebel, 1999). As noted by Burrell and Borrego (2012), parents play important roles in intervention because: (a) the time that parents spend with their child offers many natural learning opportunities; (b) parents can provide information about family goals, values, and routines, and the child’s strengths, language ability, and preferences; and (c) parent-implemented intervention can have positive, significant and durable effects on child’s skills. In this study, Jay’s father served as an active participant in individualizing the use of EMT strategies in the home. During the workshop, first, he determined the family activity settings (i.e., routines) in which he would like to see his child’s use of language improve. Then he considered language content that he wanted to promote for his child based on the theoretical framework of verbal behavior (Skinner, 1957). After that, Jay’s father selected the EMT strategies that fit his child’s language targets and his personal preference and style of interaction. Since Jay’s father
and Jay had a good sense of humour, he was creative in personalizing EMT strategies to create communication opportunities at home. For example, he purposefully put on his wife’s shoes, which made Jay laugh. He then taught Jay to comment on his silliness and to request daddy’s shoes. Lastly, during the workshop, Jay’s father considered potential implementation barriers when implementing EMT strategies in the home and solutions to overcome these potential obstacles. For example, Jay’s father shared his knowledge about Jay’s developmental history (i.e., dual diagnosis of Down Syndrome and ASD; a learning profile as a slower learner). This knowledge led to a discussion about the importance of maintaining a high level of implementation despite observing little to no improvement in Jay’s language use immediately after implementation. Jay’s father also pointed out that his younger son would often respond to the communication opportunities presented by a parent before Jay did. Therefore we discussed how Jay could still respond to even though his brother first. Anecdotally, the father reported that his younger son is now still responding faster than Jay, but Jay is learning to imitate his brother and respond more quickly.

Parents are important stakeholders in the child’s life and are entirely capable of serving as collaborators, involved in all levels of intervention, including assessment, goal development, and treatment implementation (Brookman-Frazee, Stahmer, Baker-Ericzén, & Tsai, 2006, Burrell & Borrego, 2012). When parents become valued partners in the implementation process, they gain mastery over their lives and are empowered (Rappaport, 1984). They realize their capacity to teach their child and take ownership to promote their child’s use of language in the home. This study offers one clinical case study example of a model of parent implemented language intervention that was associated with the empowerment of a father to successful empower the communication behavior of a young child with Down Syndrome and ASD in home setting.
Recommendations for Future Research

This study and its preliminary results are the first to investigate whether there is a strong association between a two-day workshop and improvements in parent use of EMT and in child use of language in trained and non-trained family routines in the home. Future research should consider four areas. First, because the current study employed a quasi-experimental case study design, future research should employ a true experimental single case design, such as a multiple-baseline design across participants to strengthen its internal validity. Second, replication is needed to strengthen its external validity. External validity would be enhanced if the efficacy of the intervention were demonstrated with children of different ages, children with ASD and different levels of functional language, and groups of parents (i.e., six to eight parent pairs) attending the workshop. Third, future research should include additional measures of child language skills, such as sentence length, complexity of sentence structure, and use of novel vocabulary. Lastly, future research should collect long-term follow-up data to assess the durability and sustainability of the parent-implemented language intervention approach.

Conclusion

The study examined two research questions: (1) Is there a strong association between a two-day workshop designed to empower a parent to use and generalize the use of EMT intervention in family routines with a young child with ASD and improvements in: (a) parent use of EMT; and (b) child use of language in trained and non-trained family routines in the home?; and (2) How does the participating parent view the social validity of the workshop-based language promotion intervention?
The results indicated that the workshop-based language promotion intervention was associated with improvements in a parent’s use of language promotion strategies and in his child’s use of language within indirectly trained and non-trained (i.e., generalization) family routines. In addition, these improvements were sustained for two months post intervention. Social validity results also suggest that the goals, procedures, and outcomes of the workshop and the parent implementation phase were acceptable and important to the parent.

The findings of this investigation make two contributions to the literature. First, the study offers an enhanced language promotion model, which synthesizes three evidence-based approaches – EMT intervention, the activity setting as a unit of analysis and general case programming – into one comprehensive, integrated language intervention. Second, the study provides a two-day workshop design that holds some promise for efficiently and effectively teaching parents how to promote language within family routines in the home. However, there is a need for replication within experimental single case designs before any firm conclusions can be drawn from these promising but preliminary results.
References


Appendix A

Workshop Manual

HELPING YOUR CHILD TO SPEAK AT HOME — A PARENT TRAINING WORKSHOP
Presented by Vivian Huen

Workshop Manual

Parent Name:

Workshop Dates:
HELPING YOUR CHILD TO SPEAK AT HOME – A PARENT TRAINING WORKSHOP
Presented by Yvian Huien

TIMETABLE OF THE TWO-DAY WORKSHOP
- Day 1
  - Who benefits most from this workshop?
  - Why do you need to teach your child to speak?
  - What do you want your child to say?
  - When and where do you want your child to talk?
- Day 2
  - Enhanced Milieu Teaching - How to teach your child to talk at home?

WHO BENEFITS MOST FROM THIS WORKSHOP?
WHO BENEFITS MOST FROM THIS WORKSHOP?

Parents who want to be their children’s primary language teachers

Children who can imitate words and enjoy interacting with their parents

WHY DO YOU NEED TO HELP YOUR CHILD TO SPEAK

TYPICAL LANGUAGE DEVELOPMENT

- Develops within natural environment/setting (e.g., at home, daycare, etc.)
- Develops with natural communication partners (e.g., parents, siblings, grandparents, teachers, peers, etc.)

The parent labels an item in the environment

The child responds
Reinforcement is something that people want and are willing to "work for it"!
ASD ATYPICAL LANGUAGE DEVELOPMENT
- One of the core features of ASD: impairment in social communication
- Delays in or absence of spoken language
- Rarely start a conversation
- Have a hard time sustaining an appropriate conversation with many turns on a topic with people

ASD ATYPICAL LANGUAGE DEVELOPMENT (cont.)
- Lack of or a reduced number of important referential gestures
  - showing, giving, pointing, following eye gaze, using eye gaze to communicate,
  - having joint attention (i.e., when both parent and child are both attending to the same item, so they may talk about that item together)
- These deficits make language development within natural environment difficult for children with ASD
ASD ATYPICAL LANGUAGE DEVELOPMENT (cont.)

The parent labels an item in the environment

The child does not respond

Over time, children with ASD experience fewer communication opportunities

Poor learning environment for children with ASD
ASD ATYPICAL LANGUAGE DEVELOPMENT (con’)

- What do we need to do?
- Create a rich language learning environment

- Even though your child may not be responsive at the beginning.
- Even though your behaviors may not be reinforced.

WHAT DO YOU WANT YOUR CHILD TO SAY?

WHAT EXACTLY DO YOU WANT YOUR CHILD TO SAY?

Commenting

Requesting

Responding to others
1. REQUESTING

(The child reaches toward the tray to get a cupcake.)

Reinforcement

I am hungry!

1. REQUESTING

"I want cupcake"

Reinforcement

I am hungry!

1. REQUESTING

"Mommy, I want to sleep in your bed."

(Mom replied ...)

I want to sleep with mom.
2. COMMENTING

"Porsche."

"Yes, that is a 2011 Prosche Panamera."
3.answering Questions

"good morning."

(The parent smiles and approaches the child.)

3.answering Questions

Yes No
**ILLUSTRATION: RYAN**

**ILLUSTRATION: VERBAL BEHAVIOR**

I am Ryan.

I am 3 years old.

I have Autism.

I live with my dad, mom, and an older sister.

I like watching TV.

I know the names of about 20 familiar items/people.

When you say something, I can copy you.

But I don't usually start talking to people.

I enjoy playing with my family.
EXERCISE

- What does your child say at home with you?

- This helps to determine what your child isn’t saying...
  - See Exercise A

WHEN AND WHERE DO YOU WANT YOUR CHILD TO TALK?

NATURAL FAMILY Routines
THREE ROUTINE CLASSES

1. Play routines

2. Caregiving routines

3. Household chores routines

THREE ROUTINE CLASSES — 1. PLAY Routines

- **What:** activities done for amusement or recreation of child and parents; may involve toys
- **When:** after school, after mealtime
- **Why:** this is where children learn and develop language use while having fun

THREE ROUTINE CLASSES — 2. CAREGIVING Routines

- **What:** meeting the child’s basic needs in care; involves many household items
- **When:** morning, snack time, mealtime, evening
- **Why:** this is where children learn to care for themselves while developing language skills
THREE ROUTINE CLASSES – 3. HOUSEHOLD CHORES ROUTINES

- **What:** small routine tasks around the house, involves many household items
- **Who:** parents + child
- **Why:** learning to be responsible at home while developing language skills

ILLUSTRATION: RYAN

ILLUSTRATION: TEACHING LANGUAGE WITHIN FAMILY ROUTINE

- Ryan’s parents identified six family routines in the home in which they wanted to see Ryan’s increase in use of language.
- Factors they considered:
  - Ryan’s interest, frequency of occurrences of each routine, their comfort, time availability, materials of interest, and opportunities for Ryan to use his communication skills
  - Ryan does not display significant problem behaviour or exhibit affect that indicates that the target routine is aversive.
Illustration: Teaching Language within Family Routine

Exercise: Selecting Family Routines
- Identify 4 family routines in the home in which you would like to see your child’s use of language improve.
- Factors to consider:
  - child interest, frequency of occurrences of each routine, parent comfort, time availability, materials of interest, and opportunities for children to use their communication skills
  - the children will not display significant problem behaviour or exhibit effect that indicates that the target routine is aversive.
- See Exercise B

Exercise B
SELECTING ROUTINES FOR TRAINING

- Select 2 family routines that can cover the most areas in terms of:
  1. Types of routine classes
  2. Materials involved
  3. Language function (i.e., requesting, commenting, responding to others)
  4. Language content within each language function
     - E.g., Request for items, information, refusal, attention, play invitation, etc.

WHAT'S NEXT?

- Learn about the language intervention strategies
- Practice the strategies in the context of the 2 selected family routines
- Continue to create your own language promotion package

See you next time!

HELPING YOUR CHILD TO SPEAK AT HOME — A PARENT TRAINING WORKSHOP

Presented by Vivian Huen
TIMETABLE OF THE TWO-DAY WORKSHOP

- Day 1
  - Who benefits most from this workshop?
  - Why do you need to teach your child to speak?
  - What do you want your child to say?
  - When and where do you want your child to talk?
- Day 2
  - Enhanced Milieu Teaching - How to teach your child to talk at home?

ENHANCED MILIEU TEACHING

ENHANCED MILIEU TEACHING (EMT)

- EMT Goal: Uses child interests and initiatives as opportunities to
  Model and Prompt language in everyday contexts
- EMT is ideally suited for parents to implement in everyday interaction
EMT: THE 3 COMPONENTS

Environmental Arrangement (EA)
- Arranging the environment to increase the opportunities for the child to communicate
- Offering choice
- Pausing within a routine
- Waiting with cue
- Inadequate portions
- Assistance

Responsive Interaction (RI)
- Notice and respond
- Take turns
- Mirror and map
- Expand

Prompting Techniques (PT)
- Time delay
- Open-ended question
- Model
- Use of natural reinforcement and praise
VIDEO EXAMPLE: WHAT STRATEGY IS USED?

ENVIRONMENTAL ARRANGEMENT (EA)

1. Offering choice: holding up two items and wait for the child to choose

Animal puzzle or vehicle puzzle?
Red socks or green socks?
Brush teeth or brush hair?

VIDEO EXAMPLE: WHAT STRATEGY IS USED?
ENVIRONMENTAL ARRANGEMENT (EA)

2. Pausing within a routine: setting up a routine in which the child expects certain actions and then wait before doing the expected action again.

VIDEO EXAMPLE: WHAT STRATEGY IS USED?

3. Waiting with cue: using an associated item and then wait before completing the expected action.
1. **VIDEO EXAMPLE: WHAT STRATEGY IS USED?**

2. **ENVIRONMENTAL ARRANGEMENT (EA)**

   4. **Inadequate portions**: providing small or inadequate portions of preferred materials

   - Give a piece of block instead of the whole container of blocks
   - Give a small portion of juice instead of a full cup of juice
   - Give one fork instead of all the forks when setting the table

3. **VIDEO EXAMPLE: WHAT STRATEGY IS USED?**
ENVIRONMENTAL ARRANGEMENT (EA)

1. Assistance: creating situations in which the child needs the adult’s help, items out of reach, things go wrong/unexpected

Parents have more opportunities to reinforce child’s use of language and teach new language

Child has more opportunities to practice talking

- Some strategies work better than others for each child
  - use the ones that work best for your child
  - avoid EA strategies that frustrate your child

ILLUSTRATION: Ryan’s Hand-washing routine

Offering Choice
- soap or foam bottle

Waiting with cue
- withhold towel, tap

Assistance
- light switch on/off, tap on/off, hang towel on rack
**Illustration: Ryan’s Cleaning Up Routine**

- **Waiting with cue**
  - provide the container without the lid

- **Inadequate portions**
  - withhold some pieces of toys

- **Pausing within a routine**
  - put toys in box and pause

- **Assistance**
  - open/close container, put box on shelf, take box out of shelf

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**Environmental Arrangement (EA) Exercise**

- See Exercise C
- Strategies I can use in this routine

- Environmental Arrangement (EA)
- Responsive Interaction (RI)
- Prompting Techniques (PT)

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**Environmental Arrangement (EA) Exercise**

- See Exercise C

- Select the EA strategies that best fit the training routines.
  - How does the strategy look like in each routine?
  - Is there natural opportunities within each routine to embed the strategy?
  - Will it facilitate your child’s language goals?
  - Will it be feasible for you and your child?
  - What materials may be utilized?
  - What additional materials may be needed in order to implement the strategy?
**Role Play Time!!!**

**EVA: The 3 Components**
- Environmental Arrangement (EA)
  - Offering choice
  - Pausing within a routine
  - Waiting with cue
  - Inadequate portions
  - Assistance

- Responsive Interaction (RI)
  - Notice and respond
  - Take turns
  - Mirror and map
  - Expand

- Prompting Techniques (PT)
  - Time delay
  - Open-ended question
  - Model
  - Use of natural reinforcement and praise

**Responsive Interaction (RI)**
- **What?**
  - A conversation style of interaction
    - Be responsive to what your child is interested in
    - Model appropriate language
- **Don’t always give instructions only!!**

**RI strategies target what function of language?**
RI – 1. NOTICE AND RESPOND

- All children are communicating NOW!
- Language forms that they are using:

Prelinguistic Communication: Point, Show, Give, Vocalizations
Linguistic: Reach, Lits arms up, Shakes head, Signs, Pictures, Symbols, Words

RI – 1. NOTICE AND RESPOND
VIDEO EXAMPLE – IS THIS A GOOD EXAMPLE?

RI – 1. NOTICE AND RESPOND

- What do I say?
- Language is most meaningful when it’s related to what your child is doing OR in response to what your child is communicating.
RI - 1. NOTICE AND RESPOND

- For example:
  - Your child cannot build the marble work pieces together and give you the piece, you notice and respond,

- Your child is playing in the yard and pointing at an airplane that flies by, you notice and respond.

RI - 1. NOTICE AND RESPOND

- For example:
  - Your child is reaching for the bowl of cereal, you notice and respond.

RI - 1. NOTICE AND RESPOND

- For example:
  - Your child is at the door and lifts his/her arms up at you, you notice and respond.

- Your child picks up a piece of dust and gives it to you, you notice and respond.
RI – 1. NOTICE AND RESPOND
VIDEO EXAMPLE – IS THIS A GOOD EXAMPLE?

---

RI – 2. TAKE TURNS
- Teach your child how to have a conversation
  - Play a game of “communication catch”

  ![Diagram](Diagram)

  You respond (and WAIT)
  Your child communicates

- WAIT and EXPECT your child to communicate
  - Don’t keep talking!
  - Let your child know that language is for communicating with others, not “background sound”

RI – 2. TAKE TURNS
VIDEO EXAMPLE
RI - 2. TAKE TURNS

- For example:
  - Child: “ball” + (roll ball to parent)
  - Parent: “ball” + (receive ball from child) + WAIT
  - Child: “ball” + (receive ball from parent) + (roll ball to parent)
  - Parent: “ball” + (receive ball from child) + WAIT

RI - 2. TAKE TURNS

- For example:
  - Child: [put one stuff animal on the bed]
  - Parent: [put another stuff animal on the bed] + WAIT for child’s next initiation
  - Child: [put one stuff animal on the bed]
  - Parent: [put another stuff animal on the bed]

RI - 2. TAKE TURNS

- For example:
  - Child: [picks up toys on floor]
  - Parent: [picks up toys on floor] “Clean up.” + WAIT for child’s next initiation
  - Child: [picks up toys on floor]
  - Parent: [picks up toys on floor] “Clean up.” + WAIT for child’s next initiation
RI – 2. TAKE TURNS
VIDEO EXAMPLE – IS THIS A GOOD EXAMPLE?

RI – 3. MIRROR AND MAP
- Your child is more likely to orient toward/notice you since you are doing what is of interest to him/her

RI – 3. MIRROR AND MAP
- How to do it?
  1. Copy what your child is doing
  2. Label the actions with descriptive words that you want your child to use
- What you say is more meaningful to your child since you are both engaged in the same activity and language is “mapped” right on top of what your child is doing
RI – 3. MIRROR AND MAP
VIDEO EXAMPLE – IS THIS A GOOD EXAMPLE?

RI – 3. MIRROR AND MAP

- **DO's and DON'Ts**
  - Mirror your child's action close to the action to make language more salient.
  - Mapping is not telling your child what to do next!
  - Avoid mirroring behaviors that are unacceptable (e.g., throwing toys, hitting).
  - Balance mapping and playing (e.g., don't over map).

RI – 3. MIRROR AND MAP

- For example:
  - Child: (pick up a book)
    - Parent: (pick up another book) "I want to read this one. "Let's read this book."
  - Child: (throw the ball)
    - Parent: (throw the ball) "Here you go. "Catch this!"
  - Child: (put garbage in garbage can)
    - Parent: (put garbage in garbage can) "We throw away garbage. "Garbage goes into the garbage can."
RI - 4. EXPAND

- What?
  - COPY what your child said and then ADD more words

- Why?
  - Immediately connect your child's communication to new language
  - Allow your child to hear more about the interesting topic

- How?
  - 50% of what you say should be at your child's level and 50% should be slightly above (e.g., 1-2 words)

**VIDEO EXAMPLE - IS THIS A GOOD EXAMPLE?**

RI - 4. EXPAND

- For example:
  - Child: "Grape."
  - Parent: "__________"

  - Child: "Dry hands"
  - Parent: "__________"

  - Child: "Vacuum."
  - Parent: "__________"
**Responsive Interaction (RI)**

- Notice and respond
- Take turns
- Mirror and map
- Expand
- Meaningful conversation
  Opportunities for learning

**Illustration: Ryan’s Snack Time Routine**

- Notice and respond:
  - Ryan is reaching out at his hands to dad, dad labels “dirty hands.”
  - Ryan is giving the bowl to dad, dad labels “all done.”
- Take turns:
  - Ryan says, “yum” when he is eating cookie, dad responds, “yum.”
- Mirror and map:
  - Ryan is drinking juice, dad also drinks his juice and says, “We are drinking apple juice.”
- Expand:
  - Ryan drinks milk and says “milk”, dad expands “milk is cold.”

**Illustration: Ryan’s Reading Book Routine**

- Notice and respond:
  - Ryan is pointing at a page, dad labels objects on each page.
  - Ryan closes the book, dad labels “all done.”
- Take turns:
  - Ryan reads one line, then dad reads the next line.
- Mirror and map:
  - Ryan picks up a book, dad copies him and labels “Let’s read some books on the couch.”
- Expand:
  - Ryan labels “cow”, dad expands “Look, a cow!” “The cow is brown.” “Cow is an animal.” “Cow is eating.”
PT - 4. USE OF NATURAL R+/PRAISE

- What?
  - Provide natural reinforcement and social praise after your child uses language
  - E.g., access to preferred items/activities, receives praise and positive attention

**VIDEO EXAMPLE - HOW DID I PROMPT HIM TO SING?**

PT - 1. TIME DELAY

- Use an expectant look and wait for the child to use language

  - Combine with EA strategies
  - Offers the least language support
PT – 1. Time Delay

Great strategy for children who are verbally imitative and are not independently communicating.

PT – 1. Time Delay

Video example – Is this a good example?

PT – 2. Open-ended Question

Gives an open prompt (i.e., no single correct answer) to verbally cue the child to communicate.
PT – 2. Open-ended Question

Tell me what you want.

What do you want?

Fly PLEASE!

What is the strategy in here?

PT – 2. Open-ended Question

Video example – Is this a good example?

PT – 2. Open-ended Question - Exercise

- You and your child are playing with these animals...

- Your child tries to reach for the toys on the shelf...
PT VIDEO EXERCISE –
WHAT STRATEGY AM I USING?

PT – 3. MODEL

- Tell the child exactly what to say
  - E.g., “____” “Say ____”
- Offers the most adult support
  - Should be taken away as soon as possible so your child is not dependent on the verbal cue

PT – 3. MODEL

- Different from RI strategies, such as responding, mapping and expanding
  - This is a prompting strategy that helps the child to gain access to RI+;
  - Needs to fade out as your child becomes more independent in communicating
PT VIDEO EXAMPLE –
ALL PROMPTING STRATEGIES COMBINED...

PT – 3. MODEL
VIDEO EXAMPLE – IS THIS A GOOD EXAMPLE?

BUT HOW CAN I MAKE MY CHILD TO TALK?
• If my child is unwilling to talk or is too excited or upset to use words in the moment...
• Use PICTURE or simple HAND SIGNS as quick replacement for spoken words
EMT: PROMPTING TECHNIQUES (PT)

- Why?
  - Practice new language targets during a highly motivating context
  - Being reinforced for using words to communicate

- Dos and DON'Ts
  - Only used as one of the many tools of EMT
  - Should not be the focus of intervention
  - Limited use of prompts is important
  - To keep a natural and responsive parent-child interaction
  - Too many demands may cause your child to become frustrated

PROMPTING TECHNIQUES (PT) EXERCISE

- See Exercise C
- Strategies I can use in this routine

ROLE PLAY TIME!!!
EIT: Common Implementation Barriers

- Environmental Arrangement
  - Materials not available (e.g., containers)
  - Environment is overwhelmed by too many toys
  - Distracted (e.g., telephone ringing, sibling requesting attention and/or assistance)
- Contextual Fit
  - Strategies do not fit the routine
  - Difficulty creating many opportunities
  - Using strategies is disrupting the natural sequence and flow of the routine
  - Too busy
  - Routine did not occur
  - Not sure when to use which strategy

EIT: Common Implementation Barriers

- Technicality
  - Only using a limited number of strategies but keep forgetting to use other strategies
  - Forget how to correctly use the strategy
  - Cannot gain and maintain child’s attention
- Motivation
  - Problem behaviour occur
  - Child becomes frustrated
  - Child is losing interest
  - You are not motivated to use strategies

EIT: Common Implementation Barriers Exercise

- See Exercise D and C
- Fill out the checklist of common barriers to identify specific obstacles for your family
- Let’s brainstorm solutions to overcome these obstacles that are specific to your each of your 2 training routines
**EMT Start-Up Checklist**
- A checklist for initial start-up before you begin using EMT strategies at home.
- See Exercise E

**EMT Daily Set-Up Checklist**
- A checklist for daily setting up
- See Exercise F
- To be completed before you do the routine
  - Please write the strategies that you want to use today for each routine
  - Complete the set-up tasks

**EMT Daily Implementation Checklist**
- A checklist for self-monitoring of your use of the strategies
- See Exercise G
- To be completed after you did the routine
  - Highlight the EMT strategies that you have selected for each training routine
EMT IMPLEMENTATION CHECKLIST

- Rate on a scale of 1 to 5
  - 1 = strategy not in place
  - 5 = strategy fully in place
- At the end of the routines, estimate the number of language your child used within the 2 trained routines
- Rate the outcome of the language intervention

THANK YOU FOR YOUR PARTICIPATION!

- Please use these language teaching techniques in your daily family routines!

REFERENCE

**Workshop Exercise A**

Here is what my child can say now.

<table>
<thead>
<tr>
<th>Requesting for item/ action/ attention/ information</th>
</tr>
</thead>
<tbody>
<tr>
<td>What does my child say?</td>
</tr>
<tr>
<td>When &amp; Where do my child say this?</td>
</tr>
</tbody>
</table>
### Labelling/ naming objects, pictures, adjectives, location, sound, etc.

<table>
<thead>
<tr>
<th>What does my child say?</th>
<th>When &amp; Where do my child say this?</th>
</tr>
</thead>
</table>

### Answering questions

<table>
<thead>
<tr>
<th>What does my child say?</th>
<th>When &amp; Where do my child say this?</th>
</tr>
</thead>
</table>
Workshop Exercise B

What, when, and where do I want my child to speak more?

- Routine Class
- Materials involved
- Family routine
- Task being done?
- When?
- Who is involved

What exactly do I want my child to say?
Workshop Exercise C

What strategies will I use during the __________ routine?

Environmental Arrangement (EA)

Responsive Interaction (RI)

Prompting Techniques (PT)

Solutions to potential implementation barriers:
**Workshop Exercise D**

**Implementation Barriers:** Identify potential barriers when implementing EMT at your home.

<table>
<thead>
<tr>
<th>Common Barriers for Implementation</th>
<th>Your Barriers (✓)</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental Arrangement</td>
<td></td>
<td></td>
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<tr>
<td>- Materials not available (e.g., containers)</td>
<td></td>
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<tr>
<td>- Environment is overwhelmed by too many toys</td>
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<tr>
<td>- Distracted (e.g., telephone ringing, sibling requesting attention and/or assistance)</td>
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<tr>
<td>- Other:</td>
<td></td>
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<tr>
<td>Contextual Fit</td>
<td></td>
<td></td>
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<tr>
<td>- Strategies do not fit the routine</td>
<td></td>
<td></td>
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<tr>
<td>- Difficulty creating many opportunities</td>
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<tr>
<td>- Using strategies is disrupting the natural sequence and flow of the routine</td>
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<tr>
<td>- Too busy</td>
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<tr>
<td>- Routine did not occur</td>
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<tr>
<td>- Not sure when to use which strategy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Other:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Technicality</td>
<td></td>
<td></td>
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<tr>
<td>- Only using a limited number of strategies but keep forgetting to use other strategies</td>
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<tr>
<td>- Forget how to correctly use the strategy</td>
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<tr>
<td>- Cannot gain and maintain child’s attention</td>
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<tr>
<td>- Other:</td>
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<tr>
<td>Motivation</td>
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<tr>
<td>- Problem behavior occur</td>
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<tr>
<td>- Child becomes frustrated</td>
<td></td>
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<tr>
<td>- Child is losing interest</td>
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<tr>
<td>- You are not motivated to use strategies</td>
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</tbody>
</table>
Workshop Exercise E

Start-Up Checklist for

Start Date:

<table>
<thead>
<tr>
<th>Tasks to be completed before implementation</th>
<th>Required Materials</th>
<th>Date Completed</th>
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<tbody>
<tr>
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</table>

Additional Notes:
**Workshop Exercise F**

<table>
<thead>
<tr>
<th>Environmental Arrangement (EA)</th>
<th>Responsive Interaction (RI)</th>
<th>Prompting Techniques (PT)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>

I reviewed the language targets for this routine (i.e., requesting, commenting, answering questions).  
Yes  No

I rearranged the environment so I can implement the strategies.  
Yes  No

I have all the materials ready-to-go.  
Yes  No

---

<table>
<thead>
<tr>
<th>Environmental Arrangement (EA)</th>
<th>Responsive Interaction (RI)</th>
<th>Prompting Techniques (PT)</th>
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</thead>
<tbody>
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</tbody>
</table>

I reviewed the language targets for this routine (i.e., requesting, commenting, answering questions).  
Yes  No

I rearranged the environment so I can implement the strategies.  
Yes  No

I have all the materials ready-to-go.  
Yes  No
## Workshop Exercise G

### Parent Self-monitoring Implementation Checklist

Date: ___________________  Family: ___________________  Child: ___________________

Please evaluate your use of EMT strategies within each training routine.

<table>
<thead>
<tr>
<th>EMT strategies</th>
<th>Routine A:</th>
<th>Routine B:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental Arrangement</td>
<td>Not in place</td>
<td>Fully in place</td>
</tr>
<tr>
<td>Offering choice</td>
<td>1 2 3 4 5</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>Pausing within a routine</td>
<td>1 2 3 4 5</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>Waiting with cue</td>
<td>1 2 3 4 5</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>Inadequate portions</td>
<td>1 2 3 4 5</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>Assistance</td>
<td>1 2 3 4 5</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>Responsive Interaction</td>
<td>Not in place</td>
<td>Fully in place</td>
</tr>
<tr>
<td>Notice &amp; respond</td>
<td>1 2 3 4 5</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>Take turns</td>
<td>1 2 3 4 5</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>Mirror &amp; map</td>
<td>1 2 3 4 5</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>Expand</td>
<td>1 2 3 4 5</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>Prompting Techniques</td>
<td>Not in place</td>
<td>Fully in place</td>
</tr>
<tr>
<td>Time delay</td>
<td>1 2 3 4 5</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>Open-ended question</td>
<td>1 2 3 4 5</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>Model</td>
<td>1 2 3 4 5</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>Use of natural R+/Praise</td>
<td>1 2 3 4 5</td>
<td>1 2 3 4 5</td>
</tr>
</tbody>
</table>

Please circle the number of functions of language that your child is using within training routines in the home.

1. Requests: 0 1 2 3 4 5 6 7 8 9 10 +
2. Initiation: 0 1 2 3 4 5 6 7 8 9 10 +
3. Responding: 0 1 2 3 4 5 6 7 8 9 10 +

<table>
<thead>
<tr>
<th>Item</th>
<th>Disagree</th>
<th>Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The language goals we are working on in the routines are important.</td>
<td>1 2 3 4 5</td>
<td></td>
</tr>
<tr>
<td>2. I see improvement in my child’s prompted language.</td>
<td>1 2 3 4 5</td>
<td></td>
</tr>
<tr>
<td>3. I see improvement in my child’s independent language.</td>
<td>1 2 3 4 5</td>
<td></td>
</tr>
<tr>
<td>4. I feel comfortable using the EMT strategies in the home.</td>
<td>1 2 3 4 5</td>
<td></td>
</tr>
<tr>
<td>5. My child’s language improvement is due to my effort to use the strategies.</td>
<td>1 2 3 4 5</td>
<td></td>
</tr>
</tbody>
</table>
# Workshop Exercise H
## Definitions of EMT Strategies

Please review the definitions of each strategy regularly so you can implement them correctly.

<table>
<thead>
<tr>
<th>EMT Strategies</th>
<th>Definitions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Environmental Arrangement</strong></td>
<td></td>
</tr>
<tr>
<td>Offering choice</td>
<td>Parent provides two or more items from which the child may select. For example, the parent says, “Do you want blue cup or red cup?”</td>
</tr>
<tr>
<td>Pausing within a routine</td>
<td>Parent sets up a routine in which the child expects certain actions and then the parent waits before doing the expected action again. For example, the parent swings the child on a swing and pause for child to request for more.</td>
</tr>
<tr>
<td>Waiting with cue</td>
<td>Parent presents an item associated to the context and then waits before completing the expected action. For example, the parent presents an empty bowl and waits for the child to request for cereal.</td>
</tr>
<tr>
<td>Inadequate portions</td>
<td>Parent provides an inadequate portion of a preferred item. For example, the parent may present one piece of block instead of the whole bucket of blocks.</td>
</tr>
<tr>
<td>Assistance</td>
<td>Parent arranges situation or material so that the child needs adults’ assistance in order to get preferred item or object. For example, the parent may put train on a shelf where the child cannot reach.</td>
</tr>
<tr>
<td><strong>Responsive Interaction</strong></td>
<td></td>
</tr>
<tr>
<td>Notice &amp; respond</td>
<td>Parent notices the child’s communicative attempts and responds by labeling what the child is doing. For example, the child is playing in the yard and pointing at an airplane in the sky, the parent notices and responds, “Airplane flies in the sky.”</td>
</tr>
<tr>
<td>Take turns</td>
<td>Parent repeats the child’s vocalization exactly without clarification or evaluative remarks. For example, the child says, “Choo-choo train.” And the parent responds, “Choo-choo train!”</td>
</tr>
<tr>
<td>Mirror &amp; map</td>
<td>Parent copies what the child is doing and comments on the action, object or activity, or describes what is occurring in the environment. For example, when building block tower with the child, as the parent put a block on the tower, the parent may say, “Block on tower.”</td>
</tr>
<tr>
<td>Expand</td>
<td>Parent imitates the child’s utterance and then expands into a more complete form of utterance. For example, the child says, “dry hands.”</td>
</tr>
<tr>
<td>Milieu Teaching</td>
<td>And the parent expands the utterance, “Dry hands with towel.”</td>
</tr>
<tr>
<td>---------------------------</td>
<td>---------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Time delay</strong></td>
<td>Parent presents an object of interest to the child and waits briefly (3-5 seconds) before giving the child a verbal prompt to respond. If the child requests, provide positive feedback and the requested object. For example, the parent presents a pair of shoes to the child and waits 5 seconds for the child to communicate. If the child says “shoes”, the parent may say “You want shoes” and give the shoes to the child.</td>
</tr>
<tr>
<td><strong>Open-ended question</strong></td>
<td>Parent attends to the child’s focus of interest. Parent presents a verbal open-ended question. If the child responds correctly, the parent provides access to the child’s requested item. If the child does not respond or does not respond correctly, present another question or a model to the child. For example, the child reaches for the cookie jar and the parent says “Tell me what you want.” If the child says “I want cookie,” then the parent provides a cookie. If the child does not respond or answers “Ah”, provide another question or a model.</td>
</tr>
<tr>
<td><strong>Model</strong></td>
<td>Parent attends to the child’s focus of interest. Parent models or demonstrates a required verbal behavior. If the child does not respond or does not repeat the model exactly, the parent gives another model. If the child responds correctly, the parent acknowledges and provides access to the child’s requested item. For example, the child reaches for the cookie jar and the parent models “I want cookie.” If the child does not respond or does not repeat the model correctly, then the parent repeats the model, “I want cookie.” If the child says “I want cookie” then the parent provides a cookie.</td>
</tr>
<tr>
<td><strong>Use of natural R+/ Praise</strong></td>
<td>Parent verbally acknowledges a child’s communication attempts and provides access to objects or events in response to child’s requests. For example, the child says “I want swing.” Then the parent swings the child and praises the child for using verbal communication.</td>
</tr>
</tbody>
</table>


Appendix B

Letter of Initial Contact

Dear Parent/Guardian,

The purpose of this letter is to inform you of an opportunity to participate in a research study whose purpose is to help parents to promote language use of children with autism. The study is entitled, “Teaching Parents to Promote Language Use of Children with Autism Spectrum Disorders within Family Routines using Enhanced Milieu Teaching.” This study will be conducted at the University of British Columbia (UBC) and in natural family routines in the homes of family participants. The study will be conducted by Joseph M. Lucysyn, Associate Professor in the Faculty of Education, who will serve as Principal Investigator; and by Vivian Huen, Graduate Student in Special Education at UBC, who will serve as Graduate Student Researcher. This research is for the fulfillment of degree requirements for a Masters degree.

The purpose of the study is to evaluate the effectiveness of a language intervention model designed to empower parents to use and generalize the use of EMT in family routines with young children with autism. The language intervention model is based on best practices in enhanced milieu teaching (EMT). The design of the intervention model emphasizes an efficient workshop-based language intervention that teaches parents to promote generalized and durable use of language in young children with ASD within natural family routines. The study will evaluate the extent to which workshop-based language promotion intervention:

- improves parents’ knowledge of language promoting strategies in the home;
- improves parents’ use of language promoting strategies in the home; and
- helps parents successfully support the child’s use of language in the home.

Participation in the project will involve parents and other family members collaborating with members of the research team in five family support activities and three research activities. The steps of the family support process are:

1) Two-day parent training workshop (3 hours per day, for a total of 6 hours);
2) Collaborative development of a customized language promotion intervention;
3) Implementation of language intervention in the home;
4) In-home coaching sessions on an as needed basis (up to five sessions); and
5) Follow-up support.

Research activities include:

1) Preliminary assessments to confirm child language use in the home;
2) Videotaped observations in target family routines; and
3) Assessment of the acceptability and importance of the language intervention to family members.

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Families who choose to participate may experience three benefits. First, the child’s communication skills may improve in the home. Second, the quality of parent-child interaction may improve and parent’s knowledge and skills in promoting the child’s language use in the home may be enhanced. A potential third benefit is that through your participation, other families who have children with disabilities and language deficits may also benefit. This will occur by describing the study’s results in journals and at conferences.

If you are interested in participating in the study, or learning more about the study, please contact Vivian Huen at (xxx) xxx-xxxx. You may also contact Joe Lucyshyn at (604) 822-1904. Alternatively, you also may contact the agency representative who gave or sent to you this introductory letter. At that time, if you give the agency representative permission to release your name and phone number, Vivian Huen will contact you by telephone to answer any questions that you may have. In any event, thank you for your time and consideration.

Sincerely,

Joseph M. Lucyshyn, Ph.D  
Associate Professor  
Faculty of Education  
University of British Columbia  
joe.lucyshyn@ubc.ca

Vivian Huen, B.A.  
Graduate Student Researcher  
Faculty of Education  
University of British Columbia  
huenvivian@hotmail.com
Appendix C

Telephone Interview Questions

Teaching Parents to Promote Language Use of Children with Autism Spectrum Disorders within Family Routines using Enhanced Milieu Teaching Telephone Screening

Parent’s Name: ______________________ Phone #: ( ) __________________

Date contacted: ______________________

This is a three month research project designed to investigate the effectiveness of a language intervention model, Enhanced Milieu Teaching (EMT), designed to empower parents to teach their child with autism to use language in natural family routines in the home.

The study is recruiting families that meet the following criteria:

- Have a child with a formal diagnosis of autism;
- Focus child is between three and seven years old;
- Focus child has delays in communication developments;
- Focus child uses at least 10 words with parents in family routine;
- Focus child does not engage in serious problem behaviors in daily family routine;
- Parents/guardians agree to have an observer videotape parent-child interactions during a minimum of four family routines;
- Parents/guardians can read and speak English;
- Parents/guardians have no previous training in any naturalistic language teaching approaches (e.g., incidental teaching, naturalistic language paradigm, and enhanced milieu language teaching);
- Parents/guardians are willing to commit to be the primary language teachers for the child;
- Parents/guardians have at least a post-secondary educational background;
- Parents/guardians have no other physical or mental illnesses that would prevent them from participating in the study at any point;
- Family is willing to participate in the study for at least three months; and
- Family lives in the Lower Mainland of BC and is planning to stay in the same local over the next three months.

Do you have questions about these criteria? Does your child and family meet the criteria I’ve described?

I’d like to ask some questions about your child, your family and your reasons for wanting to participate in this study.

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<table>
<thead>
<tr>
<th>Question</th>
</tr>
</thead>
<tbody>
<tr>
<td>Please describe your child: age, disability, school program or other services</td>
</tr>
<tr>
<td>Please describe your family: members, occupations, ability to participate in a study</td>
</tr>
<tr>
<td>Briefly describe how your child would behave when he/she wants something but can’t get it (e.g., a food item up on a shelf).</td>
</tr>
<tr>
<td>Does your child label things in the environment (e.g., see an airplane fly in the sky and say “airplane”)? If so, what would be a few examples in your experience?</td>
</tr>
<tr>
<td>Does your child answer you when you ask a question? (e.g., what’s this?) If so, what would be a few examples in your experience?</td>
</tr>
<tr>
<td>Does your child copy what you say? If so, what would be a few examples in your experience?</td>
</tr>
<tr>
<td>Are you fluent in reading and speaking English?</td>
</tr>
<tr>
<td>Do you have previous training in incidental teaching, natural environmental teaching techniques, or milieu teaching procedures?</td>
</tr>
<tr>
<td>What is your educational background?</td>
</tr>
<tr>
<td>Is your family intending to relocate within the next three months?</td>
</tr>
<tr>
<td>Briefly describe your reasons for wanting to participate in this study</td>
</tr>
<tr>
<td>Tell us about any questions or concerns you have about participating in a study</td>
</tr>
</tbody>
</table>

The next step would be a formal screening interview. Formal screening will involve a researcher making an appointment to visit your home, and obtaining your consent to conduct interviews and observations that will help us confirm that your child and family are eligible candidates for participation in the study.

Following screening, two families will be selected to participate in the study. The research activities will consist of the following:

- A language assessment of the focus child’s language ability will be conducted.
- The parents will be asked to participate in a two-session parent-training workshop designed to promote language use in the home.
- The researchers will videotape four selected family routines before and after the parent training workshop and will collect other data about how the language intervention is working. Only the researchers will view the videotapes and they will be stored in a secure location at UBC. No confidential information will be shared with anyone outside the research team.
- A benefit of participation in this study is that families will receive up to 3 months of behavioural consultation and support in language promotion in the home.

Do you have any questions? Are you interested in participating in the screening process?

Thank you for participating in this pre-screening interview. A researcher will contact you within the next 7 – 10 days.
Appendix D

Screening Informed Consent Form

CONSENT FORM FOR PARTICIPATION IN SCREENING PROCESS
Teaching Parents to Promote Language Use of Children with Autism Spectrum Disorders within Family Routines using Enhanced Milieu Teaching

Principal Investigator: Joseph M. Lucyshyn, Ph.D.
Faculty of Education
University of British Columbia
2125 Main Mall
Vancouver, B.C. V6T 1Z4

Graduate Student Researcher: Vivian Huen, B.A.,
Faculty of Education
University of British Columbia
2125 Main Mall
Vancouver, B.C. V6T 1Z4

Dear Parent/Guardian,

The purpose of this form is to request consent for your, for your child with a diagnosis of Autism, and for other family members* (focus child’s brother or sister) participation in a screening process for a research study. This study will be conducted in the Faculty of Education at the University of British Columbia. The principal investigator of the study is Dr. Joseph Lucyshyn, Associate Professor in the Faculty of Education. The graduate student researcher and co-investigator of the study is Vivian Huen. This research is for the fulfillment of degree requirements for a Master of Arts degree. I am inviting your family to participate in the screening process because a representative of a local social service agency has recommended your child and family’s participation. After reading the consent form, if you have any questions, I will be happy to answer them to ensure that the screening procedures are fully understood.

PURPOSE OF THIS STUDY

The purpose of the study is to evaluate the effectiveness of a language intervention model designed to empower parents to teach language skills to young children with autism in natural family routines in the home. The language intervention model is called Enhanced Milieu Teaching (EMT). The language intervention model is based on best practices in EMT. The intervention will involve a 2-day workshop-based language intervention that teaches parents to promote generalized and durable use of language in young children with ASD within natural family routines. The study will evaluate the extent to which workshop-based language promotion intervention:

Version 05/06/12
a) improves child communication skills in the home;
b) improves parents use of language promoting strategies in the home; and
c) helps parents successfully support the child’s use of language in the home.

SUMMARY OF FAMILY SUPPORT AND RESEARCH ACTIVITIES

Participation in the project will involve parents and other family members collaborating with members of the research team in five family support activities and three research activities. The steps of the family support process are:

1) Two-day parent training workshop;
2) Collaborative development of a customized language promotion intervention
3) Implementation of language intervention in the home;
4) In-home coaching sessions on an as needed basis (up to five sessions); and
5) Follow-up support.

Research activities include:

1) Preliminary assessments to confirm child language use in the home;
2) Videotaped observations in target family routines; and
3) Assessment of the acceptability and importance of the language intervention to family members

Research and family support activities will occur for up to 3 months. During the first 1 to 2 months, your child and family will be involved in support and research activities for approximately 1 to 2 hours per week. This will vary based on family available time and need. Your time commitment during the first 2 months will be approximately 12 hours. You will attend a two-day parent training workshop for approximately three hours per day, for a total of 6 hours. During the final month of the study, you and your child’s participation will decrease to approximately 1 to 2 hours per month. Overall, the total time commitment for your family to participate in the research and family support activities is approximately 20 hours.

CRITERIA FOR PARTICIPATION IN STUDY

Before families can participate in the study, we first need to confirm that the child and family meet the criteria for participation. A total of two (2) families will participate in the project. The families will meet the following criteria:

- Have a child with a formal diagnosis of autism;
- Focus child is between three and seven years old;
- Focus child has delays in communication developments;
- Focus child uses at least 10 words with parents in family routines
- Focus child does not engage in serious problem behaviors in daily family routines;
- Parents/guardians agree to have an observer videotape parent-child interactions during a minimum of four family routines;
- Parents/guardians can read and speak English;
- Parents/guardians have no previous training in any naturalistic language teaching approaches (e.g., incidental teaching, naturalistic language paradigm, and enhanced milieu language teaching);
- Parents/guardians are willing to commit to be the primary language teachers for the child;
- Parents/guardians have at least a post-secondary educational background;
- Parents/guardians have no other physical or mental illnesses that would prevent them from participating in the study at any point;
- Family is willing to participate in the study for at least three months; and
- Family lives in the Lower Mainland of BC and is planning to stay in the same local over the next three months.

SCREENING PROCESS

We have developed a screening process to find out if your child and family are eligible to participate in the study. We will first contact you by telephone, review the criteria for participation, and answer any questions you may have. We will then decide together whether to proceed with the formal screening process. The specific steps in the formal process are described below.

1. **Preliminary interview and language assessment.** We will meet with you in your home to conduct a preliminary interview and a language assessment with your child. The interview is focused on understanding your child’s language use in the home. The preliminary interview will take approximately an hour.

2. **Informed consent for study participation.** If the preliminary interview and language assessment confirm your eligibility to participate, then we will invite you to participate in the study. At that time, we will ask you to read and sign an informed consent letter for participation.

POTENTIAL RISKS AND SAFEGUARDS

If you agree to participate and permit your child and family to participate in the screening process, you will need to consider three potential risks: (1) physical; (2) psychological; and (3) loss of confidentiality.

1. **Physical Risk.** There is a potential for physical harm to the child or another family member if the child engages in problem behaviour during the screening process. This risk will be prevented or minimized in the following ways:
   a) Because the criteria for participation include the absence of serious problem behaviour, it is less likely that your child will engage in such behaviour during target routine.
   b) The intervention involves teaching your child language skills that replace problem behaviour as a means to achieve his or her wants and needs.
   c) Members of the project team have extensive experience effectively and safely supporting children who engage in problem behaviour in home settings.
d) Observations will be terminated immediately if the child engages in medium to high intensity problem behaviour.

2. **Psychological Risk.** Because your family will be observed during home routines, you, your child, or other family members may experience psychological risk. That is, you, your child, or other family members may feel some discomfort or stress during observations. To guard against this risk, the following precautions will be taken:
   a) during observations, the observer will maintain a low profile and not call attention to him or herself.
   b) you and other family members can terminate an observation at any time.
   c) all interviews and meetings will be conducted at a time and place that is convenient for you and your family.
   d) If a parent or child indicates or is observed to be in distress during an observation or a training session, then the session will be stopped. The parent will be asked if they wish to take a break from the study. If the parent or child displays distress across a series of sessions, they will be reminded of their right to withdraw from the study without loss of benefit. If they indicate that they wish to withdraw from the study, the study will be terminated and a list of support services will be provided.

3. **Loss of Confidentiality.** This is a risk that you, your child, or another family member may experience a loss of confidentiality. To guard against this risk we will:
   a) use only initials (first and last) for the names of all persons, places, and programs described on assessment forms;
   b) allow access to information only to members of the research team;
   c) keep all data, notes, and videotapes in a locked file in a secure office or on a password protected computer; and
   d) destroy all data collected 5 years after the study is completed.

**POTENTIAL BENEFITS**

By participating in the screening process, you and your child will experience one of two potential benefits. These are listed below.

1. **Participation in language promotion research study.** If the screening process indicates that your child and family is a good fit for language intervention study, you will be invited to participate in the study. There are three potential benefits to participation in the study:
   a) your child’s communication skills may improve in the home.
   b) the quality of parent-child interaction may improve and your knowledge and skills in promoting your child’s language use in the home may be enhanced.
   c) through your participation, other families who have children with disabilities and language deficits may also benefit. This will occur by describing the study’s results in journals and at conferences.
However, because improvements in your use of EMT strategies and in your child’s language abilities cannot be assured, it is possible that you and your family may not experience the benefits listed above.

2. **Language assessment report.** If the screening process does not indicate that your child is a good fit for the study, then we will provide you with the following:
   a) summary of the preliminary interview and/or language assessment report;
   b) recommendations for language intervention that are based on the interview and/or language assessment; and
   c) referral to appropriate, alternative sources for language intervention in your community.

**ALTERNATIVES**

If during the screening process, you choose not to participate in the study, we will refer you to appropriate, alternative sources for language intervention in your community.

**RIGHTS AS A RESEARCH PARTICIPANT**

Your participation and that of your child and other family members is voluntary. Your decision whether or not to participate and to allow your child and other family members to participate will not have any effect on your child’s education, the provision of support from a community agency, or future opportunities for behavior consultation and support. If you agree to participate and allow your child and other family members to participate, you are free, at any time, to withdraw consent and refuse to continue your participation and that of your child and family. You may do so at any time without penalty or loss of benefits to which you, your child, or other family members are otherwise entitled. Terminating participation in the study will have no negative impact on the graduate student’s thesis research whatsoever. If you withdraw early in the research, the graduate student will recruit another family for the study. If you withdraw later, the graduate student will complete her thesis, with your permission, using the data gathered up to the point of study termination. By signing the consent form, you do not waive any of your legal rights. If you have any questions, please contact Dr. Joseph Lucyshyn at (604) 822-1904 or Vivian Huen at (xxx) xxx-xxxx. If you have any concerns about your rights or treatment as a research participant, you may contact the Research Subject Information Line in the UBC Office of Research Services at (604) 822-8598. Your signature below indicates that you have received a copy of this consent form for your records. Your signature indicates that you consent to your, your child with a disability, and other family members’ (i.e., siblings) participation in the screening process.

Sincerely,

Joseph M. Lucyshyn, Ph.D  
Associate Professor  
Faculty of Education  
University of British Columbia  

Vivian Huen, B.A.  
Graduate Student Researcher  
Faculty of Education  
University of British Columbia
CONSENT FORM: PARTICIPATION IN SCREENING PROCESS

Study Title: Teaching Parents to Promote Language Use of Children with Autism Spectrum Disorders within Family Routines using Enhanced Milieu Teaching

Principal Investigator: Joseph M. Lucyshyn, Ph.D. Faculty of Education, UBC
Graduate Student Researcher: Vivian Huen, B.A. Faculty of Education, UBC

I have read and received a copy of this consent form and have had an opportunity to ask questions about the research project and the screening process. I have received an adequate description of the purpose, goals, and procedures of the screening process, and I consent to participate in the screening process. I understand that all information will be kept confidential and that my participation and that of my child and other family members (i.e., focus child’s brother and/or sister) is entirely voluntary and that I, my child, or other family members may withdraw consent and discontinue participation at any time without any penalty or loss of benefits to which my family is otherwise entitled, and that I am not waiving any legal claims, rights, or remedies. By signing below, I agree to participate in the screening process of the research study on teaching parents to promote language use of children with autism spectrum disorders under the terms described above.

______ YES  
I consent to participate in the screening process, and give permission for my child with a disability and other family members (i.e., focus child’s brother and/or sister) to participate in the screening process.

______ NO  
I do not consent to participate in the screening process, and do not give permission for my child with a disability and other family members to participate in the screening process.

Focus Child’s Name: ________________________________

Sibling’s Name: ________________________________

Parent’s Name (Mother): ________________ (Father): ________________

Parent/Guardian’s Signature: ____________________ Date: ________________

Parent/Guardian’s Signature: ____________________ Date: ________________

Witness: ____________________ Date: ________________

PLEASE RETURN THIS PAGE TO:
Joseph M. Lucyshyn, Ph.D.
Faculty of Education
University of British Columbia
2125 Main Mall
Vancouver, B.C. V6T 1Z4

Version 05/06/12
CONSENT FORM: PARTICIPATION IN SCREENING PROCESS

**Study Title:** Teaching Parents to Promote Language Use of Children with Autism Spectrum Disorders within Family Routines using Enhanced Milieu Teaching

**Principal Investigator:** Joseph M. Lucyshyn, Ph.D. Faculty of Education, UBC  
**Graduate Student Researcher:** Vivian Hsu, B.A. Faculty of Education, UBC

I have read and received a copy of this consent form and have had an opportunity to ask questions about the research project and the screening process. I have received an adequate description of the purpose, goals, and procedures of the screening process, and I consent to participate in the screening process. I understand that all information will be kept confidential and that my participation and that of my child and other family members (i.e., focus child’s brother and/or sister) is entirely voluntary and that I, my child, or other family members may withdraw consent and discontinue participation at any time without any penalty or loss of benefits to which my family is otherwise entitled, and that I am not waiving any legal claims, rights, or remedies. By signing below, I agree to participate in the screening process of the research study on teaching parents to promote language use of children with autism spectrum disorders under the terms described above.

____ YES  
I consent to participate in the screening process, and give permission for my child with a disability and other family members (i.e., focus child’s brother and/or sister) to participate in the screening process.

____ NO  
I do not consent to participate in the screening process, and do not give permission for my child with a disability and other family members to participate in the screening process.

Focus Child’s Name:________________________________________

Sibling’s Name:________________________________________

Parent’s Name (Mother):__________________________  (Father):__________________________

Parent/Guardian’s Signature:__________________________  Date:__________________________

Parent/Guardian’s Signature:__________________________  Date:__________________________

Witness:__________________________________________  Date:__________________________

PLEASE RETURN THIS PAGE TO:  
Joseph M. Lucyshyn, Ph.D.  
Faculty of Education  
University of British Columbia  
2125 Main Mall  
Vancouver, B.C. V6T 1Z4

Version 05/06/12
Appendix E

Research Participation Informed Consent Form

CONSENT FORM FOR PARTICIPATION IN RESEARCH STUDY
Teaching Parents to Promote Language Use of Children with Autism Spectrum Disorders within Family Routines using Enhanced Milieu Teaching

Principal Investigator: Joseph M. Lucyshyn, Ph.D.
Faculty of Education
University of British Columbia
2125 Main Mall
Vancouver, B.C. V6T 1Z4

Graduate Student Researcher: Vivian Huen, B.A.,
Faculty of Education
University of British Columbia
2125 Main Mall
Vancouver, B.C. V6T 1Z4

Dear Parent/Guardian,

The purpose of this form is to request consent for your, for your child with a diagnosis of Autism, and for other family members’ (focus child’s brother or sister) participation in a research study. The study is entitled, “Teaching Parents to Promote Language Use of Children with Autism Spectrum Disorders within Family Routines using Enhanced Milieu Teaching.” This study will be conducted in the Faculty of Education at the University of British Columbia. The principal investigator of the study is Dr. Joseph Lucyshyn, Associate Professor in the Faculty of Education. The graduate student researcher and co-investigator of the study is Vivian Huen. This research is for the fulfillment of degree requirements for a Master of Arts degree. I am inviting your family to participate in the screening process because a representative of a local social service agency has recommended your child and family’s participation. After reading the consent form, if you have any questions, I will be happy to answer them to ensure that the research study procedures are fully understood.

PURPOSE OF THIS STUDY

The purpose of the study is to evaluate the effectiveness of a language intervention model designed to empower parents to teach language skills to young children with autism in natural family routines in the home. The language intervention model is called Enhanced Milieu Teaching (EMT). The language intervention model is based on best practices in EMT. The intervention will involve a 2-day workshop-based language intervention that teaches parents to promote generalized and durable use of language in young children with ASD within natural
family routines. The study will evaluate the extent to which workshop-based language promotion intervention:

a) improves child communication skills in the home;
b) improves parents use of language promoting strategies in the home; and
c) helps parents successfully support the child’s use of language in the home.

SUMMARY OF FAMILY SUPPORT AND RESEARCH ACTIVITIES

Participation in the project will involve parents and other family members collaborating with the graduate researcher in five family support activities and three research activities. The entire research study will require approximately 3 months to complete. During the first 1 to 2 months, your child and family will be involved in support and research activities for approximately 1 to 2 hours per week. This will vary based on family available time and need. Your time commitment during the first 2 months will be approximately 12 hours. You will attend a two-day parent training workshop for approximately three hours per day, for a total of 6 hours. During the final month of the study, you and your child’s participation will decrease to approximately 1 to 2 hours per month. Overall, the total time commitment for your family to participate in the research and family support activities is approximately 20 hours. The five family support activities are described below.

1) Two-session Parent training workshop. During the study, you will be asked to participate in a two-session parent training workshop with the graduate student researcher, for approximately three hours per session, for two days. The workshop will consist of seven topics: (a) an overview of the model of parent-implemented language intervention, (b) the laws of behaviour as they relate to child language development, (c) typical and atypical language development, (d) verbal behavior and augmentative alternative communication, (e) activity setting as a unit of analysis and intervention, (f) EMT procedures, and (g) common implementation barriers and solutions. The workshop will include powerpoint presentations, video examples, role-play activities, and exercises in which you will, step-by-step, generate an individualized language intervention plan for their child and family.

2) Collaborative development of a customized language promotion intervention. During the workshop, you will, step-by-step, generate a customized language promotion intervention plan. The plan will include the target routines, the language goals and expectations that will be promoted across the target routines, and the specific language promotion strategies that will be implemented in each target routine.

3) Implementation of language intervention in the home. Following the workshop, you will be asked to implement the language intervention within the selected home-based routines (e.g., snack time, hand washing routine, play time, and clean up routine). The graduate student researcher will go into the home to observe the selected home-based routines twice per week for approximately two months.
4) **In-home coaching sessions on an as needed basis (up to five sessions).** If an in-home coaching session is needed, the parent(s) will meet up to five times with the graduate student researcher, for approximately one to two hours. The in-home training sessions will consist of reviewing the EMT strategies, coaching parents within the training routines, giving feedback, and discussing implementation obstacles with the parents and how to overcome them.

5) **Follow-up support.** After you have succeeded in improving child use of language in four family routines, we will transition to a phase of research called follow-up support. The graduate student researcher will meet with your family at 1-month and 2-months post-intervention (i.e., after the intervention phase had ended) to conduct follow-up observations and to provide retraining and support as may be needed or requested.

The three research activities are described below.

1) **Preliminary assessments.** Preliminary assessment activities will involve an interview and language assessment with you, your child, and other family members at a time of your convenience. The interview will last approximately 60 minutes. The purpose of the interview is to identify four family routines in the home in which you would like your child to use more language and to assess your child’s language ability in the home.

2) **Videotaped observations.** Videotaped observations in four family routines will occur during the experimental phases of the study. These phases are baseline, intervention (i.e., initial training and support, maintenance support), and follow-up. During an observation session, an observer will videotape your child and family’s participation in the target home routines. Each observation session will last up to 45 minutes. During baseline, observations will occur approximately 1 to 2 times per week over a period of 3 to 5 weeks. Approximately 5 observations will be completed. During intervention, observation sessions will occur approximately 1 to 2 times per week over a period of approximately 8 weeks. Approximately 10 observations will be completed. During follow-up, observation sessions will occur at 1- and 2-months post-intervention.

3) **Assessment of the acceptability and importance of the language intervention to family members.** Another research activity that will take place is an assessment of the language intervention. You will be asked to fill out one questionnaire about your experience at the workshop at the end of the workshop. The second questionnaire is about your language implementation experience. You will be asked to fill out the questionnaire twice during the study and once at the end of the study. Completing each questionnaire will take approximately 15 minutes.

**POTENTIAL RISKS AND SAFEGUARDS**
If you agree to participate and permit your child and family to participate in the research study, you will need to consider three potential risks: (1) physical; (2) psychological; and (3) loss of confidentiality.

1. **Physical Risk.** There is a potential for physical harm to the child or another family member if the child engages in problem behaviour during the screening process. This risk will be prevented or minimized in the following ways:
   a) Because the criteria for participation include the absence of serious problem behaviour, it is less likely that your child will engage in such behaviour during target routine.
   b) The intervention involves teaching your child language skills that replace problem behaviour as a means to achieve his or her wants and needs.
   c) Members of the project team have extensive experience effectively and safely supporting children who engage in problem behaviour in home settings.
   d) Observations will be terminated immediately if the child engages in medium to high intensity problem behaviour.

2. **Psychological Risk.** Because your family will be observed during home routines, you, your child, or other family members may experience psychological risk. That is, you, your child, or other family members may feel some discomfort or stress during observations. To guard against this risk, the following precautions will be taken:
   a) During observations, the observer will maintain a low profile and not call attention to him or herself.
   b) You and other family members can terminate an observation at any time.
   c) All interviews and meetings will be conducted at a time and place that is convenient for you and your family.
   d) If a parent or child indicates or is observed to be in distress during an observation or a training session, then the session will be stopped. The parent will be asked if they wish to take a break from the study. If the parent or child displays distress across a series of sessions, they will be reminded of their right to withdraw from the study without loss of benefit. If they indicate that they wish to withdraw from the study, the study will be terminated and a list of support services will be provided.

3. **Loss of Confidentiality.** This is a risk that you, your child, or another family member may experience a loss of confidentiality. To guard against this risk we will:
   a) Use only initials (first and last) for the names of all persons, places, and programs described on assessment forms;
   b) Allow access to information only to members of the research team;
   c) Keep all data, notes, and videotapes in a locked file in a secure office or on a password protected computer; and
   d) Destroy all data collected 5 years after the study is completed.

**POTENTIAL BENEFITS**

By participating in the research study, you and your child will experience three potential benefits. These are listed below.
1. Your child's communication skills may improve in the home.
2. The quality of parent-child interaction may improve and your knowledge and skills in promoting your child's language use in the home may be enhanced.
3. Through your participation, other families who have children with disabilities and language deficits may also benefit. This will occur by describing the study's results in journals and at conferences.

However, because improvements in your use of EMT strategies and in your child's language abilities cannot be assured, it is possible that you and your family may not experience the benefits listed above.

ALTERNATIVES

If during the study, you choose not to participate in the study, we will refer you to appropriate, alternative sources for language intervention in your community.

RIGHTS AS A RESEARCH PARTICIPANT

Your participation and that of your child and other family members is voluntary. Your decision whether or not to participate and to allow your child and other family members to participate will not have any effect on your child's education, the provision of support from a community agency, or future opportunities for behavior consultation and support. If you agree to participate and allow your child and other family members to participate, you are free to withdraw consent and refuse to continue your participation and that of your child and family. You may do so at any time without penalty or loss of benefits to which you, your child, or other family members are otherwise entitled. Terminating participation in the study will have no negative impact on the graduate student's thesis research whatsoever. If you withdraw early in the research, the graduate student will recruit another family for the study. If you withdraw later, the graduate student will complete her thesis, with your permission, using the data gathered up to the point of study termination. By signing the consent form, you do not waive any of your legal rights. If you have any questions, please contact Dr. Joseph Lucyshyn at (604) 822-1904 or Vivian Huen at (xxx) xxx-xxxx. If you have any concerns about your rights or treatment as a research participant, you may contact the Research Subject Information Line in the UBC Office of Research Services at (604) 822-8598. Your signature below indicates that you have received a copy of this consent form for your records. Your signature indicates that you consent to your, your child with a disability, and other family members' (i.e., siblings) participation in the study.

Sincerely,

Joseph M. Lucyshyn, Ph.D
Associate Professor
Faculty of Education
University of British Columbia

Vivian Huen, B.A.
Graduate Student Researcher
Faculty of Education
University of British Columbia

Version 03/06/12
CONSENT FORM: PARTICIPATION IN RESEARCH STUDY

Teaching Parents to Promote Language Use of Children with Autism Spectrum Disorders within Family Routines using Enhanced Milieu Teaching

I have read and understood the attached letter of request to participate in the study entitled, “Teaching Parents to Promote Language Use of Children with Autism Spectrum Disorders within Family Routines using Enhanced Milieu Teaching.” I also consent to and authorize the release of information from biographical records to document birth date, most recent IQ score and test, diagnostic information, and medical records. I understand that all information will be kept confidential and that my participation and that of my child and other family members (i.e., focus child’s brother and/or sister) is entirely voluntary and that I, my child, or other family members may withdraw consent and refuse to participate at any time without any penalty or loss of benefits to which my family is otherwise entitled, and that I am not waiving any legal claims, rights, or remedies. I also understand that I will receive a copy of this letter of request for consent for my own records. My decision regarding my participation, that of my child with a disability, and that of other family members is indicated below.

_____ YES  
I consent to participate in the research study and give permission for my child with a disability and other family members (i.e., focus child’s brother and/or sister) to participate in the research study.

_____ NO  
I do not consent to participate in the research study, and my child with a disability, and other family members do not have my permission to participate in the research study.

Focus Child’s Name: ________________________________

Sibling’s Name: ________________________________

Parent’s Name: ________________________________

Parent/Guardian’s Signature: ___________________________ Date: ______________

Parent/Guardian’s Signature: ___________________________ Date: ______________

Witness: ________________________________ Date: ______________

PLEASE RETURN THIS PAGE TO:

Joseph M. Lucyshyn, Ph.D.
Faculty of Education
University of British Columbia
2125 Main Mall
Vancouver, B.C. V6T 1Z4

Version 03/06/12
Appendix F

Videotaping Informed Consent Form

VIDEOTAPING CONSENT FORM
Teaching Parents to Promote Language Use of Children with Autism Spectrum Disorders within Family Routines using Enhanced Milieu Teaching

Consent: I understand that my participation in this study will involve videotaping of me, my child with a disability, and other family members in our home. I also understand that I may request that the researchers stop the videotaping at any time if I, or a member of my family, does not want to be videotaped. I also understand that all videotaped materials will be kept in a secure and locked location, and that only the researchers will have access to this material, unless I give my specific permission for it to be viewed by any other person.

My consent regarding the videotaping of my child's participation and that of my family in this study is indicated below. I understand that I will receive a copy of this consent form for my personal records.

_____ YES I consent to the videotaping of my child and family.

_____ NO I do not consent to the videotaping of my child and family.

Focus Child's Name: ____________________________

Sibling’s Name: ______________________________

Parent’s Name: ________________________________

Parent/Guardian’s Signature: _____________________ Date: ________________

Parent/Guardian’s Signature: _____________________ Date: ________________

Witness: ______________________________________ Date: ________________

If I have questions or concerns about videotaping of my child or family, I may contact:

Joseph M. Lucyshyn, Ph.D
Faculty of Education
University of British Columbia
2125 Main Mall
Vancouver, B.C. V6T 1Z4

OR

Vivian Huen, B.A.
Faculty of Education
University of British Columbia
2125 Main Mall
Vancouver, B.C. V6T 1Z4

Version 05/06/12

Page 1 of 1
## Appendix G

### Social Validity Questionnaire for Workshop

Date: ___________________________  Relationship to the child: ______________________

<table>
<thead>
<tr>
<th></th>
<th>Disagree</th>
<th>Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The goal of the workshop was clear and relevant to the needs of my child.</td>
<td>1 2 3 4 5</td>
<td></td>
</tr>
<tr>
<td>Comments:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. The workshop powerpoint presentation was clear, well-organized and helpful.</td>
<td>1 2 3 4 5</td>
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</tr>
<tr>
<td>Comments:</td>
<td></td>
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<tr>
<td>3. The presenter communicated effectively and demonstrated a comprehensive knowledge about the language-promotion intervention.</td>
<td>1 2 3 4 5</td>
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</tr>
<tr>
<td>Comments:</td>
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<tr>
<td>4. The length of workshop was too long.</td>
<td>1 2 3 4 5</td>
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<tr>
<td>Comments:</td>
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<tr>
<td>5. I believe that it is important to embed language promotion strategies within my family routines.</td>
<td>1 2 3 4 5</td>
<td></td>
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<tr>
<td>Comments:</td>
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<tr>
<td>6. The EMT strategies are difficult to understand and use.</td>
<td>1 2 3 4 5</td>
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<td>Comments:</td>
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<tr>
<td>7.</td>
<td>I have a better understanding on how I can cue my child to speak and how to strengthen my child’s verbal behaviors using reinforcement.</td>
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<td></td>
<td>Comments:</td>
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<tr>
<td>8.</td>
<td>I doubt that the EMT strategies will be effective in promoting my child’s communication in the home.</td>
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<td></td>
<td>Comments:</td>
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<tbody>
<tr>
<td>9.</td>
<td>After the workshop, I will use EMT strategies in my family routines.</td>
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<td></td>
<td>Comments:</td>
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</thead>
<tbody>
<tr>
<td>10.</td>
<td>I would recommend other parents to this language promotion workshop.</td>
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<td></td>
<td>Comments:</td>
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</tbody>
</table>
Appendix H

Social Validity Questionnaire for Parent Implementation

Date: __________________________  Relationship to the child: ______________________

<table>
<thead>
<tr>
<th></th>
<th>Disagree ------------------- Agree</th>
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</thead>
<tbody>
<tr>
<td>1. The goals of the intervention in the home are acceptable and important to me.</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>Comments:</td>
<td></td>
</tr>
<tr>
<td>2. The person coaching me has shown respect for our family’s values and beliefs.</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>Comments:</td>
<td></td>
</tr>
<tr>
<td>3. The language-promotion strategies that I learned are effective at improving my child’s use of language in the home.</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>Comments:</td>
<td></td>
</tr>
<tr>
<td>4. The set-up checklist and implementation checklist are difficult to fill out and use effectively in our family routines.</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>Comments:</td>
<td></td>
</tr>
<tr>
<td>5. I find it easy to embed the EMT strategies (i.e., environmental arrangement, responsive interaction, prompting techniques) within my family routines.</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>Comments:</td>
<td></td>
</tr>
<tr>
<td>6. I am facing obstacles and need more support to implement the intervention at home.</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>Comments:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>The use of EMT strategies in my home has caused some unexpected problems in our family. Comments:</td>
</tr>
<tr>
<td>---</td>
<td>-------------------------------------------------------------------------------------------------</td>
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<tr>
<td></td>
<td>My child is now requesting, labelling, answering questions and responding to fill-in-the-blanks more often across family routines at home than before. Comments:</td>
</tr>
<tr>
<td></td>
<td>Overall, the strategies and procedures are effective in improving my child’s communication. Comments:</td>
</tr>
<tr>
<td></td>
<td>I would recommend other parents to use this language intervention. Comments:</td>
</tr>
</tbody>
</table>
# Appendix I

## Competency Self-Evaluation Questionnaire

Date: ____________________

**Relationship to the child:** ____________________

<table>
<thead>
<tr>
<th>EMT strategies</th>
<th>I do not understand why I use this strategy</th>
<th>I have a good understanding of why I use this strategy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental Arrangement</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Offering choice</td>
<td>Comments:</td>
<td></td>
</tr>
<tr>
<td>Pausing within a routine</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Waiting with cue</td>
<td>Comments:</td>
<td></td>
</tr>
<tr>
<td>Inadequate portions</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Assistance</td>
<td>Comments:</td>
<td></td>
</tr>
<tr>
<td>Responsive Interaction</td>
<td>I do not understand why I use this strategy</td>
<td>I have a good understanding of why I use this strategy</td>
</tr>
<tr>
<td>Notice &amp; respond</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Comments:</td>
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<td></td>
</tr>
<tr>
<td>Take turns</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Comments:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mirror &amp; map</td>
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<td>2</td>
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<tr>
<td>Comments:</td>
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</tr>
<tr>
<td>Expand</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Comments:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prompting Techniques</td>
<td>I do not understand why I use this strategy</td>
<td>I have a good understanding of why I use this strategy</td>
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<td>Time delay</td>
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<td>2</td>
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<tr>
<td>Comments:</td>
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<tr>
<td>Open-ended question</td>
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<td>2</td>
</tr>
<tr>
<td>Comments:</td>
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<td></td>
</tr>
<tr>
<td>Model</td>
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<td>2</td>
</tr>
<tr>
<td>Comments:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Use of natural R+/ Praise</td>
<td>1</td>
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</tr>
<tr>
<td>Comments:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EMT strategies</td>
<td>I do not feel confident using this strategy</td>
<td>I am confident that I am doing this strategy right</td>
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<td>--------------------------------------------------</td>
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<tr>
<td>Environmental Arrangement</td>
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<td>Offering choice</td>
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<td>2 3 4 5</td>
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<td>Pausing within a routine</td>
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<td>Waiting with cue</td>
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<td>2 3 4 5</td>
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<td>Inadequate portions</td>
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<td>2 3 4 5</td>
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<td>Responsive Interaction</td>
<td>I do not feel confident using this strategy</td>
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<td>Notice &amp; respond</td>
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<td>Take turns</td>
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<td>Mirror &amp; map</td>
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<td>2 3 4 5</td>
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<tr>
<td>Expand</td>
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<td>2 3 4 5</td>
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<tr>
<td>Prompting Techniques</td>
<td>I do not feel confident using this strategy</td>
<td>I am confident that I am doing this strategy right</td>
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<td>2 3 4 5</td>
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<tr>
<td>Open-ended question</td>
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<td>2 3 4 5</td>
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<tr>
<td>Model</td>
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<td>2 3 4 5</td>
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<tr>
<td>Use of natural R+/Praise</td>
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<td>2 3 4 5</td>
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<td>Comments:</td>
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## Appendix J

### Data Collection Form – Child Behaviour

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<th>Tact</th>
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<th>Echoic</th>
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Routine: ________________  
Occurrence = √; Non-occurrence = 0
# Data Collection Form – Parent Behaviour

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<th>pause within a routine</th>
<th>waiting with cue</th>
<th>inadequate portions</th>
<th>assistance</th>
<th>notice &amp; respond</th>
<th>takes turn</th>
<th>mirror &amp; map</th>
<th>expand</th>
<th>Time Delay</th>
<th>Open-ended question</th>
<th>Model</th>
<th>Provide R+</th>
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**Routine:**

**Occurrence = √; Non-occurrence = 0**